Investigación en sistemas de salud

Evidencias para avanzar el conocimiento y la toma de decisiones

Víctor Becerril Montekio
Editor

30 ciss



Instituto Nacional de Salud Pública

Investigación en sistemas de salud
Evidencia para avanzar el conocimiento y la toma de decisiones

ciss

Investigación en sistemas de salud.
Evidencias para avanzar el conocimiento y la toma de decisiones.

Primera edición, 2026

D.R. © Instituto Nacional de Salud Pública
Av. Universidad 655, colonia Santa María Ahuacatitlán
62100 Cuernavaca, Morelos, México

ISBN: 978-607-511-257-2

Coordinación: Carlos Oropeza
Edición: Francisco Reveles, Ana Tlapale, Elizabeth Pérez Trigo
Diseño: Juan Pablo Luna
Portada: Andrea Montiel

Citación sugerida: Becerril Montekio V (editor). Investigación en sistemas de salud. Evidencias para avanzar el conocimiento y la toma de decisiones. Cuernavaca: Instituto Nacional de Salud Pública, 2026.

Hecho en México
Made in Mexico

Víctor Becerril Montekio
Editor

Coordinadores de capítulos

María Cecilia González Robledo y Víctor Becerril Montekio
1. Estructura y reforma de los sistemas de salud

Emanuel Orozco Núñez
2. Políticas y gobernanza en salud

Ileana Heredia Pi y Leticia Ávila Burgos
3. Financiamiento y protección financiera

Jacqueline Alcalde Rabanal y Víctor Becerril Montekio
4. Recursos humanos para la salud

Anahí Dreser Mansilla y Hortensia Reyes Morales
5. Medicamentos en salud pública: acceso, utilización y políticas

Ileana Heredia Pi
6. Equidad en el acceso a los servicios de salud

Ileana Heredia Pi y Hortensia Reyes Morales
7. El camino hacia la atención primaria de salud

Blanca Pelcastre Villafuerte y Sergio Meneses Navarro
8. Salud de las poblaciones indígenas

Belkis Aracena Genao, César Infante Xibille, René Leyva Flores y Tonatiuh González Vázquez
9. Migración y salud

Elisa Hidalgo Solórzano, Martha Hijar, Rosario Valdez Santiago
10. Prevención de lesiones y violencia: una línea estratégica en el CISS

Jacqueline Alcalde Rabanal
11. Evaluación de políticas y programas

Contenido

8 Presentación

Capítulo 1. Estructura y reforma de los sistemas de salud

10 **Presentación**
11 Segmentation and fragmentation of health systems and the quest for universal health coverage: conceptual clarifications from the Mexican case
22 Origin, impacts, and potential solutions to the fragmentation of the Mexican health system: a consultation with key actors
30 Análisis y reflexiones sobre la iniciativa de reforma a la Ley General de Salud de México 2019
37 Breast cancer policy in Latin America: account of achievements and challenges in five countries
48 Political economy of pursuing the expansion of social protection in health in Mexico

Capítulo 2. Políticas y gobernanza en salud

58 **Presentación**
59 Challenges to the development of taxation policies for sugar-sweetened beverages in Colombia
68 Stakeholder analysis of the deliberation of an increase to the excise tax on sweetened beverages in Mexico
76 The influence of the sugar-sweetened beverage industry on public policies in Mexico
84 Qualitative analysis of governance trends after health system reforms in Latin America: lessons from Mexico
91 Mapeo político de la discriminación y homofobia asociadas con la epidemia de VIH en México

Capítulo 3. Financiamiento y protección financiera

98 **Presentación**
100 Inequitable financial protection in health for indigenous populations: the Mexican case
111 A gender-based and quasi-experimental study of the catastrophic and impoverishing health-care expenditures in Mexican households with elderly members, 2000-2020
128 Equity in out-of-pocket health expenditure: evidence from a health insurance program reform in Mexico
141 Financing maternal health and family planning: are we on the right track? Evidence from the reproductive health Subaccounts in Mexico, 2003-2012
156 Heterogeneous effects of health insurance on out-of-pocket expenditure on medicines in Mexico

Capítulo 4. Recursos humanos para la salud

167 **Presentación**
168 Exploración de facilitadores y barreras para implementar los roles ampliados de enfermería en México
176 Trabajadoras comunitarias de salud: experiencias en el abordaje de la salud mental en zonas rurales de Chiapas
186 Gender inequality in the health workforce in the midst of achieving universal health coverage in Mexico
199 Factores socioeconómicos y desigualdad en la distribución de médicos y enfermeras en México
211 Condiciones de trabajo en consultorios adyacentes a farmacias privadas en Ciudad de México: perspectiva del personal médico

Capítulo 5. Medicamentos en salud púbica: acceso, utilización y políticas

218 **Presentación**

219 Progress and challenges in the implementation of antimicrobial stewardship programs in 50 hospitals in Mexico

230 Challenges of guaranteeing access to medicines in Mexico: lessons from recent changes in pharmaceuticals procurement

241 Potentially inappropriate prescribing to older adults in ambulatory care: prevalence and associated patient conditions

250 Access to medicines by Seguro Popular beneficiaries: pending tasks towards universal health coverage

263 Impact of over-the-counter restrictions on antibiotic consumption in Brazil and Mexico

Capítulo 6. Equidad en el acceso a los servicios de salud

269 **Presentación**

271 The gender gap in outpatient care for non-communicable diseases in Mexico between 2006 and 2022

287 Desigualdades en el acceso a servicios, base de las políticas para la reducción de la brecha en salud

295 Loss of job-related right to healthcare associated with employment turnover: challenges for the Mexican health system

306 Measuring the adequacy of antenatal health care: a national cross-sectional study in Mexico

316 Brechas en la cobertura de atención continua del embarazo y el parto en México

Capítulo 7. El camino hacia la atención primaria de salud

326 **Presentación**

327 La atención primaria como eje del sistema nacional de salud

333 Local health systems resilience in managing the Covid-19 pandemic: lessons from Mexico

350 Tackling maternal mortality by improving technical efficiency in the production of primary health services: longitudinal evidence from the Mexican case

365 The gap in human resources to deliver the guaranteed package of prevention and health promotion services at urban and rural primary care facilities in Mexico

376 Primary health care utilization by the Mexican indigenous population: the role of the Seguro Popular in socially inequitable contexts

Capítulo 8. Salud de las poblaciones indígenas

382 **Presentación**

384 Ethnic and racial discrimination in maternal health care in Mexico: a neglected challenge in the search for universal health coverage

401 Innovación pedagógica para mejorar la calidad del trato en la atención de la salud de mujeres indígenas

410 Condiciones de salud y uso de servicios en pueblos indígenas de México

420 Aging in rural, indigenous communities: an intercultural and participatory healthcare approach in Mexico

442 Prevalence and severity of intimate partner violence in women living in eight indigenous regions of Mexico

Capítulo 9. Migración y salud

449 **Presentación**

450 Ten-year hospitalization trends in Mexico: examining the profile of national and transient and migrants

458 Access to health care for migrants along the Mexico-United States border: applying a framework to assess barriers to care in Mexico

468 ¿El cierre de fronteras y el control de la Covid-19? El caso de Centroamérica y México

489 A window into mental health: developing and pilot-testing a mental health promotion intervention for Mexican immigrants through the Ventanilla de Salud program

500 Migrants in transit through Mexico to the US: experiences with violence and related factors, 2009-2015

Capítulo 10. Prevención de lesiones y violencia: una línea estratégica en el CISS

516 **Presentación**

517 Comparison of suicide attempts among nationally representative samples of Mexican adolescents 12 months before and after the outbreak of the Covid-19 pandemic

521 Obstetric violence criminalised in Mexico: a comparative analysis of hospital complaints filed with the Medical Arbitration Commission

529 Impact of Mexican road safety strategies implemented in the context of the UN's Decade of Action

544 Adherencia terapéutica a programas de reeducación para mujeres y hombres en relaciones de pareja violentas

554 El estado de las lesiones causadas por el tránsito en México: evidencias para fortalecer la estrategia mexicana de seguridad vial

Capítulo 11. Evaluación de políticas y programas

569 **Presentación**

571 Evaluation of health promotion program at the community level in Mexico: is the program efficient and effective?

580 An assessment of the performance of the Mexican health system between 2000 and 2018

592 Delaying sexual onset: outcome of a comprehensive sexuality education initiative for adolescents in public schools

601 Impact of an intervention for reducing waste through educational strategy: a Mexican case study, what works, and why?

614 Dissonant health transition in the states of Mexico, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013

Presentación

Los sistemas de salud representan un eje fundamental de la estructura y organización de los países, como pilares para el logro del bienestar de la población. Por ser uno de los determinantes sociales de la salud, su desempeño es crucial en el difícil camino hacia la equidad y la cobertura universal.

La investigación en sistemas de salud es fundamental en la búsqueda de mecanismos que permitan el diseño e implementación de políticas para dar respuesta a las necesidades de salud de la población bajo su responsabilidad. Dada la complejidad del sistema de salud y en tanto disciplina esencial en el campo de la salud pública, ésta representa un enorme valor para la generación de conocimiento basado en un enfoque multidisciplinario, mediante el trabajo de distintas perspectivas conceptuales y metodológicas y con vías novedosas de análisis. Desde esta perspectiva integradora, la investigación en sistemas de salud desarrolla estrategias innovadoras que permiten la transferencia de sus resultados para el fortalecimiento del propio sistema, de los servicios de salud que lo conforman, y el empoderamiento de las personas para la mejora de sus condiciones de salud.

Desde su creación en el año de 1995, el Centro de Investigación en Sistemas de Salud (CISS) del Instituto Nacional de Salud Pública (INSP) ha asumido la responsabilidad de generar evidencia científica relevante como sustento de la toma de decisiones para el fortalecimiento de las funciones del sistema de salud, principalmente en México, desde un trabajo interdisciplinario a nivel local, nacional, regional y global. Para lograrlo, el CISS está integrado por 36 investigadoras e investigadores organizados en grupos de investigación que desarrollan proyectos en las distintas áreas del campo de los sistemas de salud, participan en la formación de estudiantes de maestría y doctorado en ciencias en sistemas y políticas de salud, así como en el campo de salud pública en las áreas de administración y promoción de la salud.

Para conmemorar el 30 aniversario de la fundación del CISS, la comunidad de investigadoras e investigadores del Centro presenta en esta obra una selección de artículos de la producción científica entre 2011 y 2025. En este periodo, el CISS publicó 1 226 productos científicos, de los cuales 917 son artículos, 250 capítulos de libro y 59 libros. La selección de los artículos se agrupa en once grandes temas del campo de los sistemas de salud estudiados en este periodo: 1) estructura y reforma de los sistemas de salud, 2) políticas y

gobernanza, 3) financiamiento y protección financiera, 4) recursos humanos para la salud, 5) medicamentos en salud pública, 6) equidad en el acceso a servicios de salud, 7) atención primaria, 8) salud de los pueblos indígenas, 9) migración y salud, 10) prevención de accidentes y violencia, 11) evaluación de programas.

La publicación de este libro conmemorativo representa un reconocimiento a la aportación de la comunidad de investigación del CISS en el periodo 2011-2025. Es un privilegio y un orgullo presentar este trabajo, como una muestra de la consolidación de nuestro Centro como referente nacional y regional en la generación de conocimiento en el campo de los sistemas de salud desde el INSP.

Hortensia Reyes Morales
Directora, Centro de Investigación en Sistemas de Salud
Instituto Nacional de Salud Pública
Noviembre de 2025

Capítulo 1.
Estructura y reforma de los sistemas de salud

En tanto que "sistemas vivos", los sistemas de salud están siempre inmersos en procesos de transformación. En ocasiones, esos procesos siguen o están precedidos de esfuerzos deliberados por comprender los mecanismos e interrelaciones inherentes al sistema. Algunas veces, cuesta trabajo identificar un planteamiento sólido y bien fundamentado para ciertos cambios. En todos los casos, alguna visión o propuesta de organización social subyace a las propuestas y modificaciones reales. Comprender tanto las reformas sólidamente sustentadas e informadas por evidencias derivadas de la investigación científica, como ciertos cambios relativamente desarticulados cuyo soporte pareciera ser principalmente ideológico, es esencial para aportar conocimiento nuevo que permita sustentar propuestas de mejora del sistema.

En este capítulo, reunimos cinco artículos del vasto acervo de estudios realizados en el CISS entre 2015 y 2025 abocados a desentrañar aspectos clave del proceso de adaptación, mejoramiento y, eventualmente, reformas sistematizadas de los sistemas de salud. Dos de ellos hacen sugerentes aportaciones teóricas y proponen respuestas prácticas para profundizar en la comprensión del fundamento histórico y las implicaciones de la estructura segmentada y fragmentada de nuestro sistema de salud (Becerril, 2024; Gómez, 2023). El tercero presenta un análisis y reflexiones en torno a los cambios propuestos para la Ley General de Salud de México en 2019 a raíz del cambio de gobierno (Reyes-Morales, 2019). Uno más da cuenta de la evolución de las políticas destinadas a responder al incremento de la prevalencia del cáncer de mama en cinco países de América Latina (Nigenda, 2016). Y el quinto se centra en el análisis de lo que en su texto se describe como la economía política del proceso de reforma del sistema iniciado en México en 2003 a fin de brindar protección financiera a la población y avanzar hacia la cobertura universal en salud (Gómez-Dantés, 2015).

Journal of Public Health Policy
https://doi.org/10.1057/s41271-024-00470-9

VIEWPOINT

Segmentation and fragmentation of health systems and the quest for universal health coverage: conceptual clarifications from the Mexican case

Víctor Becerril-Montekio[1] · Sergio Meneses-Navarro[1,2] · Blanca Estela Pelcastre-Villafuerte[1] · Edson Serván-Mori[1]

Accepted: 9 January 2024
© The Author(s), under exclusive licence to Springer Nature Limited 2024

Abstract

Health systems are complex entities. The Mexican health system includes the private and public sectors, and subsystems that target different populations based on corporatist criteria. Lack of unity and its consequences can be better understood using two concepts, *segmentation* and *fragmentation*. These reveal mechanisms and strategies that impede progress toward universality and equity in Mexico and other low- and middle-income countries. *Segmentation* refers to separation of the population by position in the labour market. *Fragmentation* refers to institutions, and to financial aspects, health care levels, states' systems of care, and organizational models. These elements explain inequitable allocation of resources and packages of health services offered by each institution to its population. Overcoming *segmentation* will require a shift from employment to citizenship as the basis for eligibility for public health care. Shortcomings of *fragmentation* can be avoided by establishing a common package of guaranteed benefits. Mexico illustrates how these two concepts characterize a common reality in low- and middle-income countries.

Keywords Health systems · Public health systems research · Health systems plans · Healthcare financing · Health services · Universal health coverage · Mexico

✉ Sergio Meneses-Navarro
smenesesnavarro@gmail.com

[1] Centre for Health Systems Research/National Institute of Public Health, Cuernavaca, Morelos, Mexico

[2] National Council of Humanities, Sciences and Technology/National Institute of Public Health, Cuernavaca, Morelos, Mexico

Published online: 07 February 2024

Key messages

- Although segmentation and fragmentation are used synonymously in analyses of health systems, they refer to specific characteristics that need to be clarified for a thorough understanding of the design and functioning of health systems around the world.
- *Segmentation* refers to separation of the population by position in the labour market. *Fragmentation* refers to institutions, and to financial aspects, health care levels, states' systems of care, and organizational models.
- Overcoming *segmentation* depends on establishing citizenship as basis of eligibility for public health care. States can avoid shortcomings of *fragmentation* by establishing a common package of guaranteed benefits.

Introduction

Incredible as it may seem, we must insist repeatedly that health systems become precisely that *systems*: organised sets of components and relationships that interact. They are part of larger systems, the societies in, and for which they operate. Each health system exists among and interacts with other social systems: an education system, a political system, an organization of labour and the labour market, a communication system, and a transportation system, among others. Health systems encompass subsystems characterized by numerous and multidirectional interrelationships [1]. Health systems are complex entities governed by non-linear interaction laws, self-organization, and emergent phenomena [2].

As do several other health systems in the world, and particularly those in Latin American and Caribbean (LAC) countries, the architecture of the health system of Mexico includes a diversity of organizational modalities or subsystems that go beyond the basic division between the private and public health sectors [3, 4]. In Mexico, these organizational modalities include three main traits:

- each targets different populations according to elemental corporatist eligibility criteria linked to the private and public sectors of the formal economy,
- each has heterogeneous forms of financing, and
- each includes different portfolios of services [5].

Each has somewhat different forms of subnational governance. Since the start of their modern development in 1940s, these differences have led to a lack of unity in most LAC health systems, including that of Mexico [6]. Disunity, the central feature, makes it difficult to understand or to build a coherent national health system capable of providing effective universal health coverage (UHC) and of responding to the health needs of the entire population in an equitable manner [7].

There is consensus among analysts that Mexico's public health system is an *unarticulated system* [8, 9], one that lacks unity in several dimensions. Improving clarity about what this means can help us understand the multiple breakdowns of the Mexican health system and help us try to remedy them. We use two concepts related to lack of unity that can guide health policy and may also be useful politically: *segmentation* and *fragmentation* [7, 9–14]. As will be noted below, this distinction is necessary to clarify political standpoints—with their implicit approaches, values, and principles—on how to achieve UHC. To date the literature does not reflect sufficient understanding of the concepts and their potential utility.

Thus, this viewpoint discusses the utility of the concepts of segmentation and fragmentation to understand and distinguish the most relevant aspects of the lack of unity of the Mexican public health system and to advance some ideas about how to progress towards a more democratic health system and UHC.

Segmentation and fragmentation: conceptual clarifications

Contrary to generally accepted interpretations [16, 17], segmentation and fragmentation are not synonyms. Each can be used to describe relevant and distinct traits of a health system, particularly the public sector of the Mexican health system, as well as that of other low-and-middle-income countries [16]. The online Oxford Learners' Dictionary defines fragmentation as "the act or process of breaking or making something into small pieces or parts" [17]. Although like the definition of segmentation: "the act of dividing something into different parts" [17], certain nuances come into light when we consider the examples of how each can be used: "…the fragmentation of the country into small independent states" [8], and "…the segmentation of social classes" [9].

The dictionary led us to the corresponding nouns: *fragment* and *segment*. A fragment is "a small part of something that has broken off or comes from something larger" [18]; a segment is "a part that is *separate from other* parts or can be considered separately" [19]. Both are "parts" of something larger, but the fragment is related to some sort of accident, it "has broken off", while the segment "can be considered separately" even though it remains as an unbroken part of the whole. Thus, segmentation points to an effort or intention, mentally or conceptually, to separate something into different parts to understand it, but these parts are not isolated. Following suggestions in the online Oxford Learners' Dictionary, we searched for the lists of synonyms for fragmentation and segmentation on Thesaurus.com only to find that the list of 38 synonyms for segmentation does not include the word fragmentation [20]. The much shorter list of four synonyms for fragmentation includes only dissolution, decentralization, demoralization, and putrefaction [21]. The list of synonyms for fragment includes 28 terms, none of which is segment [22]. The 15 synonyms for segment do not include fragment [23].

To better understand each concept, we looked at their application to economics. A similar search to the one described above, using the online dictionary of the *Real Academia de la Lengua Española*, gave us a definition for "market segment": *Cada*

uno de los grupos homogéneos diferenciados a los que se dirige la política comercial de una empresa (Each of the differentiated homogeneous groups targeted by a company's commercial policy) [24]. Our search for English language definitions of segmentation directed us to the website of *The Economic Times*, where we found something quite similar [25]:

> Segmentation means to divide the marketplace into parts, or segments, which are definable, accessible, actionable, and profitable and have a growth potential. In other words, a company would find it impossible to target the entire market, because of time, cost, and effort restrictions. It needs to have a 'definable' segment - a mass of people who can be identified and targeted with reasonable effort, cost, and time.

Why refer to definitions of segmentation related to economics and the working of markets? Health systems are influenced by economic and political factors—for example, the relationships among employers, employees, and unions—but first and foremost health is an absolute social value and a human right. In this sense, health systems are vehicles for protecting this social value and human right. This is why we argue there is a need to differentiate and discern what each tells us about health systems in general, and the unarticulated Mexican health system. This health system not only lacks unity, but it also demonstrates multiple kinds of ruptures. We need to clarify these to open a path for shaping new policies and support the political struggle they imply. Without these distinctions we will still be far from attaining UHC.

Before deepening the analysis to address the implications of segmentation in the Mexican health system, let us reconsider the differences between "…the fragmentation of the country into small independent states" [8], and "…the segmentation of social classes" [9]. Fragmentation of a country into independent states does not convey any sense of qualification, degree, status level nor any other difference among the states as fragments of a federally organized nation. In contrast, the distinction of social classes implies socially qualified categories, income levels or other characteristics that convey the notion of more and less favoured populations. It implies the existence of populations with *different levels of access to all kinds of goods and services*. Thus, segmentation is a concept particularly useful to understand market dynamics as well as social classes. It is, therefore, a good tool to support a socioeconomic analysis, and other structural considerations such as discrimination based on occupational status or any other social criteria.

Segmentation of the Mexican health system

Starting with the creation of the *Instituto Mexicano del Seguro Social* (Mexican Social Security Institute) (IMSS) in 1943, and 20 years later with that of the *Instituto de Seguridad y Servicios Sociales para los Trabajadores del Estado* (State's Workers Security and Social Services Institute) (ISSSTE), Mexico established a clear distinction between two different kinds of citizens. First, Mexico accommodated those directly or indirectly linked to the formal economy because they (or the head of their household) had a place in the labour market and were employed in a

registered private company or a public institution. The rest of the population consisted of people who were unemployed, self-employed, or working in the informal economy. According to data from the National Occupation and Employment Survey (Encuesta Nacional de Ocupación y Empleo) during March 2023, 45.5% of the employed population (59 million) worked in the formal sector (26.5 million); the remaining 54.5% (slightly more than 32 million) worked in the informal sector [26].

Segmentation refers to separation of the population according to their positions in the labour market. The definition provided by *The Economic Times* helps us to see that Mexico created two "definable segments" of the population, one being: "people who can be identified and targeted with reasonable effort, cost and time". But it is the State, not a private company, that struggles to organize a certain kind of services particularly relevant for the development of the nation: health care for the working class. Because a large part of the working class has been, and remains excluded from the formal economy, they are underserved. Those served include only workers who participate in organized groups—mainly unions—with political and economic power. It is for these particular social groups organized in corporations that the State created social security institutions for their health care—among other social benefits. This history laid the foundation for segmentation [27].

Starting from this essential segmentation, Mexico created other segments over time. Corporativist criteria led the second-degree segmentation process: employment in the public or the private sector; or a particular public institution whose workers are forcefully affiliated with its specific union; or in different areas of the economic activity and, therefore, in their related unions [27, 28]. The first and most obvious corporativist second-degree segmentation is between workers in the private sector and employees of public institutions. After Mexico established this distinction, it rapidly created several others inside the public employees' segment: separating workers for the government (ISSSTE), the army (SEDENA) and the marine (MARINA) forces. The most privileged employees work for a publicly owned institution: the Mexican oil company *Petróleos Mexicanos* (PEMEX).

The term segmentation is very useful to distinguish those employed in the formal economy and benefiting from the social security, from those who earn a living outside the formal economy and are not entitled to social security. A secondary segmentation appeared between people employed in the public and private sectors of the formal economy. Then, a third segmentation inside the public sector separated public servants in different institutions or regions. Segmentation is a term related to the labour characteristics of the population.

Fragmentation of the Mexican health system

We have identified five areas of fragmentation of the Mexican health system. Financial fragmentation is the subject of important analyses of several LAC health systems that generally encompass other closely related domains of a health system [15]. Financial fragmentation includes collecting, pooling, and purchasing functions. This results in a diversity of sources of resources to pay for health care and other health system functions, with a higher proportion of out-of-pocket spending, concentration

in various dispersed funds that limit risk aggregation, and leads to inefficiencies, duplication, and the persistence of inequities [9]. Fragmentation also increases the propensity of catastrophic health expenditure [29]. Other aspects of the lack of unity also characterize the Mexican public health system. Each point towards different practical implications: (a) fragmentation of the institutions, (b) fragmentation of levels of health care, (c) fragmentation of the states' systems of health care, and (d) fragmentation of health care organization models.

Fragmentation of the institutions

The Mexican public health sector includes, or is formed by, several institutions. Those that provide health care to the population entitled to benefit from the social security include IMSS, ISSSTE, SEDENA, MARINA and PEMEX. Several other institutions are responsible for providing health care to the population that is not eligible for social security: the federal secretariat of health, the 32 states' secretariats of health, and IMSS-Bienestar [30]. The most important characteristic of all these institutions is that each is relatively autonomous regarding: (a) governance and administration; (b) explicit definition of priorities, programs, and strategies; (c) internal and external coordination, regulation of health care, as well as of sources, level of funds to finance their operations, and (d) design by each of a portfolio of health services. There is no relationship among these institutions to ensure their convergence to guarantee integration of the health care they provide to their enrollees into a continuum of care or the provision of a homogenous package of services including a uniform pricing system [31, 32].

Fragmentation of healthcare levels

Provision of services is fragmented by three levels of care. Patient referral mechanisms from one level to another are sometimes not explicit and usually lack elements such as adequate transportation or portable electronic files to ensure transfer of patients with sufficient information to guarantee the continuity of care, not to mention portability among health care institutions [32].

Fragmentation of the states' health care systems

Although currently under revision, decentralization of the national health system launched in 1982 led to the existence of 32 subnational health systems that have no clear nor homogenous mechanisms for cross-system provision and financing of care. Even if IMSS and ISSSTE have legal mechanisms for cross-billing of services, and some agreements have been tested for interinstitutional care of some health conditions such as obstetric emergencies, their scope is limited, and their use is infrequent [32].

Fragmentation of healthcare organization models

Fragmentation is also present due to numerous health care organization models with differing degrees of government control over service provider organizations and eligibility criteria for participation [33]. The social security model, based on the beneficiary's employment status, has a high degree of state control over its institutions. The public assistance care system, where eligibility criteria target social groups on the basis of vulnerability, depends on state welfare action.

Towards a better articulation of the Mexican healthcare system

In 1984, the Mexican Congress approved the establishment of the right to health (Article 4 of the Constitution). This was a most relevant step towards elimination of segmentation. It also eliminated the word "assistance" from the name of the ministry of health, called Secretaría de Salud (Health Secretariat) afterward. Since that time, it has been responsible for steering the entire health system towards attaining UHC.

Some reforms have been followed by regression. In 2019, the Congress amended Article 4 of the Constitution to establish a "welfare health system" aimed at people excluded from social security, contradictorily reinforcing the structural segmentation of the health system [14]. Instead, the goal should be to establish a universal health system that guarantees all citizens comprehensive, quality services, without discrimination based on employment status. In other words, a health system, in which contributions and benefits are distributed equitably. This is an ongoing challenge for most LAC countries as well as for other low- and middle-income countries in the world [14, 15, 34].

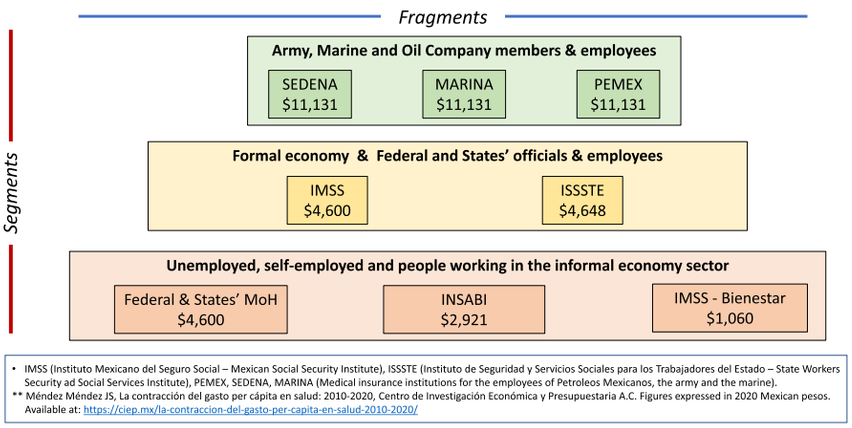


Fig. 1 Segmentation of populations, fragmentation of institutions and *per capita* expenditures in the Mexican public sector health system, 2020. *Source* based on Meneses-Navarro et al. [14]

The Mexican public health system today is still characterized by the segmentation of the population along with fragmentation of the public institutions devoted to health. These two concepts overlap, while their specificities define characteristics of the whole health system (Fig. 1). We can visualize a horizontal and almost pyramidal division of the population depending on the place held by the head of the household in the labour market: segmentation. This division defines the content and quality of the health care to which they are entitled. We also depict a complementary vertical separation of independent institutions responsible for each segment: fragmentation. Most important is the inequitable allocation of resources that each institution dedicates to the care of its assigned population segment. As noted above, this depends on corporatist criteria (Fig. 1).

According to the 2020 Population and Housing Census (Censo de Población y Vivienda) [35], of the total population (125.3 million people), 44.9% self-reported belonging to only one of the two segments of social security, and 51.9% declared belonging exclusively to the portion of the population with no social security (out of which 56.1% registered with Seguro Popular and/or INSABI and 43.9% had no health insurance), and 2.3% had some form of private insurance. Finally, in all data recorded, only 0.9% population reported health insurance enrolment in more than one of the schemes. Data from the public accounts and the federal budget show relative homogeneity in the funds assigned to the social security segments and a clear gap between these and the *per capita* expense allotted to the segments without social security (Fig. 1).

To overcome segmentation, the first step needs to be creation of a legal framework that specifies that the basis of eligibility for public health services is citizenship—not a corporatist criterion that is inherently discriminatory. Moving in this direction can be aided by establishing an equitable financial mechanism, preferably based on general taxation, and a common fund where resources are pooled, and risks are shared. Simultaneously, it will be essential to establish a common package of guaranteed benefits, to increase gradually. This implies a profound redesign of every function of the health system; that discussion exceeds the scope of this Viewpoint.

Fragmentation is not necessarily problematic if the State assures equitable packages of health services and articulation of activities performed by the different institutions. The main task for overcoming problems associated with fragmentation is strengthening the State's capacity to manage the entire health system regardless of which or how many institutions are involved, the levels of care, or how decentralized. The key is for the system—to function as a system: a single integrated and articulated one that guarantees prompt and continuous care for each user.

Segmentation and fragmentation of the public sector of the Mexican health system situation is shared to some extent by other countries, including Argentina [36], Guatemala [37], Honduras [38], Nicaragua [39], Perú [40], Dominican Republic [41], and El Salvador [42], among others. The distinction is not just a matter of academic or intellectual precision. Understanding this can guide policy development.

Fragmentation by itself is not an obstacle to UHC and equitable health service provision. Nor the existence of numerous institutions necessarily create a problem. Instead, it is allocation of resources, portability based on sharing of information about organizations and the people, and the content of health services packages that

can make the system work- articulately. In a country where only 45% of workers participate in the formal economy [26] problems linked to continuous and large-scale mobility of labour between the formal and informal sectors of the economy will never be solved without a fundamental change to include all citizens more equitably in the social security schemes. Any effort to advance towards UHC must start to eliminate the segmentation of corporatist groups.

Solving segmentation implies integrating the whole population, with citizenship as the basic principle for eligibility for health protection, and, ideally, all other benefits of social security. The aim is to guarantee access, quality, and continuity of health care for all in an equitable manner and with a people-focused approach. We need to create political consensus and to build a medium- and long-term vision of the state based on the citizens' right not just to some kind of health care, but to relatively equality in allocation of health-related goods, services, and the life opportunities they promote. In this task, public health research and practice will provide the basis to build equitable and universal health systems.

Conclusions

With all the particularities presented in this paper, the Mexican example may be useful for a wide perspective, because two the concepts describe a reality that is similar in many ways for low- and middle-income countries in LAC, and some in Asia. The need to change to more universal, equitable systems is urgent. Although there may be positive aspects of fragmentation, such as encouraging competition among the different institutions to attract their clientele by offering better egalitarian packages of health services, quality standards must be regulated by the State. In any case, it is still necessary to advance research that will ensure the application of the most adequate ways to democratically achieve UHC.

References

1. Adam T, De Savigny D. Systems thinking for strengthening health systems in LMICs: need for a paradigm shift. Health Policy Plan. 2012;27(Suppl. 4):2006–8.
2. Lipsitz LA. Understanding health care as a complex system: the foundation for unintended consequences. JAMA. 2012;308(3):243–4.
3. Londoño JL, Frenk J. Pluralismo estructurado: Hacia un modelo innovador para la reforma de los sistemas de salud en América Latina, No 353. Inter-American Development Bank, Office of the Chief Economist; 1997. pp. 1–32.
4. Frenk J, Gómez-Dantés O. Health systems in Latin America: the search for universal health coverage. Arch Med Res. 2018;49(2):79–83.
5. Field MG. The concept of the "health system" at the macrosociological level. Soc Sci Med. 1973;7(10):763–85.
6. Gómez-Dantés O, Sesma S, Becerril VM, Knaul FM, Arreola H, Frenk J. Sistema de salud de México, vol. 53. Salud Publica de Mexico; 2011.
7. Gómez-Dantés O, Flamand L, Cerecero-García D, Morales-Vazquez M, Serván-Mori E. Origin, impacts, and potential solutions to the fragmentation of the Mexican health system: a consultation with key actors. Health Res Policy Syst. 2023;21(1):80.

8. Frenk J, Gómez-Dantés O. Para entender el sistema de salud de México. México: Nostra Ediciones; 2008.
9. Stange KC. The problem of fragmentation and the need for integrative solutions. Ann Fam Med. 2009;7(2):100–3.
10. Chong JL, Lim KK, Matchar DB. Population segmentation based on healthcare needs: a systematic review. Syst Rev. 2019;8(1):202.
11. Bernales-Baksai P. Tackling segmentation to advance universal health coverage: analysis of policy architectures of health care in Chile and Uruguay. Int J Equity Health. 2020;19(1):106.
12. Dureab F, Hussain T, Sheikh R, Al-Dheeb N, Al-Awlaqi S, Jahn A. Forms of health system fragmentation during conflict: the case of Yemen. Front Public Health. 2021;9: 659980.
13. Siqueira M, Coube M, Millett C, Rocha R, Hone T. The impacts of health systems financing fragmentation in low- and middle-income countries: a systematic review protocol. Syst Rev. 2021;10(1):164.
14. Meneses Navarro S, Pelcastre-Villafuerte BE, Becerril-Montekio V, Serván-Mori E. Overcoming the health systems' segmentation to achieve universal health coverage in Mexico. Int J Health Plan Manag. 2022;37(6):3357–64.
15. Bossert T, Blanchet N, Sheetz S, Pinto D, Cali J, Cuevas RP. Comparative review of health system integration in selected countries in Latin America. Inter-American Development Bank; 2014.
16. Atun R, de Andrade LOM, Almeida G, Cotlear D, Dmytraczenko T, Frenz P, et al. Health-system reform and universal health coverage in Latin America. Lancet. 2015;385(9974):1230–47.
17. Oxford University Press. Definition, pictures, pronunciation and usage notes | Oxford Advanced Learner's Dictionary at OxfordLearnersDictionaries.com. Oxford University Press; 2019 (cited 1 Feb 2023). https://www.oxfordlearnersdictionaries.com/us/definition/english/segmentation?q=segmentation.
18. Hutson DJ. Definition, pictures, pronunciation and usage notes | Oxford Advanced Learner's Dictionary at OxfordLearnersDictionaries.com. Oxford University Press; 2019 (cited 1 Feb 2023). https://www.oxfordlearnersdictionaries.com/us/definition/english/fragment_1?q=fragment
19. Segment_1 noun—definition, pictures, pronunciation and usage notes | Oxford Advanced Learner's Dictionary at OxfordLearnersDictionaries.com (cited 1 Feb 2023). https://www.oxfordlearnersdictionaries.com/us/definition/english/segment_1?q=segment.
20. SEGMENTATION synonyms: 100 synonyms and antonyms for SEGMENTATION | Thesaurus.com (cited 1 Feb 2023). https://www.thesaurus.com/browse/segmentation.
21. FRAGMENTATION synonyms: 25 synonyms and antonyms for FRAGMENTATION | Thesaurus.com (cited 10 Feb 2023). https://www.thesaurus.com/browse/fragmentation.
22. FRAGMENT synonyms: 53 synonyms and antonyms for FRAGMENT | Thesaurus.com (cited 1 Feb 2023). https://www.thesaurus.com/browse/fragment.
23. SEGMENT synonyms: 16 synonyms and antonyms for SEGMENT | Thesaurus.com (cited 1 Feb 2023). https://www.thesaurus.com/browse/segment.
24. segmento | Definición | Diccionario de la lengua española | RAE - ASALE (cited 1 Feb 2023). https://dle.rae.es/segmento?m=form.
25. Bennett C. What is ? Definition of meaning. Econ Times. 2021 (cited 1 Feb 2023). https://economictimes.indiatimes.com/definition/segmentation.
26. Indicadores De Ocup Ación Y Empleo 1 Octubre De 2022 Próxima publicación: 28 de diciembre.
27. El G-B. Seguro Social: evolución histórica, crisis y perspectivas de reforma. Mexico: Universidad Anáhuac; 2018.
28. Bernal García F. Corporativismo y Fascismo. Los sistemas de relaciones laborales autoritarios en la Europa de entreguerras. HISPANIA NOVA Primera Revista de Historia Contemporánea on-line en castellano Segunda Época. 2017.
29. Knaul FM, Wong R, Arreola-Ornelas H, Méndez O. Household catastrophic health expenditures: a comparative analysis of twelve Latin American and Caribbean Countries. Salud Publica Mex. 2011;53(supl2):S85-95.
30. Diario Oficial de la Federación 29 de noviembre. Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley General de Salud y de la Ley de los Institutos Nacionales de Salud. México: Diario Oficial de la Federación; 2019.
31. Gutiérrez-Alba G, González-Block MÁ, Reyes-Morales H. Challenges in the implementation of clinical practice guidelines in major public health institutions in Mexico: a multiple case study. Salud Publica Mex. 2015;57(6):547–54.

32. Ramírez Rojas MG, Freyermuth-Enciso MG. Monitoreo al Convenio General de Colaboración Interinstitucional para la Atención de la Emergencia Obstétrica, 2011. Rev CONAMED. 2012;Supl 1:16–22.
33. Frenk J. La salud de la población. México: Fondo de Cultura Económica; 1993.
34. Maceira D. América Latina y el Caribe. Equidad y calidad frente al desafío de la segmentación. Rev Salud Pública. 2022;24(1):1–8.
35. INEGI. Censo de Población y Vivienda 2020, vol. 2020. pp. 22–4 (cited 28 March 2023). https://www.inegi.org.mx/programas/ccpv/2020/.
36. Belló M, Becerril-Montekio VM. The health system of Argentina. Salud Publica Mex. 2011;53(SUPPL. 2):s96–108.
37. Becerril-Montekio V, López-Dávila L. The health system of Guatemala. Salud Publica Mex. 2011;53(SUPPL. 2):s197–208.
38. Bermúdez-Madriz J, Sáenz M, Muiser J. Sistema de salud de Honduras. Salud Pública Mex. 2011;53(Supl):S209–19.
39. Muiser J, del Sáenz MR, Bermúdez JL. Sistema de salud de Nicaragua. Salud Pública Mex. 2011;53(Supl 2):S233–42.
40. Alcalde-Rabanal JE, Lazo-González O, Nigenda G. Sistema de salud de Perú. Salud Pública Mex. 2011;53(Supl 2):S243–54.
41. Rathe M, Moliné A. Sistema de salud de República Dominicana. Salud Publica Mex. 2011;53:S255–64.
42. Acosta M, del Saénz MR, Gutiérrez B, Bermúdez JL. Sistema de salud de El Salvador. Salud Publica Mex. 2011;53:S189–96.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Víctor Becerril-Montekio MS, is a Professor–Researcher at the Centre for Health Systems Research of the National Institute of Public Health of Mexico.

Sergio Meneses-Navarro PhD, MD, is a Professor–Researcher at the National Council of Humanities, Sciences and Technology and at the Centre for Health Systems Research of the National Institute of Public Health of Mexico.

Blanca Estela Pelcastre-Villafuerte PhD, is a Professor–Researcher at the Centre for Health Systems Research of the National Institute of Public Health of Mexico.

Edson Serván-Mori PhD, is a Professor–Researcher at the Centre for Health Systems Research of the National Institute of Public Health of Mexico.

Gómez-Dantés *et al.*
Health Research Policy and Systems (2023) 21:80
https://doi.org/10.1186/s12961-023-01025-2

Health Research Policy and Systems

RESEARCH

Open Access

Origin, impacts, and potential solutions to the fragmentation of the Mexican health system: a consultation with key actors

Octavio Gómez-Dantés[1], Laura Flamand[2], Diego Cerecero-García[1], Mariana Morales-Vazquez[3] and Edson Serván-Mori[1*]

Abstract

Background One of the central debates in health policy is related to the fragmentation of health systems. Fragmentation is perceived as a major obstacle to UHC. This article presents the results of a consultation with a group of actors of the Mexican policy arena on the origins and impacts of the fragmentation of the Mexican health system.

Methods We used a consultation to nine key actors to collect thoughts on the fragmentation of the Mexican health system. The group included national and local decision makers with experience in health care issues and researchers with background in health systems and/or public policies. The sessions were recorded, transcribed verbatim and analyzed thematically.

Results Participants defined the term 'fragmentation' as the separation of the various groups of the population based on characteristics which define their access to health care services. This is a core characteristic of health systems in Latin America (LA). In general, those affiliated to social security institutions have a higher per capita expenditure than those without social security, which translates into differential health benefits. According to the actors in this consultation, fragmentation is the main structural problem of the Mexican health system. Actors agreed that the best way to end fragmentation is through the creation of a universal health system. Defragmentation plans should include a research component to document the impacts of fragmentation, and design and test the instruments needed for the integration process.

Conclusions First, health system fragmentation in Mexico has created problems of equity since different population groups have unequal access to public resources and different health benefits. Second, Mexico needs to move beyond the fragmentation of its health system and guarantee, through its financial integration, access to the same package of health services to all its citizens. Third, defragmentation plans should include a research component to document the impacts of fragmentation, and design and test the instruments needed for the integration process. Fourth, defragmentation of health systems is not an easy task because there are vested interests that oppose its implementation. Political strategies to meet the resistance of these groups are an essential component of any defragmentation plan.

Keywords Health system fragmentation, UHC, Mexican health system

*Correspondence:
Edson Serván-Mori
eservan@insp.mx
Full list of author information is available at the end of the article

© The Author(s) 2023. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Background

Most health systems in Latin America (LA) are fragmented. According to Bossert et al., fragmentation implies the coexistence of several health care delivery subsystems to provide services to different population groups, financed by various funding pools, and run by specific rules for accessing financial resources and health benefits [1].

There is evidence that suggests that fragmentation increases inequalities as the members of groups with economic disadvantages are often assigned less public resources, receive fewer services of poorer quality, and, in general, present worst health outcomes [2]. Fragmentation also increases the propensity of catastrophic expenditure (i.e., the health expenditure in excess of 30 per cent of disposable income, which, in turn, is defined as total family income minus expenditure in food). One comparative analysis of 12 LA countries found that the proportion of households with catastrophic health expenditures in these nations ranged from 1 to 25% [3]. Catastrophic health expenditures were more prevalent among those living in rural areas, the poor, those living in households with older adults, and those without social security.

Several countries in the LA region are involved in some type of reform to expand access to health care and improve financial protection through, among other things, the reduction of fragmentation [4, 5]. Although these reforms vary on the proposed sources of funds and the role of public and private health care providers, most of them aim at increasing pooled funding and universal health coverage (UHC). It is crucial to follow these reforms and assess their impact.

In this article we present the results of a consultation with a group of key actors of the Mexican policy arena on the origins and impacts of the fragmentation of the Mexican health system. It also provides some insights into its possible solutions and suggests future research areas to further document this problem and contribute to the design of policies to reduce fragmentation to provide the same health benefits, with the same level of quality and under the same rules to all the Mexican population.

The Mexican health system

The Mexican health system was created in 1943. It has a public and a private component (Fig. 1) [6–8]. The public component includes two basic subsystems: (i) social security [Mexican Institute for Social Security (IMSS),

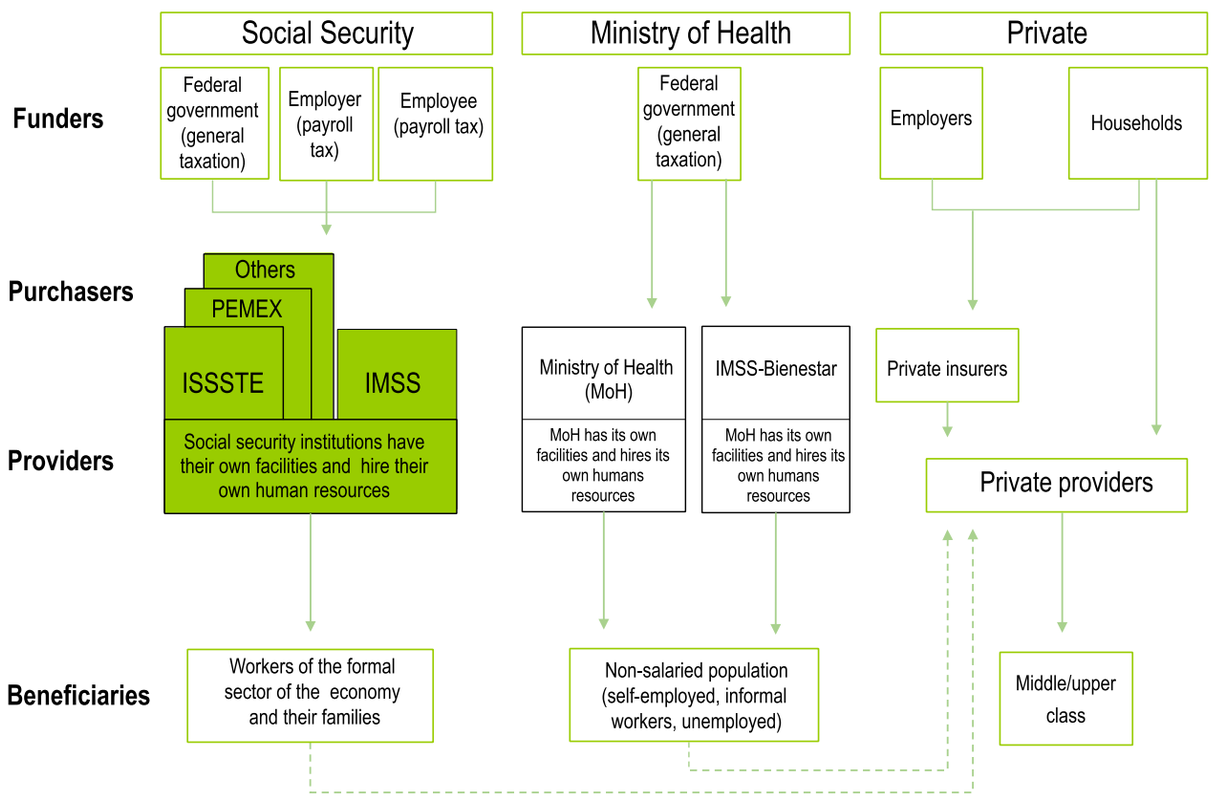


Fig. 1 The Mexican health system in 2022

Social Security and Services Institute for Civil Servants (ISSSTE), Social Security Institute for Oil Workers (Pemex), Social Security Institute for the Armed Forces (Sedena), Social Security Institute for the Navy (Semar)], which provides comprehensive health care to the population with contributive social security (56.6 million people), and (ii) the federal and state ministries of health and IMSS-*Bienestar* (IMSS-B)—small institution managed by IMSS which until recently provided basic care to the rural poor—, which provide health care to those lacking contributive social security (69.4 million people). In addition, the private sector component offers health care to the population with the capacity-to-pay in facilities offering services on a for-profit basis.

The social security subsystem in Mexico has essentially remained unchanged since the establishment of IMSS in 1943 and the other social security agencies in the 1960s. The component responsible for providing health care to those without social security, in contrast, has changed considerably in the past 20 years.

In 2003, the Mexican Congress approved a reform to provide social protection in health to those lacking social security through the System for Social Protection in Health (SSPH) and its financial vehicle, *Seguro Popular* (SP) [9]. SP guaranteed access to 294 essential services and 66 high-cost interventions. In 2015, over 50 million people were affiliated to SP.

After the election of December 2018, the new federal administration decided to dismantle SP and establish in its place the Health Institute for Welfare (*Instituto de Salud para el Bienestar* or INSABI). The new institute, launched in January of 2019, would negotiate agreements with Mexico's 32 states to provide health services to the population lacking contributive social security, recentralizing the delivery of care within the MoH [10]. However, to date, only 26 states have joined INSABI, and six remain decentralized [11]. In terms of benefits, INSABI would be legally responsible for providing outpatient and general hospitalization services, but not specialty services [12].

The initial results of INSABI's implementation were disturbing. By 2020, the number of people in Mexico without access to health services had grown to 35.7 million, an increase of 15.6 million in two years. According to the National Council for the Evaluation of Social Development Policy, most of them did not know they were entitled to free services and medicines in INSABI [13].

In February of 2022, in response to the implementation problems of INSABI, the federal government announced its intention of upgrading IMSS-B by strengthening its infrastructure and human resources in order to provide health care to the population without social security [14]. This process, branded as 'federalization of health care', includes the incorporation of the local hospitals presently managed by the state ministries of health to IMSS-B. The new role of INSABI within this process of federalization remains unclear. INSABI was finally dismantled in May 2023.

Materials and methods

The research question we intend to answer in this study is the following: what are the origins, impacts, and potential solutions to the fragmentation of the Mexican health system. To answer this question, we used a consultation with key actors to gather information and thoughts on the fragmentation of the Mexican health system. According to some authors, this type of consultation allows citizens and stakeholders to actively participate in policy design and implementation, and increases the capacity of governments to solve societal problems in a legitimate way [15]. It also gives "voice to multiple perspectives and different interests, allowing for more thoughtful decisions that take a broader view of those who will benefit or be harmed by an action [16]."

Nine actors were invited to participate in this consultation. The purpose of the sampling was to gather a group that included national and sub-national decision makers with experience in health care issues and researchers with background in health systems and/or public policy research both from public and private institutions. The selection of the sample was bases on convenience, assuming that the number of selected actors and their profile would meet the goals of the consultation.

The selected participants included two women and seven men. Six of them are physicians, all of them with public health training, and two are social scientists with training in health policy. The group also included an actuary. Three of the actors had been high-level decision makers at the federal Ministry of Health (MoH) of Mexico in previous administrations. Two of them are active decision makers, one at the MoH of Mexico City and the second one at the MoH of one state of the country. Finally, four of the actors are presently working as researchers on health policy issues. Three of them work at public academic institutions and one of them at a private university. At the end of the discussion section, we describe a major limitation of the study related to the selection of actors.

All selected actors were invited to participate in a semi-structured interview on the fragmentation of the Mexican health system. They all accepted and agreed to have their session recorded. They were told that their names would not appear in the final report of the consultation, but that a general description of their professional profile would be included. For confidentiality purposes, we

indicated that we would destroy the recordings once the analysis was concluded.

The nine actors received in advance a set of ten questions related to the following topics: (i) definition, origin, and effects of the fragmentation of the Mexican health system; (ii) potential solutions to fragmentation and the political feasibility of these solutions; and (iii) type of research needed to document and reduce the fragmentation of this system. Participants were interviewed by phone—in a call that lasted, on average, 45 min—during the first two weeks of May of 2021. Each interview was transcribed by a research assistant, and the transcripts were reviewed by two of the authors. We coded the answers around the three main topics described above, which, according to the literature, cover all key issues related to health sector reforms aimed at defragmentation [17, 18].

Results

Health system fragmentation—definition

Most participants in this consultation defined the term 'fragmentation' in similar terms: as the separation of the various groups of the population based on certain characteristics which define their access to health care services. According to them, in Mexico and many countries of the Latin American region, the type of occupation is the key variable to access comprehensive health care and, thus, explains the fragmentation of health systems.

Origins of health system fragmentation in Mexico

According to three of the actors of this consultation, during the twentieth century, in many countries of Latin America, for political and/or economic motives, certain populations were considered priority groups and, for this reason, had access to privileged health care. In Mexico, the workers of the formal private sector of the economy were considered a priority group and a special social security agency, IMSS, was created for them in 1943. This 'privilege' was then extended to those in the formal public sector of the economy. In the 1960s, social security agencies were created for civil servants (ISSSTE), oil workers (Pemex) and the armed forces (Sedena and Semar). For a short period of time, railroad workers and workers of the electric sector also counted with their own social security institutions. During this period (1943–2003), the population without social security (informal workers, self-employed, unemployed, and those outside the labor market) received health care as a public charity through services provided mostly by the MoH. According to the original design of the Mexican health system, eventually, all the Mexican population would be part of the formal sector of the economy and would be affiliated either to IMSS, ISSSTE, Pemex, Sedena or Semar. One of the researchers stated:

> *"Unfortunately, this didn't occur, due to the precariousness of the labor market, and today more than half of the total population works in the informal sector of the economy."*

The result is a system with various components—and various subcomponents—with differences in financial resources per capita. In general, those affiliated to social security institutions have a higher per capita expenditure than those without social security, which translates into differential health benefits and health conditions.

An actor in this consultation stated that fragmentation:

> *"[…] is also an expression of poor stewardship, since one of its main subfunctions is the definition of access to health care services, which in a democracy should be universal."*

Impacts of health system fragmentation in Mexico

According to one of the actors in this consultation, "[…] fragmentation is the main structural problem of the Mexican health system," and all actors indicated that the most relevant negative effect of fragmentation is that the various components of the system are unequal. The allocation of financial resources per capita for each component is different, and so are the health benefits and the quality of care that the different population groups receive. This also creates disparities in the levels of financial protection across its pieces. One of the actors, a former high official of the MoH, stated the following:

> *"Fragmentation implies the existence of privileges associated to the political strength of the groups that receive them. These privileges generate equity problems. Depending on the magnitude of the benefited segments, the aggregate effect of fragmentation on inequity can vary. In Mexico, given the size of the salaried population (around half of the total population), the effect of fragmentation on national inequity is huge."*

The second negative effect is inefficiency, especially in those national systems that have various health care delivery structures, such as Mexico. In each subsystem, infrastructure tends to be under-utilized [19].

All actors agreed that the main loser of fragmentation is the uninsured population, which includes low-wage workers employed in unstable labor positions. Finally, one actor mentioned that there is also a problem of rights differentiation, which rips the social fabric:

> *"Instead of acting as the great equalizer by provid-*

ing the same package of health care services with the same quality to all the population, the health system provides services to the various population groups using different criteria. The salaried population has the right to comprehensive health care, while the non-salaried population receives essential health services as public charity."

All actors stated that health system fragmentation in Mexico has generated no positive effects, "[…] not even the benefits of a potential competition among different health care providers," since all health services are provided through monopolies to which non-affiliated individuals have no legal access.

Solutions to health system fragmentation

According to most actors, in Mexico, the first step toward defragmentation was the creation, in 2003, of the System of Social Protection in Health (SSPH) for the population without social security, which included SP, its financial vehicle. This was an analogous insurance scheme—with a similar financial architecture—to that of social security agencies. This characteristic would eventually favor the integration of the Mexican health system. In the opinion of those interviewed, SP did not close the gaps among the various health care subsystems in Mexico, but it reduced them considerably. SP was able to reduce the financial and health benefits gaps between those with contributive social security and those without [9].

During the period of implementation of SP, health services portability was also established, especially for high-cost interventions, which included a list of health services with their price-catalogues which facilitated transactions among health care agencies. The most sophisticated integration mechanism would have been a universal health-card, which was not created.

Most actors agreed that the best way to end fragmentation is through the creation of a universal health system. One of them mentioned that:

"[…] it should be 'universal' in two senses: it must be a system that covers everybody —and a fragmented system can cover everybody—, but with the same set of health benefits and with services that have the same quality. This implies the creation of single financial fund and universal access to all health facilities, eliminating the legal barriers that exist to date."

There was consensus around the need for a system that decouples labor status from access to health care, with a universal public insurance well financed with general taxes, and a plurality of health care providers, a health system with clear, common rules, a solid set of incentives, and efficient articulation mechanisms. One of the actors added:

"One possibility is the reorganization of the health system by functions (financing, delivery, stewardship), where all functions are applied equally to all population groups."

Two actors stated that there is no space for a public monopoly responsible for the delivery of services, since competition contributes to quality and efficiency, and guarantees the freedom to choose the provider of care.

Feasibility of solutions to health system fragmentation

Various actors mentioned that the present federal administration, which has control over the Congress, missed a huge opportunity to create a non-fragmented, pluralistic system, like that of the UK or Canada. Instead, the new administration initially opted for the creation of another public monopoly, INSABI.

Three actors mentioned that INSABI left the labor-based structures of the Mexican health system, which support its fragmentation, untouched, and has demolished all mechanisms intended to de-fragment it.

"The Mexican health system is way behind what it was in 2018. At the end of the past administration, there were conditions that could help reduce the fragmentation of the system, but INSABI has strengthened it."

Two actors stated that IMSS, ISSSTE and Pemex bureaucracies and their unions have stood against the defragmentation of the health system. Since the creation of these agencies, through political support to an authoritarian regime headed by a single political party that ruled Mexico for over 70 years, the workers of these institutions have gained privileged labor conditions which are placing enormous financial pressure on their institutions. One of the actors added:

"IMSS, ISSSTE and Pemex workers have consistently opposed all integration initiatives for fear of losing their privileges, while their unions have opposed them for fear of losing control over their affiliates."

Most actors agreed that there are no chances of moving towards integration nowadays. One of them stated that *"there is a need for a political change in order to stop the erosion of the national health system."*

Research on health system fragmentation

Various actors mentioned that health systems research should document the recent evolution of the allocation of public resources in Mexico to the different subsystems to know if the gaps are closing or widening. It should also

measure the effects of these tendencies on health conditions and levels of financial protection.

Research should also take advantage of the introduction of new policies to compare the levels of access to health care and the health of the populations that are receiving the 'benefits' of INSABI (the population of the 26 states that joined this agency) with the levels of access to health care and the health of the populations that are not receiving them (the population of the six states that decided not to join INSABI).

In addition, research should measure the changes in indicators (health conditions, financial protection) associated to the disappearance of SP, which guaranteed access to 66 high-cost interventions, including treatment for cancer in children and treatment for cervical and breast cancer.

Efforts should also be devoted to costing the package of health benefits that could be provided to all Mexicans in a scenario of UHC and to the testing of measures to reduce inefficiency—duplications, managerial ineffectiveness—and liberate resources to expand and improve the delivery of health care services.

Operative health system research is also needed to test, through pilot interventions, the feasibility of delivery models that favor freedom of choice and competition among providers.

Finally, according to one of the actors, who has long-time experience in health systems research, comparative international research is required to know how other countries were able to de-fragment their systems. This implies the review not only of the organizational and financial measures taken by other countries to de-fragment their system, but also the political strategies used to meet the resistance of those groups opposing integration. According to this actor, "*[…] useful lessons will probably come not from the Latin American region but from Mediterranean/European countries, such as Greece, Italy, Portugal, and Spain […].*"

Discussion

Health systems in Latin America have a shared history [20]. They were mostly created in the 1930s and 1940s. They included both the private and public sectors. The public sector typically included a well-resourced contributive social security component offering comprehensive health care on a rights basis, and a MoH component serving those without social security with essential health services of low quality provided on a public charity basis.

According to most actors interviewed for this article, the Mexican health system represents the typical fragmented model with the separation of population groups based on labor status. Despite the increase in access to comprehensive health care services of the non-insured population achieved in the past 20 years and its positive impact on health conditions and financial protection levels, fragmentation in Mexico is perceived as a barrier to the fulfillment of the right to the protection of health enshrined in Article 4 of the Mexican constitution [21]. The reason is that the two basic groups of the population (with and without social security) have unequal access to public resources for health per capita and different health benefits. This has generated gaps both in health conditions and levels of financial protection.

Various actors in this consultation stated that SP, active in the period 2004–2018, reduced the gaps in resources and health benefits between social security agencies and the institutions providing health care to the uninsured population, and created the financial conditions for the eventual integration of the Mexican system [22, 23]. In contrast, INSABI, which substituted SP in 2019, has reinforced the fragmented nature of the Mexican health system by extending the gaps in resources and benefits between social security agencies and those institutions providing health care to the population lacking social security [24]. The fragmented nature of the Mexican health system is being further boosted by the strengthening of IMSS-B, a small health care institution previously responsible for providing health care to the rural poor, mostly uninsured.

The main conclusion from those consulted—consistent with what various analysts in the region have discussed—is that Mexico needs to move beyond the fragmentation of its health system and guarantee, through its financial integration, regular access to the same package of comprehensive health services to all its citizens in order to reach UHC [13, 25–28]. This would eventually contribute to welfare and economic growth. This is also a recommendation for any country with a fragmented health system looking to provide access to comprehensive health services to all its population. The poor are considered the most vulnerable population among those with no social security. These efforts should be complemented by focused interventions to protect vulnerable populations, such as women, girls, indigenous people, the LGBTI+ community and those geographically isolated.

According to the results of this consultation, the adjective 'universal' in the term UHC means essentially two things: (i) access to comprehensive health care to all, regardless of their labor status and (ii) access to the same package of health benefits, which should be provided with the same level of quality. This implies the design of reforms intended to create a system with a single public financial fund —in order to guarantee freedom of choice and competition, which foster quality—and a plural delivery of health care services, with the MoH in charge of stewardship. Most actors agreed that health

systems should try to move away from health care services monopolies which are, by definition, costly, and inefficient, and leave no room for the selection of the provider of care.

All actors also agreed that defragmentation plans should include a health system research component to document the impacts of fragmentation—in the distribution of public resources and services, health conditions, and financial protection—, design the organizational and financial instruments needed for the integration process, and test the delivery models that could be eventually used by a universal health system to guarantee a successful plural delivery of health care services.

A final conclusion of this consultation is that defragmentation of health systems is not an easy task because there are vested interests that oppose its implementation, most notably the workers of social security agencies and their unions. These groups oppose integration of fragmented health systems because they fear they could lose their labor and political privileges. Detailed political strategies to meet the resistance of these groups are an essential component of a defragmentation plan.

This paper has an important limitation related to the selection of actors. It did not include actors who, for various reasons, oppose the integration of the Mexican system, especially representatives from the main social security agencies. Actors from the private sector were also excluded, and they could provide interesting opinions about the need for integration of the health system and other possible solutions to move towards UHC, such as the possibility of developing public–private partnerships to expand access to comprehensive health care.

Conclusions

In the opinion of the actors interviewed, the five main conclusions of this consultation are the following:

1. Health system fragmentation in Mexico has created serious problems of equity due to the fact that the two basic population groups (population with and without social security) have uneven access to public resources for health per capita and different health benefits.
2. Mexico needs to move beyond the fragmentation of its health system and guarantee, through its financial integration, access to the same package of comprehensive health services to all its citizens to reach UHC.
3. Defragmentation plans should include a health system research component to document the impacts of fragmentation, and design and test the instruments needed for the integration process.
4. Defragmentation of health systems is not an easy task because there are vested interests that oppose its implementation. Detailed political strategies to meet the resistance of opposing groups are an essential component of any defragmentation plan.

Memorial quote

We dedicate this manuscript to our colleague and friend, Sandra Sosa-Rubí, PhD, who passed away in March 2021. Sandra consistently inspired us in our analysis of equity and financial protection in health during her fruitful lifetime.

Author contributions

OGD conceived the idea of the paper, led the formal analysis, and performed the data curation. OGD and ESM wrote the first draft of the manuscript. LF prepared a revised version of the manuscript. DGC, LF and MMV provided critical inputs on multiple iterations. OGD and ESM are the guarantors of the work and, as such, had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. The final version of the manuscript was revised and approved by all authors.

Funding

This study was funded by the NIHR GHPSR researcher-led Grant NIHR150067 using UK aid from the UK Government to support global health research. The views expressed in this publication are those of the author(s) and not necessarily those of the NIHR or the UK government.

Availability of data and materials

The data analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted as part of the preparation for the ongoing research project "Health Financing Fragmentation and Universal Health Coverage in Brazil, Colombia, India, and Mexico", approved by the ethics, research, and biosafety committees of the National Institute of Public Health of Mexico (ID: 2358/1826/S21-2022).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]Center for Health Systems Research, The National Institute of Public Health, 62100 Cuernavaca, Morelos, Mexico. [2]Center for International Studies, College of Mexico, A.C., Mexico City, Mexico. [3]University of Toronto, Toronto, Canada.

Received: 1 March 2023 Accepted: 23 June 2023
Published online: 31 July 2023

References

1. Bossert T, Blanchet N, Sheetz S, Pinto D, Cali J, Cuevas RP. Comparative review of health system integration in selected countries in Latin America. Washington DC, USA; 2014. Report No.: IDB-TN-585. https://publications.iadb.org/en/publication/11898/comparative-review-health-system-integration-selected-countries-latin-america
2. Palacios A, Espinola N, Rojas-Roque C. Need and inequality in the use of health care services in a fragmented and decentralized health system: evidence for Argentina. Int J Equity Health. 2020;19:67.

3. Knaul F, Wong R, Arreola-Ornelas H, Méndez O, Network on Health Financing and Social Protection in Latin America and the Caribbean (LANET), et al. Household catastrophic health expenditures: a comparative analysis of twelve Latin American and Caribbean countries. Salud Publica Mex. 2011;53:s85-95.
4. Cotlear D, Nagpal S, Smith O. How 24 developing countries are implementing universal health coverage reforms from the bottom up. Washington DC 20433, USA: The World Bank; 2015. p. 1–289. http://hdl.handle.net/10986/22011
5. Mesa-Lago C. Reassembling social security: a survey of pensions and health care reforms in Latin America. 1st ed. New York: Oxford University Press; 2008.
6. Mexico G-DO. In: Johnson JA, Stoskopf C, Shi L, editors. Comp Heal Syst a Glob Perspect. 1st ed. Boston: Jones & Bartlett Learning; 2009. p. 337–48.
7. Gómez Dantés O, Sesma S, Becerril VM, Knaul FM, Arreola H, Frenk J. Sistema de salud de México. Salud Publica Mex. 2011;53:S220–32.
8. Frenk J, Gómez-Dantés O. Health system in Mexico. In: van Ginneken E, Busse R, editors. Heal care syst policies. Boston: Springer; 2017. p. 1–11.
9. Frenk J, González-Pier E, Gómez-Dantés O, Lezana MA, Knaul FM. Comprehensive reform to improve health system performance in Mexico. Lancet. 2006;368:1524–34.
10. Secretaría de Gobernación (SEGOB). Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley General de Salud y de la Ley de los Institutos Nacionales de Salud. Ciudad de México, México, México: Diario Oficial de la Federación (DOF); 2019 p. 1–17. https://www.dof.gob.mx/nota_detalle.php?codigo=5580430&fecha=29/11/2019#gsc.tab=0
11. National Council for the Evaluation of Social Development Policy (CONEVAL). Strategic health evaluation. First report. Mexico City, Mexico; 2022. https://www.coneval.org.mx/InformesPublicaciones/Documents/Evaluacion_salud_web.pdf
12. Reich MR. Restructuring health reform, Mexican style. Heal Syst Reform. 2020;6: e1763114.
13. Flamand L. Un sistema de salud universal contribuiría a disminuir las desigualdades acentuadas por la pandemia. Let Libr. 2020;22:32–5.
14. Carrillo E. AMLO anuncia federalización de la salud; arranca en Tlaxcala y Nayarit. Forbes. p. 1–8. https://www.forbes.com.mx/politica-amlo-anuncia-federalizacion-de-la-salud-arranca-en-tlaxcala-y-nayarit/. Accessed 4 Feb 2022.
15. Bingham LB, Nabatchi T, O'Leary R. The new governance: practices and processes for stakeholder and citizen participation in the work of government. Public Adm Rev. 2005;65:547–58.
16. Nabatchi T. Putting the "Public" back in public values research: designing participation to identify and respond to values. Public Adm Rev. 2012;72:699–708.
17. Kelsall T, Hart T, Laws E. Political settlements and pathways to universal health coverage [Internet]. London, UK; 2016. Report No.: 432. https://odi.org/en/publications/political-settlements-and-pathways-to-universal-health-coverage/
18. Lavers T, Hickey S. Conceptualising the politics of social protection expansion in low income countries: the intersection of transnational ideas and domestic politics. Int J Soc Welf. 2016;25:388–98.
19. Montenegro H, Holder R, Ramagem C, Urrutia SO, Fábrega R, Tasca R, et al. Combating health care fragmentation through integrated health service delivery networks in the Americas: lessons learned. J Integr Care. 2011;19:5–16.
20. Cotlear D, Gómez-Dantés O, Knaul F, Atun R, Barreto ICHC, Cetrángolo O, et al. Overcoming social segregation in health care in Latin America. Lancet. 2015;385:1248–59.
21. Gobierno de México. Constitución Política de los Estados Unidos Mexicanos. Última ref. Ciudad de México, México; 2021. https://www.gob.mx/indesol/documentos/constitucion-politica-de-los-estados-unidos-mexicanos-97187
22. Frenk J, Gómez-Dantés O, Knaul F, Arreola H. Ampliación de la protección social en salud: el Seguro Popular. Salud Focos rojos Retroceso en los tiempos la pandemia. 1st ed. Ciudad de México: DEBATE; 2020. p. 27–40.
23. Flamand L, Moreno C. Seguro popular y federalismo en México. Un análisis de política pública. 1st ed. Ciudad de México, México: Centro de Investigación y Docencia Económicas (CIDE); 2014.
24. Frenk J, Gómez-Dantés O. Fracturas de la salud pública. Nexos. 2022;45:41–2.
25. Bernales-Baksai P. Tackling segmentation to advance universal health coverage: analysis of policy architectures of health care in Chile and Uruguay. Int J Equity Health. 2020;19:106.
26. Organisation for Economic Co-operation and Development (OECD). OECD Reviews of health systems: Mexico 2016. Assessment and recommendations. 1st ed. Paris, France: Organisation for Economic Cooperation and Development (OECD); 2016. https://www.oecd-ilibrary.org/social-issues-migration-health/oecd-reviews-of-health-systems-mexico-2016_9789264230491-en
27. Atun R, de Andrade LOM, Almeida G, Cotlear D, Dmytraczenko T, Frenz P, et al. Health-system reform and universal health coverage in Latin America. Lancet. 2015;385:1230–47. https://doi.org/10.1016/S0140-6736(14)61646-9.
28. Cecchini S, Martínez R. Protección social inclusiva en América Latina: Una mirada integral, un enfoque de derechos. 1st ed. Santiago de Chile, Chile: Comisión Económica para América Latina y el Caribe (CEPAL); 2011.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

BMC

ENSAYO

Análisis y reflexiones sobre la iniciativa de reforma a la Ley General de Salud de México 2019

Hortensia Reyes-Morales, D en C,[I] Anahí Dreser-Mansilla, PhD,[I] Armando Arredondo-López, PhD,[I] Sergio Bautista-Arredondo, M en C,[I] Leticia Ávila-Burgos, D en C.[I]

Reyes-Morales H, Dreser-Mansilla A, Arredondo-López A, Bautista-Arredondo S, Ávila-Burgos L.
Análisis y reflexiones sobre la iniciativa de reforma la Ley General de Salud de México 2019.
Salud Publica Mex. 2019;61:685-691.
https://doi.org/10.21149/10894

Resumen

La iniciativa con Proyecto de Decreto por el que se reforma la Ley General de Salud de México presentada en 2019 ante el Congreso de la Unión propone la creación de un sistema de acceso universal y gratuito a los servicios de salud y a medicamentos asociados para la población sin seguridad social y la creación del Instituto de Salud para el Bienestar. Este artículo analiza algunos aspectos sustantivos del Proyecto de Decreto con el objetivo de motivar la reflexión sobre la reforma propuesta y sus componentes más importantes para contribuir a su propósito. Se concluye que los principales temas del proyecto requieren precisión en rubros relevantes, como la transformación del esquema de financiamiento para la atención, el fortalecimiento de la rectoría y gobernanza, la responsabilidad en la provisión de servicios y la regulación y acceso a medicamentos. Las aportaciones de académicos, tomadores de decisiones y organizaciones sociales serán indispensables para una política pública de salud basada en evidencia y con equidad social.

Palabras clave: reforma de la atención de salud; legislación sanitaria; política farmacéutica

Reyes-Morales H, Dreser-Mansilla A, Arredondo-López A, Bautista-Arredondo S, Ávila-Burgos L.
Analysis and reflections on the 2019 initiative that reforms Mexico's *Ley General de Salud*.
Salud Publica Mex. 2019;61:685-691.
https://doi.org/10.21149/10894

Abstract

The initiative including an Act Project for reforming the *Ley General de Salud* of Mexico, submitted in 2019 to the Congress of the Union, proposes the creation of a system of universal and free access to health services and associated medicines for the population lacking of social security benefits, and the creation of the *Instituto de Salud para el Bienestar*. This article analyzes the substantive aspects of the project, with the aim of motivating the reflection of the proposed reform and its most important components, to contribute to achieving its aim. The conclusion is that the main themes of the Project require precision in relevant areas, such as the transformation of the financing scheme for care, the strengthening of stewardship and governance, the responsibility in the provision of services, and the regulation and access to medicines. The contributions of academics, decision makers and social organizations will be essential to create a public health policy based on evidence and social equity.

Keywords: health care reform; sanitary legislation; pharmaceutical policy

(I) Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.

Fecha de recibido: 14 de septiembre de 2019 • **Fecha de aceptado:** 23 de septiembre de 2019
Autor de correspondencia: Leticia Ávila-Burgos. Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
Correo electrónico: leticia.avila@insp.mx

Reyes-Morales H, Dreser-Mansilla A, Arredondo-López A, Bautista-Arredondo S, Ávila-Burgos L. Análisis y reflexiones sobre la iniciativa de reforma a la Ley General de Salud de México 2019. Salud Publica Mex. 2019;61(5):685-691. https://doi.org/10.21149/10894

En julio de 2019 se presentó en la sesión de la Comisión Permanente del Congreso de la Unión la iniciativa con *Proyecto de Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley General de Salud, de la Ley de Coordinación Fiscal y de la Ley de los Institutos Nacionales de Salud, en materia de acceso a los servicios de salud y medicamentos asociados para las personas que no poseen seguridad social*.[1] Dicha iniciativa incluye numerosas modificaciones a la Ley General de Salud (LGS) en artículos relacionados principalmente con la prestación de servicios de salud, la protección social en salud y el control sanitario de medicamentos.

La envergadura de esta iniciativa para el Sistema Nacional de Salud y sus consecuencias exige un fundamento sólido de sus propuestas a partir de la identificación de los problemas de salud y de acceso a los servicios que enfrenta la población sin seguridad social. Dicho fundamento es prioritario, principalmente ante la carencia, en el momento de publicación de la iniciativa, del Programa Sectorial de Salud 2019-2024 como referente para su desarrollo y, en consecuencia, de las leyes secundarias necesarias para la implementación y operatividad del decreto propuesto.

La limitación del referente conceptual y contextual es probablemente el origen de rubros relevantes que se aprecian poco desarrollados en la iniciativa. Por lo anterior, el presente trabajo tiene como objetivo presentar un análisis breve de aspectos sustantivos del Proyecto de Decreto que contribuya a la reflexión y al diálogo necesarios para ponderar el potencial de la reforma propuesta para el fortalecimiento del sistema público de salud.

Sobre la exposición de motivos

En la exposición de motivos se explica que la iniciativa tiene como propósito "la adecuación al marco normativo vigente a fin de crear un sistema de acceso universal y gratuito a los servicios de salud y medicamentos asociados para la población que carece de seguridad social", así como "la existencia del organismo descentralizado, Instituto de Salud para el Bienestar (Insabi), sectorizado a la Secretaría de Salud, el cual se conformará con los recursos humanos, financieros y materiales que actualmente se destinan a la Comisión Nacional de Protección Social en Salud" (CNPSS).[1]

La iniciativa parte del reconocimiento del derecho a la salud como irrevocable y esencial, lo que es relevante pues hace explícito el rol central que tiene el Estado para promover y adoptar leyes, así como asignar recursos a fin de garantizar el acceso a la atención a la salud. Asimismo, sustenta la necesidad de la reforma al señalar que en México la mitad de la población carece de acceso a los servicios de seguridad social.

No obstante, no se hace referencia a la característica central del sistema de salud mexicano, que es la fragmentación por condición laboral, ni a los resultados de los esfuerzos para incrementar la cobertura, principalmente la reforma de 2004 que dio lugar al Sistema de Protección Social en Salud (SPSS) y su brazo operativo, el Seguro Popular (SP). La población empleada en el sector formal de la economía tiene acceso a los diversos esquemas de la seguridad social, que en su conjunto dan cobertura a 38.2% de la población del país.[2] Por su parte, la población ocupada en el sector informal o desempleada cuenta con dos esquemas financiados por el gobierno (el SP, que en 2018 afiliaba a 53.5 millones de personas[3] y el Programa IMSS-Bienestar [anteriormente IMSS-Prospera], que afiliaba a 12.3 millones en ese mismo año),[4] por lo tanto, es posible que exista población adscrita a ambos esquemas. Adicionalmente, la alta tasa de informalidad laboral (57.7% en 2019, con pocos cambios durante la última década) junto con la alta rotación de los trabajadores entre los dos sectores de la economía[5,6] se traducen en alta movilidad de la población entre los distintos esquemas de atención a la salud. Esta situación, aunada a distintas formas y niveles de financiamiento, reglas de operación de los fondos y de cartera de servicios, plantea retos importantes para que el Estado pueda regular y establecer mecanismos para seguimiento y transparencia en el uso de recursos y, por lo tanto, garantizar el derecho a la atención de la salud y la equidad en el acceso. El reconocimiento explícito de esta compleja realidad ayudaría a identificar los aspectos que la reforma propuesta mejorará respecto al *estatus quo* y aquéllos que no serán abordados por la misma.

Por otro lado, si bien es importante partir de un análisis crítico de la realidad, es útil reconocer lo avanzado en materia de acceso a la salud y construir sobre dichos avances. Es cierto que a casi 15 años de implementado, el SP no ha alcanzado la cobertura universal, ya que persiste población sin protección social en salud y el gasto privado sigue siendo muy alto. Sin embargo, en 2006 la población sin protección social en salud (medida como afiliación a algún esquema de aseguramiento) representaba 48% de la población del país,[2] la cual se redujo a 15.5% en 2016, particularmente por afiliación al SP de la población de menor ingreso.[7] Es de reconocer que esta ampliación constituye un esfuerzo histórico en el país.[8,9] Desafortunadamente, datos recientes de la Encuesta Nacional de Salud y Nutrición 2018 indican que la afiliación al SP no se ha traducido en acceso a servicios para sus beneficiarios. De la población en comunidades de menos de 100 000 habitantes que concentran a la población más pobre del país y que reportaron algún problema de salud en los últimos 15 o 30 días, únicamente 32% resolvió dicho problema en el

sector público. Más aún, entre los afiliados al SP, cerca de 40% acudió a consultorios adyacentes a farmacias a resolver su problema.[10]

Otra crítica al SP es el lento avance en su cobertura de padecimientos. El Fondo de Protección contra Gastos Catastróficos (FPGC) cubrió, para 2018, 66 padecimientos agrupados en nueve categorías, desde cuidados intensivos neonatales hasta diversos tipos de cáncer en menores y adultos.[3] Sin embargo, padecimientos de alto costo siguen fuera del catálogo y quienes los padecen carecen de cobertura para enfrentarlos. Existen pocas evaluaciones sobre el impacto de este componente del SPSS; sin embargo, la evidencia preliminar sugiere que el FPGC ha tenido efectos positivos en la sobrevida por cáncer infantil y en la mortalidad ligada a hospitalizaciones.[11]

Adicionalmente, el SPSS favoreció la ampliación de la infraestructura en el sector. Entre 2003 y 2013, el número de unidades de consulta externa y de hospitalización aumentó 12%. Sin embargo, una evaluación al SPSS señala que este crecimiento ha sido desordenado, ya que las unidades de salud se concentran en zonas geográficas urbanas y aún persiste 7.4% de la población (aproximadamente 9.3 millones de personas) que en 2018 tenía bajo, muy bajo y nulo acceso físico a las unidades de salud.[7]

El alto gasto de bolsillo por motivos de salud en el que aún incurren los afiliados al SP sigue siendo muy alto. En 2014 representó 16.5% de los ingresos de los hogares en el quintil más pobre de la población, mientras que para el quintil de ingresos más alto, la cifra fue de 4%.* México es el segundo país de la Organización para la Cooperación y el Desarrollo Económicos (OCDE) con mayor gasto de bolsillo,[12] a pesar de que éste se redujo de 54% del gasto total en salud en 2000 a 42% en 2017.[13] Asimismo, la proporción de hogares con gastos catastróficos y empobrecedores en salud también decreció; para los hogares afiliados al SP el decremento fue de 38% (de 5% en 2004 a 3.1% en 2010) y su efecto fue mayor para los hogares ubicados en el primer quintil de ingreso. El decremento para los hogares con seguridad social fue menor a 18% (de 1.7 a 1.4%) en el mismo periodo.[9] Sin embargo, se reconoce que el efecto del SP es heterogéneo por tipo de localidad urbano/rural, quintil de ingreso del hogar, educación y para las poblaciones indígenas o no indígenas.[14,15]

* Bautista-Arredondo S, Colchero A. Acceso a servicios de atención primaria y costos de la cobertura universal. En: Mesa de análisis: Retos actuales de la Salud Pública. Instituto Belisario Domínguez del Senado de la República. 20 de junio de 2019.

Sobre el Instituto de Salud para el Bienestar y la prestación de servicios de salud

La iniciativa propone "[…] crear un sistema de acceso universal y gratuito a los servicios de salud y medicamentos para la población que carece de seguridad social". Se señala que el Insabi cubrirá, como mínimo, "los servicios de consulta externa en el primer nivel de atención, así como de consulta externa y hospitalización para las especialidades básicas de medicina interna, cirugía general, ginecoobstetricia, pediatría y geriatría, en el segundo nivel de atención, así como a los medicamentos del Compendio Nacional de Insumos para la Salud". Esto significa que bajo el nuevo esquema estarán garantizados por ley todos los servicios de primer y segundo nivel, objetivo ambicioso y deseable; sin embargo, potencialmente muy costoso. La iniciativa de ley se beneficiaría mucho de un análisis cuidadoso de los costos asociados con estos objetivos y de su impacto presupuestal durante los próximos años.[16]

En lo referente al acceso a servicios de alta especialidad, que son los que tienen mayor potencial de ser económicamente catastróficos, la iniciativa no es clara. Mantener el derecho que ha otorgado el FPGC es fundamental para millones de familias que actualmente cuentan con este beneficio como un derecho legislado, que los protege no sólo del riesgo de la mortalidad ligada a estos padecimientos, sino también del gasto empobrecedor y catastrófico que ocasionan.

Otro rubro relevante de la iniciativa es el referente a los acuerdos de coordinación para la ejecución de la prestación gratuita de servicios de salud y medicamentos asociados para la población sin seguridad social entre la Secretaría de Salud y las entidades federativas. Durante los últimos 15 años, los Servicios Estatales de Salud (Sesa) han tenido un papel importante en la prestación de servicios garantizados por el SP. Si bien existe evidencia que sugiere que la satisfacción de los usuarios no es óptima,[17] así como la preferencia creciente de los beneficiarios del SP por usar servicios privados en consultorios adyacentes a farmacias (CAF),[10] los Sesa son actores fundamentales en la reforma propuesta, por lo que es relevante que su función y los mecanismos para garantizarla se establezcan explícitamente.

Sobre el Compendio Nacional de Insumos para la Salud y otras reformas relacionadas con medicamentos

La iniciativa establece que el actual Cuadro Básico de Insumos (CBI) y el Catálogo de Insumos (CI) se identificarán de manera conjunta como Compendio Nacional

de Insumos para la Salud (CNIS). No obstante, no se establece explícitamente el procedimiento para el uso de tal Compendio por el Insabi en su papel de prestador de servicios de salud y medicamentos gratuitos ni su vinculación con los cuadros de insumos de las instituciones de seguridad social; esto es relevante debido a que la LGS establece que todas las instituciones públicas del Sistema Nacional de Salud deben apegarse al CBI y al CI, por lo que los ajustes que se realicen a estos documentos no sólo tendrían implicaciones para el Insabi sino para el resto de las instituciones públicas de salud.

El CBI y el CI vigentes incluyen, a su vez, varios cuadros más, entre ellos el cuadro básico y el catálogo de medicamentos, de material de curación, de auxiliares de diagnóstico, de instrumental, de osteosíntesis, de medicamentos homeopáticos y otros. Sería útil hacer explícito si todos estos insumos se incluirán en el CNIS, pues esto implicaría que serán susceptibles de ser adquiridos por las instituciones del Sistema Nacional de Salud e incluidos en la prestación gratuita de servicios y medicamentos.

En el proyecto de reforma a la LGS se menciona que "del CNIS, la Secretaría de Salud determinará la lista de medicamentos y otros insumos esenciales para la salud y garantizará su existencia permanente y disponibilidad". La elaboración de dicho Compendio de Insumos compete al Consejo de Salubridad General, el cual debe basarse en la mejor evidencia disponible sobre la práctica médica a fin de garantizar la eficiencia y el uso racional de los insumos. Por ello, es fundamental la vinculación con el Centro Nacional de Excelencia Tecnológica en Salud (Cenetec), instancia que coordina el catálogo de Guías de Práctica Clínica.

Además del CNIS, la iniciativa incluye diversas reformas a la normativa relacionada con la gestión de medicamentos, aspecto fundamental en el acceso, calidad y utilización de medicamentos. Una de las reformas se refiere a la implantación de un sistema de distribución de medicamentos por "unidosis" (es decir, en empaques individualizados) para pacientes ambulatorios, así como la participación de especialistas para su manipulación como una medida que permitirá generar ahorros y promover el uso racional de los medicamentos. Si bien en el ámbito hospitalario los profesionales farmacéuticos (PF) son responsables del sistema de dosis unitarias, la implementación en el primer nivel de atención es un reto, ya que requeriría la contratación de suficientes PF para brindar atención en dichos centros o en farmacias públicas comunitarias. Asimismo, sería necesario estimar los recursos necesarios para el adecuado envase y etiquetado de las unidosis (por ejemplo, para identificar medicamentos y describir con advertencias de interacciones o contraindicaciones) para que la implementación de esta reforma se realizara de un modo sostenible financieramente. Por otro lado, la Farmacopea de los Estados Unidos Mexicanos (FEUM) ha eliminado la posibilidad de fraccionar medicamentos en unidosis para pacientes ambulatorios para evitar la adulteración o manipulación del medicamento, así como la pérdida de identidad del producto, lo cual implica un riesgo potencial para la salud del paciente. Consecuentemente, la FEUM restringe este sistema para uso intrahospitalario y realizado por PF.

Otra propuesta –que no está reflejada en una reforma de un artículo específico de la LGS– es "establecer la posibilidad de que los medicamentos para los cuales sea necesaria receta médica puedan ser vendidos a través de máquinas despachadoras de gran formato". Si bien este tipo de estrategias tiene la ventaja de hacer más eficiente la dispensación y el acceso a algunos medicamentos, también podría significar un riesgo para los pacientes de no garantizarse las salvaguardas necesarias para su seguridad. La dispensación por PF permite corroborar que efectivamente se entregue el medicamento prescrito y aconsejar sobre el uso adecuado para evitar riesgos de uso o interacciones con otros medicamentos o alimentos.

Finalmente, en el ámbito de medicamentos se plantea que "la vigencia del registro sanitario de los medicamentos será indefinida" y no cada cinco años como lo establece la norma vigente. Esta propuesta se justifica como una necesidad de homologar la regulación sanitaria mexicana con el contexto internacional. El registro sanitario es el instrumento que permite garantizar la calidad, seguridad y eficacia de los medicamentos utilizados en el país. El plazo del registro de la norma vigente permite: a) limpiar el mercado de medicamentos obsoletos o poco seguros (con base en reportes de farmacovigilancia) o de valor terapéutico cuestionable (de acuerdo con evidencia científica actualizada); b) garantizar que todos los medicamentos genéricos cumplan con las pruebas de intercambiabilidad; y c) establecer un registro más actualizado y periódico de reacciones adversas. En este sentido, la propuesta de vigencia indefinida podría significar un riesgo para los pacientes al perpetuar la comercialización de medicamentos inseguros o poco eficaces, además de tener un catálogo de medicamentos obsoleto y desactualizado. Si bien es necesario agilizar los procesos de obtención y renovación del registro sanitario, la renovación periódica ofrece una serie de ventajas sobre la vigencia indefinida.[18]

La iniciativa busca priorizar el acceso a medicamentos, lo cual es una demanda de la población y un componente central para el funcionamiento del sistema de salud. No obstante, para que los medicamentos alcancen todo su potencial para mejorar la salud de la población debe cumplirse no sólo el objetivo de facilitar el acceso, sino también los de lograr la calidad de los medicamentos y

el uso racional de los mismos. Dado que estos objetivos frecuentemente entran en conflicto y están influidos por diversos intereses, se ha recomendado que la toma de decisiones sobre medicamentos ocurra en el marco de una política farmacéutica nacional explícita, cuyo desarrollo es todavía una asignatura pendiente en México.[19]

Sobre el financiamiento del Insabi

El gasto público destinado a financiar los servicios de salud en México fue de casi 623 000 millones de pesos en 2017. De éstos, aproximadamente 290 000 millones se destinaron a la población sin seguridad social.[13] De manera adicional, 586 000 millones de pesos destinados a la salud provinieron de fuentes privadas.[13] De acuerdo con estimaciones del Centro de Investigación Económica y Presupuestaria AC (CIEP),[16] la creación del Insabi podría tener un impacto presupuestal de entre 160 000 y 905 000 millones de pesos, según los supuestos que se usen en las estimaciones – es decir, entre 0.65 y 3.63 puntos porcentuales del PIB. Lo anterior considerando únicamente los costos asociados con la provisión de servicios de salud; es decir, sin tomar en cuenta los costos que implica absorber el personal de salud necesario para aumentar la capacidad de provisión de servicios.

Como estrategia de reducción del gasto de bolsillo de los hogares, el Insabi podría tener un impacto enorme en el bienestar de los hogares, sobre todo en aquéllos con personas que sufren padecimientos crónicos como diabetes e hipertensión y que a través de su gasto de bolsillo cubren poco más de la mitad del gasto total de la atención de estas enfermedades.[20-23] La factibilidad financiera del Insabi estará determinada, por un lado, por la cartera y la estructura de los servicios que requiere la población sin seguridad social y que serán ofrecidos por dicho Instituto; por otro lado, los fondos, fuentes y flujos de financiamiento y los criterios que se utilizarán para transferir los recursos a los estados – como pagos capitados o pagos según intervenciones prestadas – son aspectos clave que afectarán la viabilidad de la propuesta.

Aunque se resalta la obligatoriedad del gobierno federal a hacerse cargo del financiamiento del Insabi, falta precisar en qué medida se seguirá con el esquema financiero del SPSS, en el que una parte del presupuesto tendría base histórica y otra, pagos *capitados* del Gobierno Federal (RAMO 12). Se requiere también precisar quienes serán los receptores de estos recursos en el ámbito estatal, ya que en algunas partes de la iniciativa se señala a los Gobiernos Estatales y en otras a los Sesa. Asimismo, la iniciativa considera aportaciones con recursos propios sobre la base del número de afiliados atendidos; no obstante, no se establece cómo se definirán las aportaciones de los estados y municipios, ni cómo se garantizará la transparencia en la participación estatal y municipal en el financiamiento de los servicios de salud, cuya deficiencia para demostrar la aportación solidaria ha generado constante tensión entre los Servicios de Salud Estatales y la CNPSS.[9] La definición del peso relativo en las contribuciones financieras de todos los posibles aportadores a los diferentes fondos de financiamiento es un aspecto clave que puede plantear retos muy importantes para la implementación de los cambios propuestos.

Un rubro relevante de la iniciativa señala la transferencia por parte de la Secretaría de Salud de 11% de la asignación presupuestaria al Fondo para la Atención a la Salud y Medicamentos Gratuitos. Bajo el esquema del SPSS, en 2018 se contaba con un catálogo de 66 intervenciones cubiertas y una red de 332 hospitales acreditados por la CNPSS para la prestación de los servicios.[3] Dado que este fondo tiene como objetivo financiar el gasto ocasionado por las enfermedades que provocan gastos catastróficos, un aspecto fundamental de la iniciativa es precisar el grupo de padecimientos a ser incluidos por el nuevo esquema y si la transferencia de recursos se realizará a los Sesa o a los hospitales prestadores de la atención. Para este aspecto se considera que la Secretaría "va a tomar en cuenta los patrones observados de referencia y contrarreferencia que deriven de las redes integradas de servicios de salud". Esto último amerita una planeación cuidadosa para establecer tales redes de prestadores así como el intercambio de servicios entre las dependencias públicas de salud, para lo que es importante considerar la participación de la otra institución que presta servicios a población sin seguridad social; es decir, el IMSS-Bienestar.

La iniciativa ofrece una oportunidad para analizar la pertinencia de mantener dos esquemas financieros para brindar atención a la población sin seguridad social: el IMSS-Bienestar, financiado también con recursos del Gobierno Federal, y el Insabi, con recursos de los Gobiernos Federal y Estatales. Este análisis permitiría abordar explícitamente temas como la duplicidad de cobertura, de funciones y de estructura administrativa para mejorar la eficiencia de este subsistema y reducir la cifra que reporta México en gastos administrativos, que es de 5.2% del gasto total en salud, uno de los más altos entre los países de la OCDE.[12]

Sobre la Rectoría y Gobernanza

En materia de rectoría y gobernanza del sistema de salud, las reformas planteadas en la nueva Ley hacen necesaria la definición clara de los actores sociales e institucionales involucrados en la conducción de los cambios. Son fundamentales aspectos apropiados de gobernanza y

rectoría para facilitar la factibilidad política y técnica de cualquier propuesta de reforma.[24] Un paso importante para avanzar en este sentido es desarrollar de manera explícita la rectoría que asumirá el Insabi y su interacción formal con todos los actores federales, estatales y municipales, con los Sesa y con las otras instituciones de salud (principalmente el Instituto Mexicano del Seguro Social [IMSS] y el Instituto de Seguridad y Servicios Sociales para los Trabajadores del Estado [ISSSTE]), así como con las organizaciones competentes en política farmacéutica. Ante los retos vigentes de bajos niveles de gobernanza, derecho a la salud y baja participación ciudadana en el marco de reformas recientes al sistema de salud en México,[25] es recomendable incluir líneas de acción que incorporen a académicos y líderes/organizaciones de la sociedad civil (OSC) para integrar su perspectiva en la respuesta a las necesidades de salud de los diferentes conjuntos poblacionales. Incluso, es pertinente considerar en las adiciones del decreto en materia de transparencia y rendición de cuentas la conformación de un Observatorio Ciudadano como contraloría social de los nuevos esquemas de cobertura universal.

Conclusiones

Este breve análisis de la iniciativa de ley que propone el *Proyecto de Decreto para reformar las Leyes en materia de acceso a los servicios de salud y medicamentos asociados para las personas que no poseen seguridad social* permite identificar importantes áreas de oportunidad en la definición de aspectos relacionados con la creación del Insabi, la transformación del esquema de financiamiento para la atención de salud, el planteamiento de estrategias sobre rectoría y gobernanza del Sistema de Salud en el marco de la iniciativa propuesta, y las disposiciones para la regulación y acceso a medicamentos. La trascendencia de la reforma planteada que modifica sustancialmente la estructura y organización del Sistema de Salud mexicano amerita un análisis cuidadoso como base de un planteamiento más sólido en los aspectos mencionados en este trabajo y en otros que puedan identificarse, previo al sometimiento de la ley para votación por el Congreso. La propuesta se beneficiaría del establecimiento de foros de trabajo entre los proponentes y los principales actores, incluyendo expertos en los temas de Sistemas de Salud, tomadores de decisiones de los propios servicios e integrantes de la sociedad, con el propósito de incorporar la mejor evidencia disponible para fortalecer la iniciativa como base para una política pública de salud con equidad.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Iniciativa 2019 que reforma la Ley General de Salud, de la Ley de Coordinación Fiscal y de la Ley de los Institutos Nacionales de Salud en materia de acceso a los servicios de salud y medicamentos asociados para las personas que no poseen seguridad social. Gaceta de la Comisión Permanente. México: Senado de la República, 2019 [citado septiembre 10, 2019]. Disponible en: http://infosen.senado.gob.mx/sgsp/gaceta/64/1/2019-07-03-1/assets/documentos/Ini_Delgado.pdf
2. Gutiérrez JP, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L, *et al.* Encuesta Nacional de Salud y Nutrición 2012. Resultados Nacionales. Cuernavaca, México: Instituto Nacional de Salud Pública, 2012 [citado septiembre 9, 2019]. Disponible en: https://ensanut.insp.mx/informes/ENSANUT2012ResultadosNacionales.pdf
3. Sistema de Protección Social en Salud. Informe de Resultados. Enero a diciembre 2018 [sitio de internet]. México: Secretaría de Salud, 2018 [citado septiembre 10, 2019].Disponible en: http://www.transparencia.seguro-popular.gob.mx/index.php/planes-programas-e-informes/22-planes-programas-e-informes/39-informes-de-labores-de-la-cnpss
4. IMSS Bienestar 2019. Estadísticas e Informes. Población Adscrita 2019. Ciudad de México: IMSS [citado septiembre 10, 2019]. Disponible en: http://www.imss.gob.mx/imss-bienestar/estadisticas
5. Instituto Nacional de Estadística y Geografía. Datos de empleo y ocupación. México: INEGI, 2019 [citado septiembre 9, 2019]. Disponible en: https://www.inegi.org.mx/temas/empleo/
6. Instituto Nacional de Estadística y Geografía. Indicadores de ocupación y empleo. Cifras oportunas durante marzo de 2019. México: INEGI, 2019 [citado septiembre 9, 2019].Disponible en: https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2019/iooe/iooe2019_04.pdf
7. Consejo Nacional de Evaluación de la Política de Desarrollo Social. Estudio Diagnóstico del Derecho a la Salud 2018. México: Consejo Nacional de Evaluación de la Política de Desarrollo Social, 2018 [citado septiembre 10, 2019]. Disponible en: https://www.coneval.org.mx/Evaluacion/IEPSM/Documents/Derechos_Sociales/Diag_derecho_Salud_2018.pdf
8. Gakidou E, Lozano R, González-Pie E, Abbott-Klafter J, Barofsky JT, Bryson-Cahn C, *et al.* Assessing the effect of the 2001–06 Mexican health reform: an interim report card. Lancet 2006;368(9550):1920-35. https://doi.org/10.1016/S0140-6736(06)69568-8
9. Instituto Nacional de Salud Pública. Evaluación Externa del Sistema de Protección Social en Salud 2012. Cuernavaca, Morelos, México: Instituto Nacional de Salud Pública, 2012 [citado septiembre 12, 2019]. Disponible en: http://dged.salud.gob.mx/contenidos/deppes/descargas/SPSS/EXT12_SPSS_IF.pdf
10. Colchero A, Gómez R, Bautista-Arredondo S. Caracterización de la "cascada de atención" en servicios públicos entre la población más pobre de México. Salud Publica Mex. 2019. https://doi.org/10.21149/10570
11. Perez-Cuevas R, Doubova S, Zapata M, Flores S, Frazier L, Rodríguez-Galindo C, *et al.* Scaling up cancer care for non-insured children in developing countries: the case of Mexico. Pediatr Blood Cancer. 2013;60(2):196-203. https://doi.org/10.1002/pbc.24265
12. Organisation for Economic Cooperation and Development. Health at a Glance 2017: OECD Indicators, OECD Publishing. París: OECD, 2017 [citado septiembre 12, 2019]. Disponible en: https://www.oecd.org/mexico/Health-at-a-Glance-2017-Key-Findings-MEXICO-in-English.pdf
13. Secretaría de Salud, Dirección de Información en Salud Sistema de Cuentas en Salud a Nivel Federal y Estatal (Sicuentas). Indicadores de Gasto Público en Salud. México: Secretaría de Salud, 2019 [citado septiembre 11, 2019]. Disponible en: http://www.dgis.salud.gob.mx/contenidos/sinais/indica_financieros_gobmx.html

14. Sosa-Rubí S, Galárraga O, Harrisc J. Heterogeneous impact of the "Seguro Popular" program on the utilization of obstetrical services in Mexico, 2001–2006: A multinomial probit model with a discrete endogenous variable. J Health Econ. 2009;28(1):20-34. https://doi.org/10.1016/j.jhealeco.2008.08.002
15. Ávila-Burgos L, Serván-Mori E, Wirtz VJ, Sosa-Rubí SG, Salinas-Rodríguez A. Efectos del Seguro Popular sobre el gasto en salud en hogares mexicanos a diez años de su implementación. Salud Publica Mex. 2013;55 (supl 2):S91-9. https://doi.org/10.21149/spm.V55s2.5103
16. Centro de Investigación Económica y Presupuestaria AC. Consideraciones de impacto presupuestario de la Iniciativa que reforma, adiciona y deroga diversas disposiciones de la Ley General de Salud, de la Ley de Coordinación Fiscal y de la Ley de los Institutos Nacionales de Salud. Ciudad de México: CIEP [citado septiembre 16, 2019]. Disponible en: https://ciep.mx/consideraciones-de-impacto-presupuestario-ante-la-iniciativa-de-creacion-del-insabi/
17. Reyes-Morales H, Flores-Hernández S, Sauceda-Valenzuela AL, Vértiz-Ramírez JJ, Juárez-Ramírez C, Wirtz V, Pérez-Cuevas R. Percepción de los usuarios sobre la calidad de la atención ambulatoria en servicios de salud en México. Salud Publica Mex. 2013;55(supl 2):S100-5. https://doi.org/10.21149/spm.v55s2.5104
18. González-Pier E, Barraza-Lloréns M. Trabajando por la salud de la población: propuestas de política para el sector farmacéutico. Versión para el diálogo. Ciudad de México: Funsalud, 2011.
19. Wirtz VJ, Dreser A, Heredia-Pi I. Retos y oportunidades para el desarrollo de la política farmacéutica nacional en México. Salud Publica Mex. 2013;55(3):329-36. https://doi.org/10.21149/spm.V55i3.7216
20. Arredondo A, Azar A, Recaman AL. Challenges and dilemmas on universal coverage for non-communicable diseases in middle-income countries: evidence and lessons from Mexico. Globalization Health. 2018;14(1):1-10. https://doi.org/10.1186/s12992-018-0404-3
21. Arredondo A, Recaman AL. Determinants of uncontrolled hypertension in the context of universal health coverage in middle-income countries. Am J Hyperten. 2018;11:1175-7. https://doi.org/10.1093/ajh/hpy124
22. Organisation for Economic Cooperation and Development. Indicators of public spending and out-of-pocket spending on health in different countries. Health at a Glance 2017: OECD Indicators. París: OECD Publishing, 2017 [citado septiembre 5, 2019]. Disponible en: https://doi.org/10.1787/health_glance-2017-en
23. Arredondo A, Orozco E, Duarte MB, Cuadra M, Recaman AL, Azar A. Trends and challenges in diabetes for middle income countries: Evidence from Mexico. Glob Public Health. 2019;14(2):227-40. https://doi.org/10.1080/17441692.2018.1498115
24. Arredondo A, Orozco E, Recaman AL. Qualitative analysis of governance trends after health system reforms in Latin America: lessons from Mexico. Public Health. 2018;156:140-6. https://doi.org/10.1016/j.puhe.2017.12.019
25. de Andrade LO, Pellegrini-Filho A, Solar O, Rígoli F, de Salazar LM, Serrate PC, *et al*. Determinantes sociales de salud, cobertura universal de salud y desarrollo sostenible: estudios de caso en países latinoamericanos. MEDICC Review. 2015;17(1):S53-61.

Nigenda *et al. Globalization and Health* (2016) 12:39
DOI 10.1186/s12992-016-0177-5

Globalization and Health

RESEARCH Open Access

Breast cancer policy in Latin America: account of achievements and challenges in five countries

Gustavo Nigenda[1], Maria Cecilia Gonzalez-Robledo[2*], Luz Maria Gonzalez-Robledo[1] and Rosa Maria Bejarano-Arias[3]

Abstract

Background: The recent increase of breast cancer mortality has put on alert to most countries in the region. However it has taken some time before breast cancer could be considered as a relevant problem. Only in recent years breast cancer has been considered a priority in some Latin American countries and resources have been mobilized to confront the problem at the institutional level. The article analyzes the efforts made in five Latin American countries (Argentina, Brazil, Colombia, Mexico and Venezuela) in the last 15 years to design and implement policies to address the growing incidence of breast cancer.

Methods: Data was collected between July and December 2010 from both primary and secondary sources. Semi-structured interviews were conducted with key informants from governmental and non-governmental organizations. Secondary data was obtained from publications in journals, government reports and official statistics in each country. Analysis combines information from both types of sources.

Results: Countries have followed different paths and are in different stages of policy implementation. In all cases early detection is a key strategy. Through the design of programs and guidelines, the allocation of financial resources to treat patients, as well as a formally structured information system, Brazil and Mexico have been able to set up comprehensive national policies. Argentina, Colombia and Venezuela have made important advancements but not yet capable of coordinating comprehensive national policies.

Conclusion: Breast cancer is being considered a priority in all five countries but there are different stages in the rolling out of comprehensive national policies due to differences in their capacity to allocate resources, implement operational strategies and encourage the participation of relevant stakeholders.

Keywords: Public policy, México, Breast cancer

Background

Breast cancer mortality has been increasing significantly in the last decade in Latin America (LA). Epidemiological trends follow those identified in industrialized nations 20 years ago. Breast cancer is becoming an enormous challenge in developing countries together with diabetes, hypertension and obesity, among others [12, 19, 41].

Breast cancer mortality rate is increasing in most LA countries [14, 24, 26, 29] unlike cervical cancer that has been declining in recent years mainly due to the expansion of policies that promote –among other strategies- the dissemination of condoms as a barrier to the transmission of HPV, considered the infectious agent of cervical cancer [47, 51, 60]. However, breast cancer has not proved to be an infectious disease, thus demanding different coping strategies featuring the use of technologies and resources as well as behavioral changes based on promoting an active participation in screening programs along with the identification of emergency signs in order to trigger a care-seeking behavior [25, 61].

Breast cancer policies in the region normally share resources and are implemented jointly with those regarding cervical cancer. However the etiology of both diseases is

* Correspondence: cecilia.gonzalez@insp.mx
[2]Centre for Health Systems Research, National Institute of Public Health, Av. Universidad 655, Santa María A, Cuernavaca, Morelos CP 62100, Mexico
Full list of author information is available at the end of the article

BioMed Central

© 2016 The Author(s). **Open Access** This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

completely different, moreover, it has been mentioned that their epidemiological trends also vary [50]. Unlike cervical cancer, breast cancer has not been specifically linked to just one cause, there are however a whole group of potential determinants. This feature makes it impossible to establish policies based on primary preventive actions. The most commonly used strategy is early detection which is considered to be a secondary preventive action [45].

Early detection is relevant because the earlier a cancer lesion is identified, the probability of survivorship increases, the invasive procedures can be avoided and the cost of treatment can be kept at a minimum [2, 7, 57]. In most industrialized countries early detection is guaranteed by screening female populations among age groups of 40–50 [16]. Mammography is the technology used to confirm initial diagnosis but the controversy about its efficacy is still open [27]. Nevertheless, industrialized countries have seen an important reduction in their mortality rates in recent years following a broad mammographic screening [6, 28].

Based on these facts, Latin American countries have started to develop governmental actions towards the implementation of a policy [17] to tackle the increase in breast cancer. It is important to assess the progress of recent developments heading towards the constitution of goal-oriented, structured and financed policies.

Theoretical framework

According to Gilson [15] there are two main perspectives to define what health policy is about. First, the technical perspective that seeks to underpin the development of new policy or evaluates the result of a policy process in terms of the potential health benefits. Second, a more political and organizational approach that intends to understand the process in itself by identifying interested actors (individual, group or institutional) and their capacity to influence the policy process.

Those who adhere to the first perspective argue that it is possible to identify stages in the policy process while those who have a political perspective of the policy process do not assume that these stages are sequential or those they always occur in every decision-making process. Furthermore the second group tends to focus on the dynamics of human interaction, its modalities, and the role of hidden agendas and the capacity of individuals or groups to bias the process towards their particular interests.

Corkery, et al, [10] argue that the creation of a policy can be identified when incumbent actors, are capable of stating specific objectives that respond to a certain health problem. Incorporating the issue into the political agenda is the first step in turning it into a governmental priority. These objectives together with sound justifications and a normative frame have been incorporated into documents to be approved by legislative branches of government [1]. Most of these documents have a compulsory nature regulating the participation of interested parties. Normally policies derive into programs, guidelines and norms that specify the legal, administrative and technical nature of the activities to be carried out. Once policies are legally approved, they are frequently granted public resources to coordinate the implementation of concrete actions to accomplish the defined objectives. However, as initially mentioned, in most policy processes, these stages do not take place sequentially but they generally follow iterative patterns until final definitions are reached.

The analysis of breast cancer policies can be carried out based on the previous considerations but as in the majority of available policy analysis –including those interested in health issues- specificities should be considered to identify those key elements that characterize their essential nature [17]. In our case, a major consideration is that in Latin America and the Caribbean most breast cancer policies are actually being developed, clearly showing gaps in their technical and managerial definitions. A second consideration is that policies in the region are articulated based on the experience of European countries, USA and Canada but under different social, cultural and health conditions [58]. Third, they are framed in health systems that are being reformed aiming to develop stronger financial schemes, achieve universal coverage, increase the availability of resources (including information) and open up the system to the participation of more social actors [61, 62].

Existing breast cancer policies consider early detection as a key activity. However there are different ways to carry out this activity, which greatly depend on the structural characteristics of health care systems [3]. For example, health care systems have a better possibility of organizing successful screening programs when broad segments of the population have access to them.

Governmental entities are responsible for undertaking the stewardship role in the development and implementation of policies [5, 28]. Also major challenges emerge for the stewardship role when health systems are segmented or fragmented [39, 40]. Decentralization also implies a major challenge as local entities can identify their own priorities and implement their own policies, particularly when taxes are collected at that level [10]. In most cases, reference systems find enormous difficulties to operate due to the lack of organization, coordination and poor management [40].

In all stages of public policy, a diversity of actors are commonly involved. Policy is of course not only prerogative of public institutions but more recently following the increasing democratization in developing countries, civil society has emerged as a powerful actor [46] in its own

right. In female cancers an important source of interest is the universal movement towards gender equity in health [53]. Civil society organizations (CSOs) currently participate in all stages of breast cancer policy. More recently CSOs and governmental entities seem to have found positive ways of interacting, which can promote that policies benefit targeted populations and not only interest groups which is always an inherent risk [4].

Most specialists convey that the generation of data and the analysis derived from it, is key in the policy cycle [22]. Data can be used to identify priorities, to draw up plans and programs and implement new operational mechanisms. Data can also be used to evaluate policy. Evaluating of policy is a key stage in identifying the achievement of defined goals. Moreover, data obtained from evaluations can be used to identify deviations in the policy process [52]. Data dissemination to interested parties is also a key democratic tool capable of informing society about the use of public resources and its consequences [43].

The following sections rely on a study carried out at the end of 2010 in five LA countries, Argentina, Brazil, Colombia, Mexico and Venezuela in order to assess the definition and implementation of breast cancer policy, the participation of CSOs in these endeavors and the capacity to set up routine data collection to evaluate and monitor the development of policy.

Methods

The scarcity of information regarding breast cancer policies in LA [2, 17, 31, 44] motivated the development of a research project by a team of researchers from the National Institute of Public Health (NIPH) of Mexico between July and November of 2010 with support from the American Cancer Society.

The original study was based on a mixed-methods design. However, this article focuses only on the qualitative component that contains the core data used for the analysis of policies. Sample selection was intentional and carried out in two stages. In the first stage, countries were selected using the following criteria: a) structural diversity of health systems b) prevalence, incidence and mortality rates, c) variety of financing mechanisms, and d) participation of various stakeholders in the definition of breast cancer policy. In the second stage, key informants were selected from governmental and non-governmental organizations using the snow-ball technique [38, 54] from each of the selected countries (Table 1).

Information was obtained by means of primary and secondary sources. In the first case, semi-structured interviews were applied to representatives from central and local government, CSOs' personnel, professional associations' representatives, and academics with experience in the field of breast cancer care. The final sample of informants was 65 in all five countries considered (Table 2).

Interviews were carried out in Spanish and Portuguese. A piloted semi-structured questionnaire was applied which facilitated the systematic exploration of topics. All informants provided a verbal informed consent before the interview. The main explored topics were the existence of national/local policies for breast cancer care, the implementation of policies through specific activities, the participant actors, resources available and finally, the attainment of objectives and goals.

Table 1 Health Systems characteristics of five Latin American countries

Country	Total Population (thousands)	Health coverage[a]			Health systems type[a]	National health expenditure as a % of GDP		Physicians per 10,000 pop.
		Public	Social security	Private		Public	Private	
Argentina	41,119	30.2 %	60.8 %	9 %	Fragmented	6.2	3.2	Not available
Brasil	198,361	75 %	0 %	25 %	Unified	3.1	4.1	15.1
Colombia	47,551	Contributory regime: 39.7 % Subsidized regime: 51.4 % Special regimes: 4.6 %		Without insurance 4.3 %	Segmented and articulated	3.5	1.5	16.5
Mexico	116,147	36.6 %[b]	36.8 %[b]	0.44 %[b] and without insurance 25.43 %	Segmented, not articulated	3.0	3.1	22
Venezuela (Boliviarian Republic of)	29,891	Not available	17.5 %[c]	11.7 %[c] without insurance 68 %	Segmented, not articulated	Not available	2.4	Not available

Source: Panamerican Health Organization (PAHO). Health situation in the Americas. Basic Indicators 2012. Available on: http://ais.paho.org/chi/brochures/2012/BI_2012_ENG.pdf

[a]Pan American Health Organization. Health in the Americas: 2012 Edition. Regional Outlook and Country Profiles. Washington, DC: PAHO, 2012

[b]Gutiérrez JP, Hernández-Ávila M. Health protection coverage in Mexico and profile of unprotected population, 2000–2012. Salud Publica Mex 2013:55 suppl 2:S83–S90

[c]Bonvecchio A, Becerril-Montekio V, Carriedo-Lutzenkirchen A, Landaeta-Jiménez M. The health system of Venezuela. Salud Publica Mex 2011;53 suppl 2:S275–S286

Table 2 Informants by country

Type of informant	Mexico	Colombia	Venezuela	Brazil	Argentina	Total
Public sector	7	5	3	3	5	23
Civil society organization	3	5	8	3	3	22
Professional society	0[a]	1	3	3	1	8
Other stakeholder	4	2	4	1	1	12
Total	14	13	18	10	10	65

Source: own elaboration with data obtained from secondary sources
[a]In Mexico, it was not possible to interview an authorized representative of professional associations. However, a number of public sector respondents belonged to professional groups. An extended interview was carried out in these cases

Secondary sources gathered published and non-published official documents containing availability of physical, technological, human and financial resources to support the care of breast cancer as well as laws, guidelines, plans, programs, evaluation reports, clinical practice guidelines and articles addressing these topics (Table 3).

The processing of data from primary sources started with the transcription of audio recordings into Word format files. Data analysis (from primary and secondary sources) was guided through the design of codes organized by previously defined topics and sub-topics by the research team. A flexible approach was followed throughout the process in the integration and systematization of new information in order to identify emerging issues.

The project was approved by the Research and Ethics Committees of the National Institute of Public Health of Mexico # CI: 944, 944 September 27/2010.

Results

Summarized in Table 4, results are presented in four sections as follows: a) definition of specific policy to confront breast cancer, b) early detection strategy, c) civil society participation, and d) information systems.

Table 3 Secondary information by country

Data source	Mexico	Colombia	Venezuela	Brazil	Argentina
Women's health program	Yes	Yes	Yes	Yes	Yes
Sexual and reproductive health program	Yes	Yes	Yes	Yes	Yes
Breast cancer policies	Yes	Yes	No	Yes	Yes
Breast cancer care/ control programs	Yes	No	Yes	Yes	Yes
Breast cancer treatment consensus	Yes	Yes	No	Yes	Yes
Breast cancer statistics (from national or regional surveys)	Yes	Yes	Yes	Yes	Yes
Breast cancer statistics (from continuous information system)	Yes	No	No	Yes	No

Source: Own elaboration with information from secondary sources

a) Definition of policy to confront breast cancer

The following elements were found among the group of countries to inform and characterize the development of breast cancer policy: 1) breast cancer as priority in the public health agenda, 2) allocation of specific funds to cover for breast cancer care, 3) the capacity of the central government to carry out and monitor the application of operational guidelines.

Even though breast cancer is identified as an important public health problem in all countries, only the Brazilian and Mexican health authorities have recognized it as a health priority. In these countries it has been incorporated as such in the public policy agenda ([32, 49]). In Argentina in spite of the fact that the rate of breast cancer mortality (21.8 per 100,000 women) is second in LA only behind Uruguay, various informants expressed that breast cancer is far away from being considered a public health priority. One of them pointed out:

> *"Up to now, the government has said very little (about breast cancer policy).Plans were initiated and quickly disappeared. The current expectation is that the (new) National Cancer Institute could provide an assessment to understand the situation and see what we can do.* (Argentina 4)

Regarding financing, all breast cancer cases attended by the public system in Mexico and Brazil have guaranteed funds to cover all stages of the disease. In Venezuela, specific financing only exists for chemotherapy, which is managed by the Venezuelan Institute of Social Security. Argentina presents an opposite scenario considering that major problems were identified because breast cancer financing depends on the type of service package that different groups of populations are entitled to receive, generating major inequities in the possibility of these groups to have access to cancer care. In Colombia, before 2011, the scenario was similar to Argentina given the important differences between services packages provided to populations that were contributing to the social security fund and those who were fully subsidized by the state [55]. However, this scenario may have changed already –at least

Table 4 Summary of basic epidemiological data and policy results by country

Country	Breast cancer epidemiology (Estimated incidence and mortality per 100,000 women 2008)[a]	Specific breast cancer policy	Early detection strategy	Civil society and civic participation	Information system
Mexico	Incidence: 27.2 Mortality: 10.1	Yes. Supported by a program with defined objectives and goals.	Organized opportunistic mammography screening program for women 40–69 years old.	High level of participation in the areas of education, research, service provision and lobbying but atomized.	Yes. SICAM PRO-MAMA is a routine data collection system.
Colombia	Incidence:31.2 Mortality: 10.0	No. Recently approved a cancer care law. National Cancer Institute is involved in policy.	Opportunistic mammography screening for both contributory and subsidized regimens. Not fully organized. Annual mammography starting at 49 years of age, except for symptomatic cases and the related risks.	High level of participation in the areas of education, research, service provision and lobbying but atomized.	No. Indicators produced through national surveys [35].
Venezuela	Incidence: 42.5 Mortality: 13.7	Not. The Ministry of Health has an under-funded sub-program for breast cancer control.	Sub-program with indications for opportunistic mammography screening carried out differently in each state. Starting age of mammography 35 years and for women with known risk factors at low age.	Low level of participation in program and policy definition. Active participation in educational activities and support for women with breast cancer.	Yes. Data collection is problematic and not all stakeholders are aware of its existence.
Brazil	Incidence:42.3 Mortality: 12.3	Yes. Supported by a program with defined objectives and goals.	Organized opportunistic mammography screening program for women 35 years and older and for women with known risk factors less than 35 years old.	High level of organized participation. Assigned seats in state and municipal health councils.	Yes. SISMAMA is a routine information collection system.
Argentina	Incidence: 74.0 Mortality: 20.1	Not at the national level. Some provinces have well developed policies.	No national screening program due to decentralized health system structure. In generally annual mammography starting from 49 years of age, except for symptomatic cases and the	Low level of participation in program and policy definition. Active participation in service provision.	No. Measured through national studies.

Source: own elaboration with information obtained from fieldwork primary and secondary sources
[a]Data [20]

referring to treatment- following two legislative important changes: 1) the leveling of services packages between both types of populations [9], and 2) the definition of specific financing for breast cancer care within the social security fund [36].

Although all countries have programs, laws and/or clinical guidelines for breast cancer care, its implementation and operation is very lopsided both between and within each of the countries. In this sense all countries, with the exception of Venezuela, have set up National Cancer Institutes to carry out stewardship functions. However, the specific roles of Institutes differ according to the country. In Argentina, the new Cancer Institute created by presidential decree, is responsible for designing and guiding the implementation of a policy to combat different types of cancer, including breast cancer. The institute has been engaged, since its foundation, in negotiations with decentralized provinces for the definition of programs and specific guidelines for cancer care, a major objective in breast cancer is to set up a program for early detection. Brazil's National Cancer Institute (INCA) has the dual function of guiding policy and providing hospital services to the population in the State of Rio de Janeiro. Its main specific function is to define national guidelines and try to negotiate its application in the more than 5,000 Brazilian municipalities. INCA also carries out research at different levels in order to produce evidence to back up its decisions. National Cancer Institutes in Mexico and Colombia share a specific focus on service provision. They were originally designed to provide hospital cancer care to the population. The Mexican institute also carries out clinical and epidemiological research. Both of them participate in the definition and monitoring of policy. Although neither of them is responsible for implementing policy, they do serve as advisory bodies to executive units.

b) Early detection strategy

Early detection of breast cancer is a key activity in each country. However variations in its implementation can be identified.

In general, early detection policy calls for an annual or biannual mammography starting at age 50. However, in seeking to meet the specific needs of their at-risk populations, each country has adjusted the age group in which a mammography is to be initiated. Debate persists among government and non-government stakeholders on the appropriate age for initiating routine mammography [8, 11]. The increasing amount of women dying at young ages in LA has raised the possibility of lowering the age for a routine mammography initiation, as it was referred by a middle-level decision maker from the Mexican public health system:

> *"In the year 2009, the updating process of the Breast Cancer Official Norm started. This process engaged into the discussion of lowering the age of the start of screening mammography down to 40 years, based on the existence of new epidemiological evidence that stated that breast cancer in Mexico was appearing at younger ages. In these discussion the main participants were the government, the academia and civil society organizations"*(Mexico 5)

In Brazil, a law was passed in 2009 to guarantee that every asymptomatic woman aged 35 or older would receive a mammography provided by public institutions on yearly basis and those who are under 35 if they present suspicious signs or have direct family history of breast cancer. In Venezuela, access to biannual mammography starts at age 35. In Mexico, the age for routine annual mammogram initiation (regardless of risk factor profile) was programmatically reduced after a two-year process of technical standard review.[1] Colombia and Argentina preserve their initial definition of yearly mammography starting at 50, except for symptomatic and risk-related cases.

Nevertheless, early detection programs in all countries have major challenges to overcome. All of them follow an "opportunist" strategy where the possibility of detecting a woman with breast cancer depends on the probability that the person reaches the services which is unlike most European strategies that target all population at risk. Scarcity of resources and little awareness in the population have combined to produce poor results in early detection programs. In all countries the percentage of women who are detected at early stages is quite low [37, 48, 59]. In Brazil it has been estimated at 10 % [18]. Furthermore, inequities exist. In Argentina and Venezuela there is no national strategy of early detection and the possibility of having such a strategy depends on the province or state defining it as a priority and consequently allocating resources. In Mexico and Colombia women who are covered by the employees' contributive subsystem have a higher chance of early detection compared to those financed and assisted by the public system. An informant from the Ministry of Health of Colombia stated the following:

> *"There is an enormous gap in the timely detection of breast cancer due to the fragmentation of the health care system in two insurance modalities: the contributory and the subsidized. The first one has defined that it should reach 20 % of mammographic screening of its target population while the second has not established any goal at all"* (Colombia 5)

c) Civil society and citizen's participation

Civil society participation in Argentina and Venezuela is at the more spontaneous end of the spectrum. In Argentina various organizations have participated in promoting health activities for decades, though relationships with government institutions tend to be weak.

One exception is the Argentine League to Fight Cancer, which plays a distinct advisory role to health authorities regarding clinical care issues. In Venezuela the gap between health authorities and CSOs is so wide that the latter practically do not participate in any decisions related to breast cancer policy. In contrast, active dialogue to put pressure on government institutions was observed in Brazil, where CSOs have been incorporated into the structure of local government and state councils, making their voices significantly represented in many of the decisions made at different levels. One case to highlight is the Brazilian Federation of Philanthropic Institutions in Support to the Health of the Breast (FEMAMA) who has actively participated over a long period of time in the passing of the 2009 mammography norm. About this issue, one of the informants pointed out:

> *"In 2002 conversations started to define a breast cancer policy. Once the analysis was completed in 2003, the ministry of health called upon the civil society and decision makers to debate about cancer policy"* (Brazil 3)

Key organizations have shown leverage in Mexico and Colombia and have successfully put pressure on health authorities when making decisions at the programmatic and policy level. CSOs have been particularly active in updating technical standards for breast cancer care in Mexico.

In all five countries, there are an increasing number of international stakeholders participating in various fronts. The pharmaceutical global corporate industry is participating using local CSOs as recipients of their support. For example, CIMA*B in Mexico and SenoSalud in Venezuela receive funds from companies to carry out their activities. Other non-pharmaceutical companies such as Avon, Caterpillar, General Motors, etc., also provide support to NGOs in order to carry out their advocacy roles. All corporations supporting CSOs obtain at least non-tangible benefits such as prestige and positive social image. Some CSOs are particularly successful in raising funds from various corporative sources in order to expand their capacity and influence. Not only are private for-profit businesses involved. The American Cancer Society (ACS), one of the most influential global cancer CSO supports local CSOs to carry out their advocacy roles through the provision of technical advice based on research evidence that ACS contracts. ACS has also supported the development of a regional organization called the Latin American Union for Breast Cancer (ULACCAM in Spanish) aiming at disseminating information throughout the region about participation strategies in the breast cancer arena. Another area of participation is through the implementation of clinical guidelines that have been drawn up to establish the basic conditions in providing breast cancer care. The Breast Global Health Initiative (BGHI) has developed a set of guidelines adapted to the needs of developing countries. BGHI has been trying to introduce its guidelines in LA with relative success. It is clear that international stakeholders have an important presence in the breast cancer field in all the studied countries.

d) Information systems

Epidemiological information systems in Brazil and Mexico routinely produce information which allows prevalence, incidence and mortality to be estimated throughout the entire country. In contrast, Colombia, Argentina and Venezuela do not have national information systems that routinely collect information and are unable to monitor policy or program outcomes. However, alternative sources of information provide certain useful data for monitoring activities. In the words of a decision maker from the Venezuelan public health system:

> *"Cancer registries have faced serious difficulties to have available enough human, material and financial resources to guarantee their continuous operation. These difficulties have affected the continuity of recordings, affecting quality and coverage targets"* (Venezuela 3)

A variety of structures and processes in the collection and use of information were observed. Brazil and Mexico have advanced the most in the implementation of specific information systems for different types of cancer. In Mexico, an information system for monitoring breast cancer care procedures has only recently been created, nevertheless, this step is crucial for policy monitoring at a time when breast cancer programs are in an expansion phase. In Brazil, INCA operates an information system that collects population based indicators as well as service provision indicators from all states and municipalities.

The way health care is financed and organized in Colombia substantially affects the collection and use of its information system. Organizations with health insurance functions called Management Companies Benefit Plans allocate funding to pay for health care and therefore have incentives to collect information on system users. While no mechanism currently exists to use information from these Entities for national policy monitoring,

the National Cancer Institute is making a major effort to build an information system that meets these requirements. In Argentina the newly created Cancer Institute may help to overcome its information gaps in the coming years, as it is being depicted by the following testimony:

> *"What the Institute of Cancer should do is to put together all registries (..) available throughout the country. We have registries in various provinces even in (small) localities such as Venados Blancos."*(Argentina 4).

Table 4 summarizes a set of qualitative indicators used in the description of previous sections. Key information is included in each column to allow the situation of each of the five countries to be compared.

Discussion

Although data collection showed that there is no specific sequence in the development of breast cancer policy stages in any of the countries, it was possible to identify four features that are common and relevant to provide a clear response to the breast cancer epidemics (definition of a specific policy, existence of an early detection strategy, civil society participation and development of information systems). However, there are important differences in the way they have developed in each country due to social and institutional traditions as well as the capacity of each country to allocate financial resources for their implementation. Although information obtained by the research was originally collected in 2010, the picture that is portrayed upon the description of the cases has not really changed in the last five years, except for Brazil. In this country a norm was recently approved [23] stating that no more than 60 days should pass between the diagnosis and the start of the treatment for all cancer patients. Furthermore, the public system is providing access to oral chemotherapy which allows patients in good physical conditions to receive treatment at home and, finally, Trastuzumab is now being provided to all breast cancer patients and is paid by the public system. However, over this period of time, the private sector dynamics in all countries including CSOs participation has to be highlighted allowing these organizations to increase their influence in designing and implementing these policies.

All five countries have made significant progress in ratifying national programs to combat breast cancer. The first feature has been to understand the health threat of breast cancer and a subsequent reaction from health authorities and interested stakeholders. The second important feature has been the definition of actions, plans and programs; and the third, implementation, which shows clear differences in progress by country [13, 30, 56].

Brazil and Mexico have made the greatest progress in both designing and operationalizing breast cancer policies. Both countries have official government documents that define the problem and describe actions to be carried out that are linked to specific goals [33, 49]. A sustainable, specific source of financing seems to be guaranteed in both countries as well. However, weak spots persist in day-to-day operations, mainly due to low coordination capacity. Defining breast cancer as a health priority in all Brazilian decentralized municipalities represents a major challenge, particularly when the prevalence in northern municipalities is quite low compared with that of the southern region, due mostly to socioeconomic and genetic factors [34]. Likewise, breast cancer mortality rates present differential regional patterns in Mexico (mortality is higher in the north than in the south), however the federal level of government appears to be more capable of standardizing its policy actions because of its centralized financing mechanism. Mexico's main problem is a deficit of material and human resources [37].

In addition to regional differences in breast cancer magnitude, the dual health system in Colombia contributes to differentiate the service provision between the contributory and subsidized populations [55]. Although service packages have been recently equalized, it will take some time before historical differences in access to cancer care disappear both in ambulatory and hospital care. Argentina finds itself in a crucial phase in developing a breast cancer policy following the creation of its new National Cancer Institute, whose mission is to construct a harmonized health care policy for different types of cancer featuring breast cancer as one of its top priorities. While important progress has been made in the design of a policy, all provinces must be convinced to make a concerted effort. Finally, in Venezuela the most important obstacles in the consolidation of a coherent and functional breast cancer policy are the lack of coordination among different sectors and the persistence of inequities between rich and poor states.

Good policy harmonization always depends on the implementation of high-quality information. Despite important advances made in this area, it is imperative that countries create and/or strengthen their monitoring and evaluation systems. Mutual learning among LA countries on indicator design and technological implementation is a promising strategy that could drive progress in this area. Several voices have called about the need of better cancer registries to produce key data to feed clinical and policy process [21, 29, 42].

Finally, civil society plays a fundamental role in national efforts to combat breast cancer. CSOs must maintain their critical position but at the same time, be proactive regarding government-initiated proposals aiming at harmonizing the role of participating actors in the

attainment of common goals. Breast cancer CSOs -many of them supported by global stakeholders- are gaining enormous power making them a formidable political driving force that could be used in favor of achieving public breast cancer goals.

Conclusions

Breast cancer care is raising awareness among LA health authorities. This awareness is a result of both the increase in the death toll in women in the last ten years as well as the role of advocacy groups calling for a more decisive response from governments. The countries included in the study have already started actions to tackle breast cancer but not all cases have developed a structured policy. Actions differ according to the level of priority given in every country, the financial resources involved in it, the existence of a coordination entity at national level, the capacity to produce statistical data to guide decisions and the role of non-governmental actors (including civil society, professional groups, media and others). It is not possible to say at this point how successful analyzed countries will be in fully implementing breast cancer policies and reducing mortality in the long run but steps to accomplish that objective have been clearly identified in all of them.

Abbreviations

ACS, American cancer society; BGHI, breast global health initiative; CSOs, civil society organizations; GN, Gustavo Nigenda; HPV, human papillomavirus; INCA, Brazil's national cancer institute; LA, Latin America; LMGR, Luz Maria Gonzalez-Robledo; MCGR, Maria Cecilia Gonzalez-Robledo; RMBA, Rosa Maria Bejarano-Arias; ULACCAM, Latin American union for breast cancer; USA, United States of America

Endnotes

[1]The norm was revised in 2010. It now defines mammography at 40 every two years.

Acknowledgements

The authors gratefully acknowledge Alessandra Durstine, Cristina Parsons and Sylvana Rochet-Belleri for their comments on early versions of the document. The first author would like to express his gratitude to IDRC Canada for hosting him as Research Fellow while various drafts of the paper were written. Authors are also grateful for the support received in Argentina, Brazil, Colombia, Mexico and Venezuela from institutions and informants involved in the project. However, all opinions expressed are the sole responsibility of the authors.

Funding

Agreement "ACS Contract #9681" of 2010, between American Cancer Society and National Institute of Public Health (Mexico).

Availability of data and materials

Data and materials not available.

Authors' contributions

All authors participated in the design of the study, the collection of data in countries and its organization. GN drafted the first version of the manuscript and revised subsequent versions. MCGR wrote initial methods section, LMGR the initial results section and RMBA put together tables in first versions. All authors contributed to revisions of the manuscript and critical content. Also, All authors read and approved the final manuscript.

Authors' information

GN: Research Coordinator. School of Medicine. Morelos State Autonomous University. (Mexico). International Consultant. Expertise in Human Resources for Health; Health Systems Reform; Public Policy Analysis. e-mail: gnigenda@outlook.com.
MCGR: Professor and Researcher. National Institute of Public Health (Mexico). Expertise in Evaluation of Health Policy and Programmes, Health System Response to Chronic Diseases and Human Resources for Health. e-mail: cecilia.gonzalez@insp.mx.
LMGR: Associate Professor. School of Medicine. Morelos State Autonomous University (Mexico). Expertise in Health System Reforms, Health Management, Human Resources for Health. e-mail: luz.gonzalez@uaem.mx.
RMBA: Coordinator of clinical practices and Social Service School of Health Sciences and Medicine, Valley of Mexico University. Expertise in Health Management, Human Resources for Health. e-mail: rosa.bejarano@uvmnet.edu.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

The project was approved by the Research and Ethics Committees of the National Institute of Public Health of Mexico # CI: 944, 944 September 27/2010.

Author details

[1]School of Medicine, Morelos State Autonomous University, Calle Leñeros esquina Iztaccíhuatl s/n Col. Volcanes, Cuernavaca, Morelos CP 62350, Mexico. [2]Centre for Health Systems Research, National Institute of Public Health, Av. Universidad 655, Santa María A, Cuernavaca, Morelos CP 62100, Mexico. [3]Health Science and Medicine School, Valley of Mexico University, Calzada de Tlalpan No. 3016 y 3058 Ex Hacienda Coapa, CP 04910 Coyoac, Mexico.

Received: 9 April 2015 Accepted: 23 June 2016
Published online: 12 July 2016

References

1. Anderson JE. Public policymaking: An introduction. Boston: Houghton Mifflin Company, 2003:1-34. [Consulted February 23 2013]. Available at: http://www.kropfpolisci.com/public.policy.anderson.pdf.
2. Anderson B, Shyyan R, Eniu A, Smith R, Yip CH, Senel Bese N, Chow LWC, Masood S, Ramsey SD, Carlson R. Breast Cancer in Limited-Resource Countries: An Overview of the Breast Health Global Initiative 2005 Guidelines. Breast J. 2006;12(s1):S3–S15.
3. Anderson B, Yip C, Ramsey S, Bengua R, Bram S, Fitch M, et al. Breast Cancer in Limited- Resource Countries: Health Care Systems and Public Policy. The Breast Journal. Volume 12, Issue Supplement s1, pages S54–S69, January 2006b. Arias SA, Murillo-Moreno RH, Piñeros M, Bravo MM, Hernández G, Pardo C, et al. Prioridades de investigación para el control del cáncer en Colombia. Rev Colomb Cancerol. 2007;11:155–67.
4. Azenha G, Bass LP, Caleffi M, Smith R, Pretorius L, Durstine A, Perez, C. P. The role of breast cancer civil society in different resource settings. Breast. 2011;20:S81–7.
5. Bérubé S, Provencher L, Robert J, Jacob S, Hébert-Croteau N, Lemieux J, Duchesne T, Brisson J. Quantitative exploration of possible reasons for the recent improvement in breast cancer survival. Breast Cancer Res Treat. 2007;106:419–31.
6. Broeders M, Moss S, Nyström L, et al. The impact of mammographic screening on breast cancer mortality in Europe: a review of observational studies. J Med Screen. 2012;19 suppl 1:14–25.
7. Brown ML, Yabroff KR. Economic impact of cancer in the United States. In: Schottenfeld D, Fraumeni JF, editors. Cancer epidemiology and prevention. 3rd ed. New York (NY): Oxford University Press; 2006.
8. Buist D, Porter P, Lehman C, Taplin S, White E. Factors Contributing to Mammography Failure in Women Aged 40-49 Years. J Natl Cancer Inst. 2004;96(19):1432–40. [Consulted July 15, 2013], Available at: http://jnci.oxfordjournals.org/content/96/19/1432.full.pdf+html.

9. Comisión de Regulación de Salud. Acuerdo 032 de 2012. [Consulted December 2013]. http://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=47532.
10. Corkery J, Land A, Bossuyt J. The process of policy formulation. European Centre for Development Policy Management. December 1995. [Consulted: July 5, 2012]. Available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.571.1971&rep=rep1&type=pdf.
11. Davidson AS, Liao X, Magee BD. Attitudes of women in their forties toward the 2009 USPSTF mammogram guidelines: a randomized trial on the effects of media exposure. Am J Obstet Gynecol. 2011;205:30. e 1-7.
12. De Magio F. 2012 Understanding chronic non-communicable diseases in Latin America: towards an equity based research agenda. Globalization and Health 2011, 7:36. [Consulted July 3, 2012]. Available at: http://www.globalizationandhealth.com/content/7/1/36.
13. Frenk J. Sensibilización, detección temprana y combate a los prejuicios. Claves en la lucha contra el cáncer de mama. Salud Publica Mex. 2009;51(2):135–7.
14. Forouzanfar MH, Foreman KJ, Delossantos AM, Lozano R, Lopez AD, Murray CJ, Naghavi, M. Breast and cervical cancer in 187 countries between 1980 and 2010: a systematic analysis. Lancet. 2011;378(9801):1461–84.
15. Gilson L, Erasmus E, Borghi J, Macha J, Kamuzora P, Mtei G. Using stakeholder analysis to support moves towards universal coverage: lessons from the SHIELD Project. Health Policy Plan. 2012;27:i64–76. [Consulted January 15 2013]. Aviable at: http://heapol.oxfordjournals.org/content/27/suppl_1/i64.full.pdf+html.
16. Giordano L, von Karsa L, Tomatis M, et al. Mammographic screening programmes in Europe: organization, coverage and participation. J Med Screen. 2012;19 suppl 1:72–82.
17. González-Robledo LM, González-Robledo MC, Nigenda G, López-Carrillo L. Government actions for the early detection of breast cancer in Latin America. Future challenges Salud Publica Mex. 2010;52:533–43.
18. Goss P, Lee BL, Badovinac-Crnjevic T, Strasser-Weippl K, Chavarri-Guerra Y, St Louis J, Villarreal-Garza C, et al. La planificación del control del cáncer en América Latina. Lancet Oncol. 2013;14:391–436.
19. Globocan. Breast Cancer Estimated Incidence, Mortality and Prevalence Worldwide in 2012. 2012. [Consulted July 18 2014]. Aviable: http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx.
20. Globocan. Breast Cancer Incidence and Mortality Worldwide in 2008 Summary. [Consulted January 15 2010]. Available at: http://globocan.iarc.fr/factsheets/cancers/breast.asp.
21. Harford JB, Otero IV, Anderson BO, Cazap E, Gradishar WJ, Gralow JR, Rieger, P. T. Problem solving for breast health care delivery in low and middle resource countries (LMCs): consensus statement from the Breast Health Global Initiative. Breast. 2001;20:S20–S29.9. http://www.thebreastonline.com/article/S0960-9776(11)00042-7/abstract.
22. Innvaer S, Vist G, Trommald M, Oxman A. Health policy-makers' perceptions of their use of evidence: a systematic review. J Health Serv Res Policy. 2002; 7:239–44.
23. Isaúde.net. [website]. Saúde Pública. Lei que obriga início do tratamento de cancer em 60 dias entre en vigor dia 23. Published 16/05/2013. [Consulted July 17, 2013]. Available at: http://www.isaude.net/pt-BR/noticia/34919/saude-publica/lei-que-obriga-inicio-do-tratamento-de-cancer-em-60-dias-entra-em-vigor-dia-23.
24. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. Cancer J Clin. 2011;61(2):134.
25. Knaul FM, Arreola-Ornelas H, Gómez-Dantés H. México: Numeralia del Cáncer de Mama. México 2008a. Working paper. Funsalud, Instituto Carso de la Salud. [Consulted february 18 2012]. Available at: http://tomateloapecho.org.mx/Archivos%20web%20TAP/numeralia%20ESP%20MAYO11.pdf.
26. Knaul FM, Nigenda G, Lozano R, Arreola-Ornelas H, Langer A, Frenk J. Breast cancer in Mexico: a pressing priority. Repro health matters. 2008;16(32):113–23.
27. Kopans DB. Screening for breast cancer among women in their 40s. Lancet Oncol. 2010;11(12):1108–9.
28. Kurian A, Clarke C, Carlson R. The Decline in Breast Cancer Incidence: Real or Imaginary? Current Oncology Reports. Volume 11, Number 1/January 2009. [Consulted July 13, 2012]. Available at: http://www.springerlink.com/content/v2004647640163j8/.
29. Lozano-Ascencio R, Gómez-Dantés H, Lewis S, Torres-Sánchez L, López-Carrillo L. Breast cancer trends in Latin America and the Caribbean. Salud Publica Mex. 2009;51 suppl 2:S147–56.
30. Martins S, Magalhaes JL. O Programa Viva Mulher. Programa Nacional de Controle de Câncer de Colo Uterino e de Mama. Revista Mineira de Saúde Pública 1;Junho 2002. [Consulted 24 junio 2012]. Available at: http://www.esp.mg.gov.br/wp-content/uploads/2009/07/revista01.pdf.
31. Martínez-Montañez OG, Uribe-Zúñiga P, Hernández-Ávila M. Public policies for the detection of breast cancer in Mexico. Salud Publica Mex. 2009;51 suppl 2:S350–60.
32. Ministério da Saúde. Control do Câncer do Mama. Documento de Consenso. Rio de Janeiro: Instituto Nacional de Câncer (INCA); 2004.
33. Ministerio da Saúde. Secretaria de Assistência a Saúde. Instituto Nacional de Câncer. Viva Mulher. Programa Nacional de Controle do Câncer do Colo do Útero e de mama. Câncer do Colo do Útero: Informações Técnico Gerenciais e Ações Desenvolvidas. Rio de Janeiro: INCA; 2002.
34. Ministerio da Saúde. Secretaria de Atenção à Saúde. Instituto Nacional de Câncer. Coordenação de Prevenção e Vigilância. A situação do cáncer no Brasil/Ministério da Saúde, Secretaria de Atenção à Saúde, Instituto Nacional de Câncer, Coordenação de Prevenção e Vigilância. Rio de Janeiro: INCA; 2006.
35. Ministerio de Protección Social. Conjunto Nacional De Indicadores De Calidad De La Atención En Salud Colombia. Propuesta de informe PRIMER INCAS COLOMBIA. 2009. [consultado 18 diciembre 2010] Available in: http://calisaludable.cali.gov.co/secretario/2010_incas/indicadores.pdf.
36. Ministerio de Protección Social. Resolución 3974 DE 2009. [Consulted December 2013]. http://www.icbf.gov.co/cargues/avance/docs/resolucion_minproteccion_3974_2009.htm.
37. Mohar A, Bargalló E, Ramírez MT, Lara F, Beltrán-Ortega A. Available resources for the treatment of breast cancer in Mexico. Salud Publica Mex. 2009;51 suppl 2:S263–9.
38. Noy C. Sampling Knowledge: The Hermeneutics of Snowball Sampling in Qualitative Research. Int J Soc Res Methodol. 2008;11(4):327–44.
39. Pan American Health Organization (PAHO). Chapter 4 Public Policies and Health Systems and Services. In Health in the Americas. 2007. Pan American Health Organization, Washington, DC: PAHO, 2007-2v. p.302.
40. Pan American Health Organization (PAHO). Integrated Health Service Delivery Networks: Concepts, Policy Options and a Road Map for Implementation in the Americas. Washington, D.C.: PAHO, 2011:13, 21.
41. Porter PL. Global trends in breast cancer incidence and mortality. Salud Publica Mex. 2009;51 suppl 2:S141–6.
42. Porter P. Westernizing Women's Risks? Breast Cancer in Lower-income Countries. N Engl J Med. 2008;358:213–21.
43. Rico A and León S. Health care devolution in Europe: Trends and prospects. Oslo: Health Organization Research Norway. Working Paper: 1. 2005. [Consulted 8 July 2012] Available at: https://www.duo.uio.no/bitstream/handle/10852/30310/HORN_2005_1.pdf?sequence.
44. Robles SC, Galanis E. Breast cancer in Latin America and the Caribbean. Rev Panam Salud Publica. 2002;11(13):178–85.
45. Saadat S. Can We Prevent Breast Cancer? Int J Health Sci. 2008;2(2):167–70.
46. Sanders D, Labonte R, Baum F, Chopra M. Making research matter: a civil society perspective on health research. Bull World Health Organ. 2004; 82(10):757–63.
47. Saonere JA. Awareness screening programme reduces the risk of cervical cancer in women. Afr J Pharm Pharmacol. 2010;4(6):314–23.
48. Schwartsmann G. Breast Cancer in South America: challenges to improve early detection and medical management of a public health problem. J Clin Oncol. 2001;19(18 Suppl):118S–24S.
49. Secretaría de Salud (SSA). Programa de Acción Específico 2007-2012. Cáncer de Mama. Primera Edición. México: SSA 2008. [Consulted 16 April 2011]. http://www.spps.gob.mx/images/stories/SPPS/Docs/proy_prog/6._pdatcm.pdf.
50. Shack L, Jordan C, Thomson CS, Mak V, Møller H. Variation in incidence of breast, lung and cervical cancer and malignant melanoma of skin by socioeconomic group in England. BMC Cancer. 2008;8(1):1.
51. Shepherd J, Peersman G, Weston R, Napuli I. Cervical cancer and sexual lifestyle: a systematic review of health education interventions targeted at women. Health Educ Res. 2000;15(6):681–94.
52. Stein E and Tommasi M. Editors. Policymaking in Latin America. How Politics Shapes Policies. Washington: InterAmerican Development Bank. 2008. [Consulted March 2013]. Available at: http://www.cide.edu/investigador/documentos/gabriel.negretto/Policy_Making_printed_version.pdf.
53. United Nations Economic and Social Commission for Western Asia (ESCWA). Enhancing Civil Society Participation In Public Policy Processes. 2010. [Consulted July 17]. 2012. https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/sdd-10-tp1.pdf.
54. Van Meter K. Methodological and Design Issues: Techniques for Assessing the Representativeness of Snowball Samples. In: The Collection and Interpretation

of Data from Hidden Populations. Elizabeth Y. Lambert Editor. NIDA Research Monograph 98. Washington 1990: 31-43.
55. Charry VD, Constanza L, Carrasquilla G, Roca-Garavito S. Equidad en el acceso al tratamiento para el cáncer de mama en Colombia. Salud Publica Mex. 2009; 51:s246–53.
56. Viniegra M, Paolino M, Arrosi S. Cáncer de mama en Argentina: organización, cobertura y calidad de las acciones de prevención y control. Informe final julio 2010: diagnóstico de situación del Programa Nacional y Programas Provinciales. Buenos Aires: OPS; 2010.
57. Viñes J. La efectividad de la detección precoz de las enfermedades. Revista ANALES. 2007; 30 (1) [Consulted September 28, 2010]. http://scielo.isciii.es/pdf/asisna/v30n1/colaboracion.pdf.
58. Walt G, Shiffman J, Schneider H, Murray SF, Brugha R, Gilson L. 'Doing' health policy analysis: methodological and conceptual reflections and challenges. Health Policy Plan. 2008;23:308–17.
59. Wiesner C. Psychological, Social, and Clinical Determinants of Breast Cancer Early Detection in Bogotá, Colombia. Rev Colomb Cancerol. 2007;11(1):13–22.
60. Winer R, Hughes JP, Feng Q, O'Reilly S, Kiviat NB, Holmes K, Koutsky LA. Condom Use and the Risk of Genital Human Papillomavirus Infection in Young Women. N Engl J Med 2006; 354:2645-54 [Consulted July 2013] Aviable at: http://www.nejm.org/doi/pdf/10.1056/NEJMoa053284.
61. World Health Organization (WHO) (2012)/Alliance for Health Policy and Systems Research. Health Policy and Systems. A Methodology Reader. The Abridged Version. Edited by Lucy Gilson. [Consulted September 26, 2013] Aviable at: http://www.who.int/alliance-hpsr/resources/alliancehpsr_abridgedversionreaderonline.pdf?ua=1.
62. World Health Organization (WHO) (2013). Health policy. [Consulted July 15, 2013] available at: http://www.who.int/topics/health_policy/en/.

Submit your next manuscript to BioMed Central and we will help you at every step:

- We accept pre-submission inquiries
- Our selector tool helps you to find the most relevant journal
- We provide round the clock customer support
- Convenient online submission
- Thorough peer review
- Inclusion in PubMed and all major indexing services
- Maximum visibility for your research

Submit your manuscript at
www.biomedcentral.com/submit

BioMed Central

Health Systems & Reform, 1(3):207–216, 2015
Copyright © Taylor and Francis Group, LLC
ISSN: 2328-8604 print / 2328-8620 online
DOI: 10.1080/23288604.2015.1054547

Research Article

Political Economy of Pursuing the Expansion of Social Protection in Health in Mexico

Octavio Gómez-Dantés[1,*], Michael R. Reich[2], and Francisco Garrido-Latorre[1]
[1]Center for Health Systems Research; National Institute of Public Health of Mexico; Cuernavaca, Morelos, Mexico
[2]Department of Global Health and Population; Harvard T. H. Chan School of Public Health; Boston, MA USA

CONTENTS

Materials and Methods
Content of SPH Policies in Mexico
Enabling Factors
Driving Factors
Conclusions
References

Abstract—This article uses political economy analysis to identify the factors that contributed to the adoption of policies to expand social protection in health (SPH) in Mexico in the early years of the 21st century. It focuses on the adoption stage of these policies to answer two questions: (1) Which contextual factors created the window of opportunity where SPH reforms could be adopted in Mexico? (2) What political strategies did the main actors driving the reform use to promote its adoption? Two types of analysis were developed: an analysis of the context and a stakeholder analysis. The analysis of the context was used to identify the "enabling factors" (epidemiological, political, and economic) that created the window of opportunity to place the problem of limited health care coverage in Mexico on the national policy agenda. The stakeholder analysis was used to (1) construct a map of actors, positions, and power during the deliberation of these policies in the Mexican Congress; (2) evaluate the behavior, intentions, interrelations, agendas, and interests of key actors; and (3) assess the influence and resources that actors brought to the debate and the strategies used by proponents to pursue and achieve adoption of the policies. This article shows that actors with high political power can take advantage of a propitious context (a window of opportunity for major change) through effective political strategies to design, promote, and successfully negotiate SPH policies, even in the absence of beneficiary mobilization. This was the case in the adoption of Mexico's health reform in 2003.

Many countries around the world have recently begun pursuing the goal of universal health coverage through national health reforms whose explicit aim is to extend access to comprehensive health services with financial protection to all citizens. This article uses political economy analysis to identify the factors that contributed to the adoption of policies to expand social protection in health (SPH) in Mexico in the early years of the 21st century. We focus on the adoption stage of these policies to answer two questions: (1) Which contextual factors created the window of opportunity where

Keywords: political economy of universal health coverage, stakeholder analysis, *Seguro Popular*, social protection in health, universal health coverage

Received 16 March 2015; revised 15 May 2015; accepted 19 May 2015.
*Correspondence to: Octavio Gómez-Dantés; Email: ocogomez@yahoo.com

Gómez-Dantés O, Reich MR, Garrido-Latorre F. Political economy of pursuing the expansion of social protection in health in Mexico. Health Syst Reform. 2015;1(3):207-216. https://doi.org/10.1080/23288604.2015.1054547

SPH reforms could be adopted in Mexico? (2) What political strategies did the main actors driving the reform use to promote its adoption? We do not examine the implementation of these policies or their impact on health conditions and financial protection of the Mexican population, because these questions have been addressed elsewhere.[1–3] Instead, we focus on the political economy of the reform adoption process, which has not been sufficiently analyzed previously.

The article is divided into four sections. In the first section we discuss the methods and materials used to develop the analysis. We then describe the content of the Mexican health reform and its expansion of SPH. In the third section we discuss three contextual factors that created a window of opportunity to adopt new policies to extend SPH in Mexico: the epidemiological transition, the democratic transition, and relatively high rates of economic growth. We consider these as *enabling factors* but not necessary conditions for the adoption of SPH policies, because similar policies have been approved in other countries in the absence of these factors and not all countries with these factors have enacted reforms. In the fourth section, we examine the *driving factors* behind the adoption of these policies in Mexico, with attention to proponents, opponents, and beneficiaries of those policies.

The central message of this article is that actors with high political power can take advantage of a propitious context (a window of opportunity for major change) through effective political strategies to design, promote, and successfully negotiate SPH policies, even in the absence of citizen or beneficiary mobilization. This was the case in the adoption of Mexico's major health reform in 2003.

MATERIALS AND METHODS

This article uses a political economy approach to analyze the policy design and adoption stages of the policy cycle. For the purpose of this article we define political economy as "a variety of approaches for studying economic and political behavior, and the understanding of how political institutions, social and political power relations, and the political and economic environment influence each other."[4] We focus on the influence of the political and economic environment on the design of a policy to expand social protection in health in Mexico and on the behavior of the actors involved in its design and approval.

The concept of *policy cycle* refers to common patterns in the processes that lead to the design and implementation of a public policy.[5] This cycle describes how an issue moves from the recognition of a social problem to the adoption, implementation and evaluation of a public policy that seeks to solve it.[6,7] We focus on the initial stage of this cycle—adoption—which includes the identification and framing of the problem, its incorporation into the national policy agenda, the design of a possible solution, its debate in the legislature and other political circles, and its eventual approval. We do not assume that this is a linear process. On the contrary, we recognize the existence of important overlaps of these phases in ways that produce changes in how the problem is framed and the policy is formulated.

This project used two types of analysis: an analysis of the context and a stakeholder analysis. The analysis of the context was used to identify the enabling factors (epidemiological, political, and economic) that created the window of opportunity to place the problem of limited health care coverage in Mexico on the national policy agenda. We borrowed the idea of enabling factors from the behavioral sciences, referring to Andersen's behavioral model of families, which was widely used in the 1970s by health system and health management researchers. According to this model, enabling factors are forces that facilitate individual, collective, or environmental change based on their level of availability.[8–10] In this article, we looked for factors in Mexico that facilitated the identification of limited social protection in health as a major social problem and the design of a policy to solve it. However, these factors do not by themselves guarantee the incorporation of a policy into the government's agenda or its approval. Enabling factors are *not sufficient* conditions to create the adoption of a public policy. Adoption requires some *driving factors*, forces or agents that take advantage of enabling conditions to design, push, and negotiate a new public policy.

These driving factors are defined as the forces that trigger change in an organization or system; they are the forces that make change happen.[11,12] The driving factors of the SPH policies adopted by Mexico were identified through a stakeholder analysis of the negotiation process used by the Ministry of Health of Mexico (MoH) to promote the new national SPH policies adopted in the early 2000s. The stakeholder analysis was used to (1) construct a map of actors, positions, and power during the deliberation of these policies in the Mexican Congress;[13] (2) evaluate the "behavior, intentions, interrelations, agendas [and] interests" of key actors;[14,15] and (3) assess the influence and resources that actors brought to the debate and the strategies used by proponents to pursue and achieve adoption of the policies.

We gathered information for the two analyses of context and stakeholders through an academic literature review and direct interviews. We explored electronic databases using structured searches of Boolean combinations of the keywords "political," "economy," "universal," "health," "coverage," "care,"

"social," and "protection." JSTOR returned 1238 papers; PubMed, 203; BASE, 11; and Social Science Research Network, 4. We further refined our search by including the terms "Mexico," "Mexican," "reform," and "Seguro Popular." We identified 163 additional documents in Spanish (academic articles, institutional documents, technical reports) through personal contacts and a Google/Google Scholar search.

For the stakeholder analysis we compiled a list of the main actors involved in the discussion of SPH policies and collected information about them. We then developed a semistructured interview guide, which we used to interview a small set of key informants, including two researchers familiar with the Mexican reform and six actors directly involved in the discussion of SPH policies in the Congress or other political circles, including some former high officials of the MoH who participated directly in the negotiation process. The interviews were conducted by two authors (O.G.D. and F.G.L.). We asked each informant to validate our actor's inventory; identify the actors who supported or opposed the SPH policies; evaluate their level of power; assess their level of support or opposition to the policies; and discuss the reasons why different actors took particular stances. The input from these informants was used to adjust the stakeholder analysis as we conducted the interviews. With this information and the information gathered from academic and gray literature, we built a position map of major players using as reference the level of power of each actor and the level of support or opposition (or their indifference) to the proposed policies. Permission was requested to tape the interviews, which were transcribed. The map, the discussion, and the conclusions constitute a blend of the opinions of both the informants and the authors. We promised to share a draft of the article for comments with all informants and not to quote any of them by name without written permission. The institutional review board of the institution where the research project was based (National Institute of Public Health of Mexico) granted an exemption of review by the ethical committee on the basis that the interviews did not place the informants at any type of risk.

In sum, the study used a blend of perspectives: (1) inside information provided by one of the authors (O. G. D.) who was involved in the reform process and some key informants; (2) an external perspective provided by one of the authors (M. R. R.), who was not involved in the reform process; and (3) finally, information gathered from academic and gray literature.

CONTENT OF SPH POLICIES IN MEXICO

Until 2003, access to comprehensive health services in Mexico with financial protection was limited to the workers of the formal sector of the economy and their families, through social security. Health services for this salaried population were provided mostly by the Mexican Social Security Institute (IMSS; for private sector workers) and the Institute for Social Security and Services for Civil Servants (ISSSTE; for public sector workers). The rest of the population received health services either from the MoH under public assistance or by purchasing services in the private market. On February 3, 1983, an amendment to Article 4 of the Mexican constitution created a new right to the protection of health,[16] which established the constitutional platform for pursuing universal SPH policies. However, it was not until 2003 that the secondary laws and the financial mechanism to guarantee the universal and effective exercise of this right were approved by the Mexican Congress with the creation of the System of Social Protection in Health.[3] It is important to mention that the original vision of the reform was a unified system that would cut across all of the Mexican health sector, but that idea was abandoned due to resistance from the IMSS director general and the IMSS trade union, resulting in a reform of just the main institution providing services to the nonsalaried population, the MoH.

Mexico's new system of social protection was able to expand access to comprehensive health care with financial protection by increasing funding for health by over one full percentage point of GDP over a period of eight years. The vehicle for achieving this goal is a public insurance scheme called *Seguro Popular* (SP), funded predominantly through federal and state subsidies. Funding for the 32 state ministries of health, which are the local providers of health services, is now determined by the number of individuals affiliated to SP and is thus driven by demand.[3] SP guarantees access to over 280 interventions (as of December 2014), including all interventions offered at the primary and secondary levels of care.[17] It also covers a package of 59 high-cost interventions, including treatment for all cancers in children, HIV/AIDS, cervical and breast cancer, and myocardial infarction in adults under 60, among others.[18] The law creating the system of social protection in health established that SP would gradually expand affiliation over seven years (adding around 1.7 million families a year).[19] The number of health interventions covered by SP also increased gradually to reach its present number. The program has expanded significantly, so that by June 2013, over 45 million people were enrolled in it.[20] When this figure is added to those enrolled in social security institutions (49.5 million) and those with private health insurance (4.0 million), it shows that Mexico has made great progress in pursuing universal SPH in the past decade (**Table 1**), leaving only around 16% of the population without health insurance.

Population	Number (million)	%
Enrolled in SP	46.5*	39.2
Enrolled in social security institutions	49.5	41.8
With private health insurance**	4.0	3.4
With no health insurance***	18.5	15.6
Total	118.5	100

*The figure of SP affiliates is a mid-point between the figure offered by the National Commission for Social Protection in Health for 2013 (52 million) and that offered by the National Employment and Social Security Survey 2013 (41 million).
**It is estimated that half of those with private health insurance also hold public health insurance. This figure includes those with private health insurance only.
***The number of people with no health insurance is an estimate, based on national household surveys.
Sources: Refs. 20, 54, and 55.

TABLE 1. Estimates of Health Care Coverage in Mexico, 2013

ENABLING FACTORS

Three contextual factors created a window of opportunity for the adoption of policies to pursue the expansion of SPH in Mexico: the epidemiological transition, the democratic transition, and relatively high rates of economic growth.

Globally, the proportion of total deaths and disability-adjusted life years attributed to noncommunicable diseases (NCDs) has been increasing in recent decades, and the proportion of total deaths and disability-adjusted life years attributed to communicable ailments has decreased.[21] In Mexico, in 1990, 55% of total deaths were due to NCDs. By 2000 this figure had reached 69%.[22,23] The pressure of this health transition was adversely affecting the performance of the Mexican health system and demanding additional financial resources, transformations in the prevailing models of care, and new organizational behaviors to address the social and behavioral risks associated with the rising NCD pathologies. Indeed, health policy analyses about Mexico in the 1990s typically began with an explanation of the epidemiological transition and the aging process and their impacts on health expenditures, reflecting the importance of this contextual factor in setting the stage for a transformation of the Mexican health system.

Mexico also witnessed a trend toward growing democratization in the late 20th century. After six political and electoral reforms (1977, 1986, 1989–90, 1993, 1994, and 1996), the authoritarian-minded Institutional Revolutionary Party (PRI), which ruled Mexico for most of the 20th century, was ousted from the presidency in the 2000 national elections by Vicente Fox, the candidate of the conservative National Action Party (PAN). This election helped establish an effective multiparty system, based on the design and implementation of reliable electoral mechanisms, and led to the beginning of political alternation at the national level.[24,25]

Finally, positive economic growth rates in Mexico around the turn of the century helped mobilize additional public financial resources for social development, including health care, which contributed to a willingness by government leaders to consider greater efforts at expanding access to health care. The average economic growth rate in the period 1990–2002 was 3.4% for Mexico.[26] This relatively prosperous situation was reflected in rising health expenditure. Between 1995 and 2002, health expenditure per capita in Mexico (in PPP$) increased from 388 USD to 584 USD.[27]

These contextual factors created a window of opportunity for placing the problems of limited health care coverage onto the national policy agenda and helped frame a policy proposal to expand social protection in health in Mexico. The increasing prevalence of NCDs was a major reference point in the design of SPH policies in Mexico. Advocates for reform consistently referred to the epidemiological transition as one of the main reasons for mobilizing additional resources for health. Mexico's changing epidemiological profile had been thoroughly documented since the mid-1990s using both traditional health indicators as well as newly developed burden of disease indicators.[28] The transition was also addressed in relation to a possible reform in policy briefs extensively discussed by the transition team of President Fox and in the National Health Program 2001–2006 launched in July of 2001.[29,30] In short, the transformations in national disease patterns were presented as requiring transformations in the national health system.

Mexico's democratization process was also crucial in opening the opportunity for reform in the health sector. This is consistent with the experiences in other countries where democratization has created opportunities to expand social welfare policies, including health policies targeting a broader proportion of the population.[31–33] Mexico's democratization process opened political space for health reform, as has occurred in other countries such as Brazil, Ghana, South Africa, and South Korea. The elections in 2000 ended the single-party corporatist rule that had dominated Mexico for 71 years. The benefits (including comprehensive health care) that were traditionally reserved for certain interest groups (mostly the unions of salaried industrial workers and civil servants) associated with the old regime now could be extended to all citizens, including the nonsalaried population.

The promoters of the reform for Mexico's health system recognized the historical moment and adopted the "democratization of health" as a core purpose, thereby placing health reform within the broader political agenda of the Fox administration.[30] They defined the democratization of health as "the application of the norms and procedures of

citizenship to those institutions that were governed using other principles such as coactive control, social tradition, judgment of specialists and managerial practices."[34] They then translated this broader objective into a set of guiding ethical principles that were explicit in the National Health Program 2001–2006: citizenship, solidarity, and pluralism.

Finally, the high rates of economic growth in the two decades of the 1990s and 2000s also helped open political space for health reform, by generating additional resources that could be used to expand SPH. Economic growth is an element that has been identified by Savedoff and colleagues as a common feature of many successful universal health coverage efforts.[35] It should be noted, however, that circumstances of economic crisis can also sometimes provide an impetus for health reform, as was the case with the creation of the Unified Health System or SUS in Brazil.[36] Mexico's economic growth was not explicitly used to promote the health reforms, but it gave the advocates of reform political and economic space for negotiations with the Ministry of Finance (MoF), as did the extraordinary oil revenues that boosted the federal budget in the early years of the new century.[a]

DRIVING FACTORS

The Mexican health reform is a classic example of minister-driven reform. The Minister of Health (Dr. Julio Frenk), with a team of people working closely with him, designed, developed, and drove the reform process, from beginning to end. The minister had headed several academic efforts since the late 1980s to examine the challenges confronted by the Mexican health system, especially demands associated with the epidemiological transition, and to propose specific measures to reform the Mexican health system.[37,38] These previous efforts helped (1) identify and frame the problems faced by the Mexican health system; (2) place the health reform issue on the national political agenda; and (3) provide a platform for designing a reform proposal to present to the Fox administration and the Mexican Congress.

The minister's reform team included persons with both strong technical and political skills, features found in other successful "change teams."[33] This team took charge of promoting the policy proposal among the main actors involved directly or indirectly in the approval process: the heads of the social security institutions, the leaders of the three main political parties (the centrist PRI, the PAN, and the left-of-center Party of the Democratic Revolution or PRD), the leaders of the health sector unions, and other ministries and government bodies, such as the MoF, state governors, and members of Congress.

In 2001–2002, soon after the start of the Fox administration, the minister of health initiated a pilot program for health reform in five states. This pilot program was both a substantive effort (to show that the proposed changes would work) and a political strategy (to generate political support for the reform). Positive results from the pilot were crucial in generating support from the president, who, in the second half of 2002, allowed the minister of health to discuss the possibility of moving forward with reform with the minister of finance.

Efforts to promote the reform started in early 2002, once results became available from the pilot program. These efforts focused initially on the president and next on two key groups: high officials of the MoF (who would need to approve the reform proposal, before it could go forward) and members of Congress (who would need to vote on and approve a draft law).

Negotiations with the minister of finance were aided by the fact that some members of the MoH negotiating team had strong technical training in economics (including one person whose PhD in economics came from the same university as the minister of finance) and could discuss the proposal with MoF officials in their own language, including epidemiological data as well as economic analysis. Two ideas that were well received by MoF officials became part of the reform proposal that was sent to Congress: the idea of a demand-subsidy orientation and gradual implementation over a period of 7 years.

The negotiations with the MoF also included discussion of the need to expand public expenditure on health by one percentage point of GDP in order to reach universal coverage of social protection in health in Mexico. This figure made the Mexican financial authorities extremely nervous. In the initial negotiation phases, the MoF wanted to make the implementation of health reform conditional on the approval of fiscal reform. Given the fact that a previous fiscal reform attempt had failed, this would have been, in the words of Jason Lakin, "the kiss of death" for the reform.[39] This condition was rejected by the minister of health, but he was forced to include it in the draft law sent to the Mexican Congress for debate. Eventually, its exclusion was demanded by a group of senators from the PRI in the negotiation process, arguing that they could not pass a law that lacked the financial resources for implementation.[40]

In parallel, the reform team started lobbying members of Congress. Conversations and negotiations with them started when the reform was still in the design phase and included over 100 meetings by the minister of health and his team with the leaders in Congress of the main political parties, the most prominent members of the senate and the chamber of deputies, and members of the Health and Finance Commissions of the Congress. The strategy used to negotiate with

legislators supporting and opposing the reform proposal was straightforward: to (1) explain that the nature of the reform was consistent with the political platforms of all of the Mexican parties represented in Congress; (2) explain in detail the content and potential impacts of the reform; and (3) inform legislators that changes and additions to the reform proposal were welcome.

Opponents of the reform, in turn, voiced their opposition in various locations: the national and local press, debates in Congress, academic conferences and informal fora, and private meetings. They sought to convince members of Congress and public opinion to oppose the reform initiative. The opponents knew that reform supporters had enough votes, between the PAN and the PRI, to pass the reform proposal. Once the opponents realized that seeking to convince PRD legislators alone was a lost cause, they redirected their efforts at trying to change the votes of reform supporters. Reform promoters, on the other hand, did not seek to counteract the efforts of opponents, other than securing the votes of supporters in Congress, by stressing the potential benefits of the reform among those directly involved in its negotiation.

The position map in **Table 2** shows that the main driver of SPH policies in Mexico was the minister of health, who counted on strong support from the president and the great majority of PAN legislators, as members of the political party in power. The reform initiative received medium support from most state governors, who were expecting additional financial resources for health, and a large group of PRI members of Congress, who could not easily dismiss a reform proposal designed and promoted by a group of technocrats who had been high officials in three previous PRI administrations and with whom many of them had strong, long-standing personal and professional relationships. Various prominent members of the PRI were part of the Health Commission of the Senate and key supporters of the reform, including two former directors of IMSS and the leader of the MoH trade union and national leader of the Civil Servants Unions Federation (*Federación de Sindicatos de Trabajadores al Servicio del Estado* or FSTSE). The MoH union offered modest support to the reform proposal on the assumption that additional financial resources associated with the new insurance scheme would eventually improve the working conditions of the employees of the federal and state ministries of health. Finally, based on the negotiations discussed above, the powerful MoF showed guarded support for proposed reform.

Four important actors staunchly opposed the reform: a large fraction of the leftist PRD headed by the mayor and the minister of health of Mexico City, the leaders of the IMSS trade union, the director general of IMSS, and two prominent figures of the National Autonomous University (*Universidad Nacional Autónoma de México* or UNAM), the rector (and former minister of health) and the dean of the School of Medicine (and former vice minister of health).

Within the PRD, the minister of health of Mexico City, a long-standing personal rival of the federal minister of health, was the most active opponent of the reform. She argued that a personal financial contribution to SP (as an annual premium) was incompatible with the idea of health care as a social right.[41] The draft law included a premium scaled according to income class, with the lowest two deciles exempt from paying. She also stated that the proposed insurance scheme was designed according to a managed competition model, would increase the segmentation of the Mexican health system, and would grow at the expense of social security institutions.[42,43] She was also concerned that SP would undermine a free health care program that she had started in Mexico City (*Programa de Servicios Médicos y Medicamentos Gratuitos*, Free Health Care and Drugs Program). Her position was supported by Mexico City's mayor (Andrés Manuel López Obrador), a powerful political figure (who ran for president in 2006 and 2012), and a large number of PRD members in Congress (including the head of the Health

High Support	Medium Support	Low Support	Non-mobilized	Low Opposition	Medium Opposition	High Opposition
Minister of health	State governors	Minister of Finance	Private sector			PRD
President	PRI	MoH Union	Beneficiaries			Mexico City's major
PAN			Media			IMSS union
						Head of IMSS
						UNAM Rector and Dean of the School of Medicine
	High power		Medium power		Low power	

TABLE 2. Position Map for Players in the Mexican Health Reform (First Trimester of 2003). Based on Ref. 56

Commission in the Senate), but not all. She was also unable to persuade any of the governors or ministers of health of the four other states governed by the PRD (Baja California Sur, Michoacán, Tlaxcala, and Zacatecas) to join her in opposition to the proposal.

Serious opposition also arose from the leaders of the IMSS trade union, through newspaper declarations and through their representatives in Congress. They opposed the proposal by arguing that the reform would generate a redistribution of public resources for health that would negatively affect social security institutions.[44] They also felt threatened by a new form of social insurance that separated financing of health care from the direct provision of services, which disrupted the union's traditional model in IMSS, where a single organization provided both financing and services for its members.

The IMSS director general opposed the reform by claiming that SP would grow at the expense of IMSS and stimulate informality in the labor force.[45] On the latter point he argued that providing nonsalaried workers with better health services through a new insurance scheme would create a disincentive to joining the formal workforce and would thereby slow down economic growth in Mexico. He was also concerned that the new insurance scheme would threaten the existence of *IMSS-Oportunidades* (IMSS-O), a federal program for the rural poor managed by IMSS. This fear was shared by IMSS union leaders, who were negotiating the incorporation of IMSS-O workers into their membership.

Finally, the rector of UNAM and the dean of its School of Medicine opposed the creation of SP arguing that a better alternative was the gradual incorporation of the nonsalaried population into IMSS, using the optional Health Insurance for the Family (*Seguro de Salud para la Familia*) offered by IMSS to people ineligible for conventional social security. This option, however, was discussed at the beginning of the Fox administration and was rejected by both the IMSS trade union and the IMSS director general. The dean, a prominent member of the PRI, occasionally used his weekly column to oppose the reform, which he characterized as privatizing and demagogic, but his articles, published in a low-circulation national newspaper, had little influence on Mexican legislators or on public opinion.[46,47] A few months after the reform was approved, he anticipated its failure using dramatic language: "[The promoters of SP] . . . will be responsible before history for the weakening of public policies, the lack of health care coverage, and the fatal parenthesis they have opened which is causing disease, pain and death in spite of what was previously accomplished." [48]

Mexico's private sector (insurance, providers, and pharmaceutical industry), health-related nongovernmental organizations, and the beneficiaries themselves showed no clear preference or strong position on the reform proposal. The lack of mobilization of the last two actors illustrates the limited public debate around health issues in Mexico, the organizational weakness of Mexican physicians as an autonomous interest group, and the scarcity of civil society organizations in health, reflecting the low political power of Mexican citizens in the health arena.

The reform bill was sent to Congress by the minister of health on November 12, 2002. During the negotiation process, 100 amendments were made and 21 transitory articles were introduced before the bill reached its final form. The reform, with all of the amendments and transitory articles, was approved about five months later, on April 30, 2003, with 92% of the votes of the Senate (83 votes out of a total of 90) and 72% of the votes of the Chamber of Deputies (305 votes out of a total of 425).[49–51] Several PRD senators and all of the PAN, PRI, and Mexico's Green Ecological Party senators voted in favor of the law. Voting in the Chamber of Deputies was more complex. All of the PAN representatives present in the voting session (187), with the exception of one, voted in favor of the bill; 102 of the 160 PRI representatives present in the voting session also voted in favor; and the 45 PRD representatives present in the voting session voted against it.[52] Finally, 16 of the 25 remaining representatives of the other political parties present in that session voted in favor of the creation of *Seguro Popular* and nine voted against it.

CONCLUSIONS

Several conclusions may be drawn from the negotiation of SPH policies in Mexico and the legislative approval process that took place in 2002 and 2003.

First is the importance of contextual factors. Changes in the epidemiological profile of the Mexican population, a major step forward in the process of democratization, and the relatively high rates of economic growth all contributed to create a window of opportunity to introduce policies that would expand SPH. These enabling factors may not all be necessary to create opportunities for major reform (in Mexico or elsewhere), but they certainly are not sufficient. They create the context and open political space, which political actors can then exploit to move a reform proposal forward and create the circumstances for adoption. This process is inevitably political for a major reform because the proposal promises to change who gets what in society, an intentional redistribution of resources.

Second, the Mexican experience shows that the problem needs to be framed in ways that will attract the attention and

support of the main political actors so that the proposal can be incorporated into the national policy agenda. The Mexican reform proposal had to be designed to fit with the ongoing epidemiological, political, and economic transitions, so that key political actors would view the proposed changes in the health system as desirable, feasible, and necessary. Opposition to the reform was addressed by consistent arguments and analysis about the reform's anticipated benefits and by securing the firm commitment of legislative supporters in the Mexican Congress.

Third, the Mexican experience demonstrates that policies to expand health care coverage may be successfully promoted even by conservative governments because they can be persuaded to recognize the social, political, and economic importance of investments in health. The Mexican health reform was driven by the minister of health with strong support from the president and his center-right political party (PAN), medium support from the centrist PRI, and guarded conditional support from the MoF. Putting together this alliance of supporters required intense lobbying and persuasion by the minister of health and his change team. Without their efforts to bring together these diverse groups, the reform proposal would not have moved forward and would not have been adopted.

The Mexican reform process also suggests that a supportive relationship with the MoF is a necessary condition for approval of a reform proposal. The failure of the fiscal reform proposal in the initial years of the Fox administration encouraged the financial authorities to resist efforts to expand health care coverage. Three elements of the reform proposal aided negotiations with the MoF: the gradual expansion of population coverage, the gradual expansion of the covered benefits, and the demand-oriented nature of the proposal. The anticipated growth of the federal budget due to the expansion of oil revenues was also very helpful. Negotiators used all of these factors, explained in high-quality analysis prepared by the MoH through its Economic Analysis Unit, to argue that the proposed new system would not break the bank. But it was the sturdy support of President Fox that ultimately disabled the continuing resistance of the MoF. In this case, the decisiveness of the political leader trumped the cautiousness of the economic bureaucracy.

A fifth conclusion is that a pilot project phase can serve both substantive and political motives. The overall positive results of this experiment in Mexico were extremely useful in subsequent discussions with most political actors, to provide substantive arguments and evidence about how the reform would work. The pilot projects also showed the governors that the reform, if adopted, could provide significant new financial resources for them to use and allocate (with some flexibility) in their states. This experience suggests that evidence of practical feasibility and impacts, along with promises of new resources, can improve the chances of legislative approval for controversial policy reforms.

The SP experience also suggests that evidence alone is not sufficient to push a major reform forward to adoption. No matter how wide the window of opportunity is, how well placed the problem is in the national agenda, and how well framed the policy under negotiation is, legislative approval requires effective political strategies. Three factors of the Mexican experience should be highlighted: first, the existence of a team of negotiators with both technical and political skills; second, the early contacts with all stakeholders; and third, the repeated personal meetings with all relevant actors by the change team and the minister of health. In addition, requests from some stakeholders were taken seriously and incorporated into the proposal, as reflected in the 100 amendments that were included in the final bill. None of these were considered to be deal-breakers, according to most individuals interviewed for this article. But the compromises helped persuade reluctant legislators to support the bill.

Finally, the SP process shows that actors who usually support certain public policies may sometimes follow their political interests rather than their social values. The IMSS trade union and a large portion of the left-wing party (PRD), seeking to protect their organizational interests and existing benefits, opposed the reform even though it was intended to benefit mostly poor people. For example, John Scott has written that SP is one of Mexico's two most fiscally progressive public initiatives of the past two decades.[53] Nonetheless, the PRD, in this case, acted more as an opposition party might be expected to behave, driven in part by Mexico City's minister of health. This example suggests that, in certain circumstances, the defense of immediate labor, organizational, and even personal interests may be more relevant for political organizations (unions, political parties, and political actors) than the defense of a social goal (the expansion of social protection in health) that is strongly associated with working-class and left-wing traditions.

This analysis of the negotiation process of adopting Mexico's health reform underlines the importance of political factors in the approval of public policies that seek to expand social protection in health. Given the redistribution of resources and power implied in these reform processes, it is necessary to study, when evaluating them, the institutional, political, and economic contexts in which these policies are promoted and explore the interests, intentions, and power of the main stakeholders.

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

No potential conflicts of interest were disclosed.

NOTE

[a] The price of the barrel of crude oil increased from less than 25 USD in early 2003 to over 40 USD in 2004, 75 USD in 2006, 99 USD by the end of 2007, and 141 USD in August of 2008, the highest levels in history.[57]

REFERENCES

[1] Gakidou E, Lozano R, González-Pier E, Abbott-Klafter J, Barofsky JT, Bryson-Cahn C, Feehan DM, Lee DK, Hernández-Llamas H, Murray CJL. Assessing the effect of the 2001–06 Mexican health reform: an interim report card. Lancet 2006; 368(9550): 1920–1935.

[2] King G, Gakidou E, Imai K, Lakin J, Moore RT, Nall C, Ravishankar N, Vargas M, Téllez-Rojo MM, Avila JE, et al. Public policy for the poor? A randomized assessment of the Mexican universal health insurance programme. Lancet 2009; 373(9673): 1447–1454.

[3] Knaul FM, González-Pier E, Gómez-Dantés O, García-Junco D, Arreola-Ornelas H, Barraza-Lloréns M, Sandoval R, Caballero F, Hernández-Avila M, Juan M, et al. The quest for universal health coverage: achieving social protection for all in Mexico. Lancet 2012; 380(9849): 1259–1279.

[4] Van Breukelen AM. Drivers of change: understanding the forces for poverty reduction. In: A rich menu for the poor: food for thought on effective aid policies. The Hague: Ministry of Foreign Affairs; 2007.

[5] Encyclopedic Dictionary of Public Administration. Policy cycles. n.d. Available at http://www.dictionnaire.enap.ca/dictionnaire/docs/definitions/definitions_anglais/policy_cycles.pdf (accessed 10 September 2014).

[6] Hardee K, Feranil I, Boezwinkle J, Clark B. The policy circle: a framework for analyzing the components of family planning, reproductive health, maternal health, and HIV/AIDS policies. Available at http://www.policyproject.com/pubs/workingpapers/wps-11.pdf (accessed 10 September 2014).

[7] Roberts MJ, Hsiao W, Berman P, Reich MR. The health-reform cycle. In: Getting health reform right. A guide to improving performance and equity, Roberts MJ, Hsiao W, Berman P, Reich MR, eds. Oxford: Oxford University Press; 2004; 21–39.

[8] Andersen RM. Behavioral model of families' use of health services. Chicago: Center for Health Administration Studies, University of Chicago; 1968.

[9] Gilmore GD. Enabling factors. 2013. Available at http://www.oxfordbibliographies.com/view/document/obo-9780199756797/obo-9780199756797-0081.xml (accessed 19 December 2014).

[10] Mercer SL. Enabling factors. 2002. Available at http://www.encyclopedia.com/doc/1G2-3404000298.html (accessed 19 December 2014).

[11] University of Houston–Victoria. Driving forces (or change drivers). n.d. Available at http://www2.uhv.edu/wang/MGT6331/Questions/Driving%20forces%20vs.%20Key%20Success%20Factors.htm (accessed 19 January 2015).

[12] Dictionary Revers. Driving factors. 2014. Available at http://dictionary.reverso.net/english-cobuild/driving%20factors (accessed 20 December 2014).

[13] Roberts M, Hsiao W, Berman P, Reich MR. Political analysis and strategies. In: Getting health reform right. A guide to improving performance and equity, Roberts MJ, Hsiao W, Berman P, Reich MR, eds. Oxford: Oxford University Press; 2004; 61–89.

[14] Brugha R, Varvasovszky Z. Stakeholder analysis: a review. Health Pol Plan 2000; 15(3): 239–246.

[15] Varvasovszky Z, Brugha R. How to do (or not to do) a stakeholder analysis. Health Pol Plan 2000; 15(3): 338–345.

[16] Decreto por el que se adiciona con un párrafo penúltimo el artículo 4 de la Constitución Política de los Estados Unidos Mexicanos [Decree Adding a Penultimate Paragraph to Article 4 of the Political Constitution of the United Mexican States] DIARIO OFICIAL DE LA FEDERACIÓN [D.O.]. 1983. Available at https://www.scjn.gob.mx/normativa/analisis_reformas/Analisis%20Reformas/00130125.pdf (accessed 4 February 2015)

[17] Comisión Nacional de Protección Social en Salud. Catálogo Universal de Servicios Esenciales de Salud 2014 [Universal Catalogue of Essential Health Services 2014]. Mexico City: Secretaría de Salud; 2014. Available at http://www.seguro-popular.gob.mx/images/Contenidos/gestion/Anexo%20I%202014.pdf (accessed 22 January 2015)

[18] Comisión Nacional de Protección Social en Salud. Fondo de Protección contras Gastos Catastróficos (Fund for the Protection against Catastrophic Expenditures). Available at http://www.seguro-popular.gob.mx/index.php/servicios/sistema-de-gestion-de-gastos-catastroficos (accessed 5 November 2014)

[19] Frenk J. Bridging the divide: global lessons from evidence-based health policy in Mexico. Lancet 2006; 368(9550): 954–961.

[20] Comisión Nacional de Protección Social en Salud. Seguro Popular. Informe de Resultados Enero-Junio 2013 (Popular health insurance. Results report January-June 2013). Mexico City: Comisión Nacional de Protección Social en Salud; 2014. Available at http://gaceta.diputados.gob.mx/Gaceta/62/2013/ago/Inf_Salud-20130816.pdf (accessed 17 June 2015)

[21] Institute for Health Metrics and Evaluation. The global burden of disease: generating evidence, guiding policy. Seattle, WA: IHME; 2013.

[22] Secretaría de Salud. Programa Nacional de Salud 2007–2012. Por un México sano: construyendo alianzas para una mejor salud [National Health Program 2007–2012. Towards a healthy Mexico: building alliances for a better health]. Mexico City: Secretaría de Salud; 2007.

[23] Institute for Health Metrics and Evaluation. Data visualizations. Mexico. Mortality. n.d. Available at http://www.healthdata.org/results/data-visualizations (accessed 15 May 2015)

[24] Woldenberg J. Democracia y desesperanza [Democracy and despair]. Letras Libres 2014; XVI(192): 21–24.

[25] Bartra R. La corrupción corroe la democracia [Corruption erodes democracy]. Letras Libres 2015; XVII(193): 22–23.

[26] The World Bank. Data. GDP growth (annual %). n.d. Available at http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG (accessed 25 June 2013)
[27] World Health Organization. National health accounts. Country health information. n.d. Available at http://www.who.int/nha/country/en/#B (accessed 15 May 2015)
[28] Frenk J, Lozano R, González-Block MA, Ruelas E, Bobadilla JL, Zurita B, Cruz C, Alvarez F, González-Rosseti A, Querol J, et al. Economía y salud. Propuestas para el avance del sistema de salud en México [Health and the economy. Proposals for progress in the Mexican health system]. Mexico City: Fundación Mexicana para la Salud; 1994.
[29] Equipo de Transición del Presidente Electo de México, Coordinación de Salud y Seguridad Social. Salud inversión para un desarrollo con oportunidades. Propuesta estratégica para mejorar el desempeño del sistema de salud en México [Health: Investment for development with opportunities. Strategic proposal to improve the performance of the Mexican health system). Unpublished.
[30] Secretaría de Salud. Programa Nacional de Salud 2001–2006. La democratización de la salud en México. Hacia un sistema universal de salud [National Health Program 2001–2006. The democratization of health in Mexico. Towards a universal health system]. Mexico City: Secretaría de Salud; 2001.
[31] Grépin KA, Dionne KY. Democratization and universal health coverage. A case comparison of Ghana, Kenya, and Senegal. Global Health Governance 2013; 6(2): 1–27.
[32] Carbonne G. Do new democracies deliver social welfare? Political regimes and health policy in Ghana and Cameroon. Democratization 2012; 19(2): 157–183.
[33] Wong J. Healthy democracies: welfare politics in Taiwan and South Korea. Ithaca: Cornell University Press; 2006.
[34] O'Donnel G, Schmitter P. Transiciones desde un gobierno autoritario [Transitions from an authoritarian government]. Buenos Aires: Paidos; 1991; 22–23.
[35] Savedoff WD. Political and economic aspects of the transition to universal health coverage. Lancet 2012; 380(9845): 924–932.
[36] Fox A, Reich MR. Political economy of reform. In: Scaling up affordable health insurance: staying the course, Preker AS, Lindner ME, Chernichovski D, Schellekens OP, eds. Washington, DC: The World Bank; 2013; 395–434.
[37] Frenk J, Bobadilla JL, Sepúlveda J, López-Cervantes M. Health transition in middle-income countries: new challenges for health care. Health Pol Plan 1989; 4(1): 29–39.
[38] Frenk J, Frejka T, Bobadilla JL, Lozano R, Sepúlveda J, José M. The epidemiologic transition in Latin America. Bol Of Sanit Pan Am 1992; 111(6): 485–496.
[39] Lakin JM. The end of insurance? Mexico's Seguro Popular, 2001–2007. J Health Politics Pol Law 2010; 35(3): 313–352.
[40] Ortiz M. El Seguro Popular: una crónica de la democracia mexicana [Popular Health Insurance: chronicle of the Mexican democracy]. Mexico City: Fondo de Cultura Económica; 2006.
[41] Laurell AC. Sistema de Protección Social en Salud/Seguro Popular. In: Seguro Popular/Ideas para el Debate [Popular Health Insurance/Ideas for debate], Brugada-Molina C, ed. Mexico City: Centro de Producción Editorial; 2004; 23–28.
[42] Laurell AC. El Programa de Servicios Médicos y Medicamentos Gratuitos está más apegado a la esencia del derecho a la salud que el Seguro Popular. In: Seguro Popular de Salud. Siete perspectivas [Popular Health Insurance. Seven perspectives], Gómez-Dantés O, ed. Cuernavaca: Instituto Nacional de Salud Pública; 2006; 35–40.
[43] Laurell AC. Health system reform in Mexico: a critical review. Int J Health Serv 2007; 37(3): 515–535.
[44] Milenio Diario. Sindicato del IMSS advirtió del riesgo en seguridad social [IMSS union warns of risk to social security]. 2003.
[45] Levy S. Good intentions, bad outcomes. Social policy, informality and economic growth in Mexico. Washington, DC: Brookings Institution Press; 2008.
[46] Narro J. Lo público y lo social. El Seguro Popular de Salud: una regresión [The public and the social. Popular Health Insurance: a regression]. El Sol de México; 4 November 2002; 9A.
[47] Narro J. Lo público y lo social. Insisto, el problema es que no aprenden [The public and the social. I insist, the problem is that they don't learn]. El Sol de México; 25 November 2002; 9A.
[48] Narro J. Porque ellos lo dicen [Because they say so]. El Sol de México; 26 January 2004; 9A.
[49] El Senado aprueba el Seguro Popular [The Senate approves Popular Health Insurance]. Imagenmedica; 31 July 2014. Available at http://www.imagenmedica.com.mx/portal/index.php/reportajes-menu/reportajes-2003/125-abril-2003/648-el-senado-aprueba-el-seguro-popular (accessed 3 November 2014)
[50] El Universal. Aprueban la creación del Seguro Popular [Popular Health Insurance is approved]. Available at http://www.eluniversal.com.mx/nacion/96042.html (accessed 3 November 2014)
[51] Frenk J. El Seguro Popular de Salud es un instrumento de justicia social. In: Seguro Popular de Salud. Siete Perspectivas [Popular Health Insurance. Seven perspectives], Gómez-Dantés O, ed. Cuernavaca: Instituto Nacional de Salud Pública; 2005; 15–23.
[52] Centro de Estudios Sociales y de Opinión Pública de la Cámara de Diputados de México. Programa Seguro Popular [Popular Health Insurance Program]. Mexico City: Cámara de Diputados; 2005.
[53] Scott J. 10 puntos para entender el gasto en equidad en México: consideraciones sobre la desigualdad y la exclusión [10 arguments to understand expenditure in equity in Mexico: considerations on inequity and exclusión]. Mexico City: Centro de Análisis de Políticas Públicas; 2011. Available at http://www.mexicoevalua.org/wp-content/uploads/2013/02/MEX_EVA-INHOUS-GASTO_EQUI_LOW.pdf (accessed 7 November 2014)
[54] CNN Expansión. Seguros de gastos médicos a la medida [Health insurance made to measure]. August 15, 2013. Available at http://www.cnnexpansion.com/mi-dinero/2013/08/15/un-seguro-de-gastos-medicos-a-la-medida (accessed 17 June 2015)
[55] Instituto Nacional de Estadística y Geografía, Mexico. Encuestas Nacional de Empleo y Seguridad Social 2013 [National Employment and Social Security Survey 2013]. Mexico City: INEGI; 2013. Available at http://www.inegi.org.mx/prod_serv/contenidos/espanol/bvinegi/productos/encuestas/hogares/eness/2014/702825058777.pdf (accessed 17 June 2015)
[56] Policymaker 4 software. Computer-assisted political analysis. Available at http://www.polimap.com (accessed 17 June 2015)
[57] InvestmentMine. Historical crude oil prices and price chart. Available at http://www.infomine.com/investment/metal-prices/crude-oil/all (accessed 4 February 2015)

Capítulo 2.
Políticas y gobernanza en salud

El análisis de políticas de salud es un componente inherente de la investigación en sistemas de salud. Su enfoque se centra en los mecanismos sociales a través de los cuales pueden alcanzarse los objetivos definidos por la estructura y los distintos programas de salud. Este tipo de análisis está en la base del desarrollo de esfuerzos conceptuales y metodológicos dirigidos a generar evidencia pertinente para el diseño, la implementación, la evaluación y la retroalimentación de la toma de decisiones en cada una de estas etapas del desarrollo de las políticas.

Desde su fundación, el CISS ha impulsado la investigación en políticas de salud como parte de su quehacer, recuperando tradiciones analíticas que han favorecido la conformación de un acervo sólido para analizar el devenir del sistema mexicano de salud y problematizar sus inercias y retos a fin de responder a las necesidades de la población, particularmente, de los grupos vulnerables. Un elemento central de este quehacer ha sido la identificación de oportunidades para mejorar el acceso a servicios médicos a poblaciones que carecen de cobertura de seguros públicos.

El análisis de políticas de salud ha sido un componente transversal al interior del CISS. El centro ha desarrollado investigaciones sobre programas de extensión de cobertura y provisión de servicios médicos; análisis de diversos procesos políticos y del rol de actores clave, así como análisis de barreras y oportunidades para la consecución de las metas de las políticas de salud. Desde 2003, este tipo de investigación incorporó la perspectiva de gobernanza en salud, la cual resultó fundamental para profundizar en la comprensión de los mecanismos políticos mediante los cuales los actores se coordinan para dar cumplimiento a objetivos a partir de acuerdos y alianzas estratégicas.

Destacan los estudios de políticas de largo aliento como la descentralización de los servicios médicos, las reformas sanitarias y los ajustes estructurales a políticas de salud. En segundo lugar, sobresalen estudios de partes interesadas y análisis de grupos clave, en los que se ha procurado identificar el rol y la postura de los actores ante el esfuerzo por alcanzar algunos objetivos colectivos. Finalmente, arrojando luz sobre el rol de los actores y los mecanismos de acción, se han desarrollado investigaciones sobre la actividad política corporativa destinada a bloquear ciertas políticas de salud.

Los trabajos seleccionados reúnen los diferentes enfoques descritos en colaboraciones tanto al interior del CISS como a nivel global, así como la labor de investigadores y de personas egresadas de nuestros programas académicos.

Original research

BMJ Global Health

Challenges to the development of taxation policies for sugar-sweetened beverages in Colombia

Paula Andrea Cárdenas-Torres [1], Emanuel Orozco-Nuñez [1], Anahí Cristina Dreser-Mansilla [1], Christian Paul Torres-de la Rosa [2], Eliana María Pérez-Tamayo [3]

To cite: Cárdenas-Torres PA, Orozco-Nuñez E, Dreser-Mansilla AC, *et al*. Challenges to the development of taxation policies for sugar-sweetened beverages in Colombia. *BMJ Glob Health* 2024;**8**:e012074. doi:10.1136/bmjgh-2023-012074

Handling editor Eduardo Gómez

► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjgh-2023-012074).

Received 23 February 2023
Accepted 12 November 2023

Check for updates

© Author(s) (or their employer(s)) 2024. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

[1]Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública, Cuernavaca, Mexico
[2]El Poder del Consumidor AC, Ciudad de Mexico, Mexico
[3]Escuela de Nutrición y Dietética, Universidad de Antioquia Facultad de Medicina, Medellin, Colombia

Correspondence to
Prof. Emanuel Orozco-Nuñez; emanuel.orozco@insp.mx

ABSTRACT

Frequent consumption of sugar sweetened beverages (SSB) is related to the risks of developing overweight, obesity, cavities, diabetes and other diseases. Policies to significantly increase taxes on SSB have proven to be effective in reducing their consumption. The political debate on implementing these taxes in Colombia shows a series of barriers to placing this policy on the political agenda, and therefore, to its approval. This work analyses the political process involved in the struggle for the approval of an SBB tax in Colombia, as well as barriers and opportunities to putting it on the political agenda. This is done through a policy analysis with three research methods: a documentary analysis, political mapping of actors and semistructured interviews with key actors. Among the main findings, we have that actors who are in favour of the SSB tax stated that it is needed due to the health problems caused by SSB consumption, while those who opposed it argue that Colombia regulations are sufficient and already inform and educate consumers on excessive sugar consumption and its health implications. The Colombian political context is a barrier to SSB taxation, as the government favours and has a close connection with the food and SSB industry. In short, the policy issue has been reaching the agenda intermittently throughout the years. Nevertheless, new opportunities are arising after the COVID-19 pandemic and the 2022 administrative changes and further efforts from policy entrepreneurs are required to make this initiative progress in the political agenda.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Sugar-sweetened beverages (SSB) taxation policies have proven to be effective in protecting the population's health by reducing SSB consumption. Policy analysis is relevant to the adoption of these taxes in Latin American countries such as Colombia.

WHAT THIS STUDY ADDS

⇒ The development of coalitions is a relevant strategy to delay or block legislative and political processes related to the implementation of SSB taxation policies.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study aims to influence the governance of political processes. It provides evidence that political processes in Colombia need to be more transparent and the development of regulation needs to be free from conflicts of interest.

INTRODUCTION

Non-communicable diseases (NCDs) related to diet are becoming more frequent and are increasing in low-income and middle-income countries, due to the economic and political influence of companies that manufacture sugar-sweetened beverages (SSB), as well as to the lack of measures to regulate the purchases of such products and to the food nutritional transition.[1] World trends show that consumption of SSB is an important cause of metabolic diseases like obesity, type 2 diabetes and cardiovascular disease in various populations.[2] This problem has increased significantly in the last years since these products are more easily obtainable, especially in low-income areas.[3]

Frequent consumption of SSB is related to overweight, cavities and diabetes. SSB taxation policies have proven to be effective in reducing SSB consumption.[4] The adoption of a 20% tax on SSB in Colombia is delayed because of a series of barriers.[5] Commercial actors, in particular, have derailed, delayed or disrupted the development of such policies.[6]

The WHO recommends a 20% selective tax as minimum to discourage SSB consumption.[7] Worldwide, 74 countries (38%) who are members of the United Nations have taxed SSB.[8 9] In the region of the Americas, 21 countries (60%) of those belonging to the Pan American Health Organization established, to a greater or lesser extent, this type of selective tax at a national level.[4 8] Most of these

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Cárdenas-Torres PA, Orozco-Núñez E, Dreser-Mansilla AC, Torres-de la Rosa CP, Pérez-Tamayo EM. Challenges to the development of taxation policies for sugar-sweetened beverages in Colombia. BMJ Glob Health. 2024;8(supl 8):e012074. https://doi.org/10.1136/bmjgh-2023-012074

BMJ Global Health

experiences have been criticised to a certain degree since they increase tax revenue without modifying behaviours, nor are they aligned with the 20% tax recommended by the WHO to achieve an impact on public health.[9] Despite the above, some studies found that in countries where this policy was implemented, such as Mexico, Chile and Barbados, SSB sales decreased.[10–13]

In the case of Colombia, approval of a selective tax on SSB has been sought several times, since 2016.[14 15] The main obstacle which has been documented in scientific literature is the relationship that the SSB industry has with some educational and research institutions, as well as with the government.[16] The SSB industry exerts a political and economic influence on diverse actors who participate in the policy processes,[17] and uses persuasion and lobbying to block the approval of an increase in SSB taxation.[18] Little is known about opportunities existing in the present political and social context, with the recent elections in the executive and legislative branches, and in the postpandemic context.

Policy analysis is relevant in this case because it allows us to understand how and why different governments use to develop and implement policies for protecting population's health. Through this approach, which emphasises the observation of policy actors and processes, it is possible to understand in which way a change in power or in political influence could allow actors to position an issue on the decision agenda and to approve policy proposals,[18] like an excise tax on SSB. Policy analysis in public health helps us to understand how the balance of ideas, interests, institutions, as well as social and political contexts affect policy-making.[19] One of its wide applications includes the characterisation of barriers and opportunities for the success of a policy in a given context where population health can be at risk.[20]

Public policy legislation, such as the policy to tax SSB, is a dynamic process that requires strategic approaches, as well as an understanding of the changing political environment.[21] Scientific literature tells us that the barriers and opportunities that arise in political processes may have an influence on the feasibility of successfully implementing or finalising a public policy.[18] The overlap of different features of competing policy proposals leads to a better understanding of the potential fate of initiatives and the negotiations that may be required to improve prospects for this taxation policy.[22] Thus, the objective of this study is to analyse the challenges to and opportunities for the approval of an increase in SSB taxation in the country.

METHODS

A stakeholder analysis[17] was conducted from January to April 2021, including three methodological components: documentary review, interviews with key stakeholders and political mapping.

Documentary review

An analysis of the narrative around the SSB tax was done through a search in news media and databases of scientific articles (table 1). Relevant material was selected using the following descriptors: (taxes) AND (sugar sweetened beverages) AND (Colombia); (Diseases) AND (sugar sweetened beverages) AND (Colombia); (Consumption) (sugar sweetened beverages) AND (Colombia), between July 2018 and February 2021; this is the date on which the government under study took office (see online supplemental annex 1).

The literature search was conducted by the first Colombian author, under the supervision of researchers in Mexico and Colombia. The context and events in Colombia were analysed, and barriers and opportunities were identified, as well as key actors in the policy process.

Semistructured interviews

By means of the documentary review, 70 relevant political actors were identified, who engaged in the discussion on SSB taxation in Colombia in recent years. We selected persons involved in decision-making, academia and non-governmental organisations (NGOs) that we identified by consulting public directories and through personal recommendations. We added five more actors to the list, using the

Table 1 Documentary review relevant to the discussion on a 20% tax on SSB in Colombia

Type of search	Search engine	Articles or notes	Included with complete text
Scientific literature	PubMed	6	3 (39, 33, 52)
	Scielo	11	4 (36, 38, 39, 54)
	BVS	25	2 (37, 32)
Gray literature	Congress gazette	4	4 (35, 41, 42, 43)
Newspaper articles	El Espectador (The Spectator)	25	8 (40, 44, 46, 48, 50, 51, 27, 28)
	El tiempo (Time)	15	2 (45, 49)
	Revista Semana (Week Magazine)	2	1 (47)
	Liga Contra el Silencio (League Against Silence)	13	4 (29, 30, 31, 34)

Source: Scientific literature, gray literature and newspaper articles.
SSB, sugar-sweetened beverages.

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

snowball technique, which consists of asking participants for recommendations of other potential actors to be interviewed. We interviewed 20 informants, 7 from NGO, a representative from a multilateral organisation (MO), 2 members of international think tanks working on public health policies (TT), three from the Network of Academics Without Conflict of Interest (AWCI) (Red de Académicos sin Conflicto de Interés), an officer from the Health Ministry (GOV) and a journalist from independent media (MED). The opponents to an increase in SSB taxation refused to be interviewed. We classified under this category those political and corporative actors that had a contrary position about the implementation of a tax to SSB in Colombia.

The actors were invited to participate by email; the interview guide and consent forms were sent to them as well. The pilot testing of the interview guide was carried out with two experts in Mexico, who made suggestions for its improvement.

The interviews were done by the first author between April and June 2021, using digital platforms such as Zoom or Meet, and lasted approximately 45 min. Before the interview began, the interviewees gave their consent for the audio recordings to be done. Once the data analysis was completed, the recordings were deleted. To protect the participants' confidentiality, each interview was coded according to the sector to which they belonged, and a consecutive number was assigned to them.

Mapping of actors

Actors were divided by sectors into representative groups, including those who had been identified as relevant actors who support or oppose the proposal for an increase in SSB taxation, according to the information obtained in the interviews and the documentary review. This task was done using the V.4.0 Policymaker software. Following that process, a mapping of different stakeholders, according to their positions, in favour or against the policy proposal, was obtained.[23]

Regarding the phases of social network analysis, a profile of key actors represented as nodes and the types of relationships between them was developed using the V.6.0 Ucinet software. This package is helpful for the analysis and graphical representation of social network data, considering different types of interactions among actors. The mapped interest groups were grouped according to their position. In favour of the tax were: (ONG 1, 2 and 3), (LEG3), (MO), (AWCI), (MED1), (TT 1 and 2); those who did not show a clear position were: (IND1) and (GOV2). The opposing groups were analysed through the information provided by (LEG 1 and 2) who expressed being against the tax. Their positions were also analysed on documents published by the industry and media belonging to the commercial chains of SSB producers.



Figure 1 Map of positions and power of the key interest groups in the 20% tax on SSB in Colombia, 2021. **Non-interviewed groups that were included in the Map due to their relevance in the process, according to the secondary sources. Source: created by the authors from the policy-maker. AWCI, Academics Without Conflict of Interest; MO, multilateral organisation; NGO, non-governmental organisation; SSB, sugar-sweetened beverages.

Data analysis

Classification of actors by sectors was done according to the literature review and interviews. Procedures of stakeholder analysis that include defining interests, position, power, barriers and opportunities, and those of the social network analysis, that include interests, reciprocity and exchange, were applied.[24 25] Analysis was aided by using the V.4.0 Policymaker algorithm, based on access to financial, symbolic, organisational and media resources to influence policies, to map positions of each actor mentioned in figure 1.[23] This software was also helpful to organise information on actors, to develop the table of groups and the analysis of barriers and opportunities. As a complement of this analysis, we created a relationships map using the V.6.0 Ucinet software, showing political and economic interests of the represented actors.[26] We consider that these methods were adequate, given the political nature of the analysed problem.

In order to define the political challenges to the implementation of an SBB taxation policy, information collected through the semistructured interviews and the documentary review was centred on the definition of the SSB consumption problem, the characterisation of the social and political context that has an influence on decision-making with respect to taxes on SSB, and the definition of barriers to and opportunities for placing on the political agenda and approving a tax on SSB in Colombia.[23] Since it was not possible for us to interview the main opponents, their positions were developed from secondary sources. The compiled information describes the role of key groups, their political alliances and network relationships.

Public involvement

We had limited resources and funding to conduct this study. Moreover, public involvement in research, although essential, is scarcely addressed in our countries. We recognise the importance of having the public involved in all steps of the research cycle. However, our interviewees and members of the public did not

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

BMJ Global Health

participate in the design of the study, including the analysis and presentation of results, nor in the recruitment or in any stage of the study. A translated abstract will be sent to study participants.

RESULTS

By means of the documentary review, 14 articles were recovered from the scientific literature, which contributed to an understanding of the SSB consumption problem in Colombia, as well as 24 newspaper articles and 4 gazette articles from the Colombian Congress, which provided information on the political and social context in the country, as described in table 1.

Mapping of actors

Figure 1 shows the 17 key groups that have participated in placing the SSB tax on the public agenda. Some actors in the figure did not accept our invitation to participate in the interviews but, according to newspaper articles, their role has been fundamental during the debates on an increase in SSB taxation in Colombia (see online supplemental annex 2).

A polarised situation was observed which has jeopardised the practical feasibility of SSB taxation: nine groups supported the initiative, belonging to NGO1, (NGO2) y (NGO 3), MO1, AWCI1, minority parties of Congress (LEG3), international think tanks who are sharing experiences (TT1) and (TT2) and independent media (MED 1). Their influence varies according to access to decision-making and resources available for the initiative.

Six groups opposed the initiative, mainly those belonging to the SSB industry (IND 1) and (IND 2), the government (GOV 1), right-wing parties who favoured the government at that time and were a majority in Congress in 2021 (LEG 1) and (LEG 2), and the media (MED 2). Those clearly opposing the increases in taxation were the SSB companies (IND 1), the ANDI (the Chamber of the Beverage Industry) (IND 2) and the Presidency of the Republic (GOV 1). This opposition was discussed in our interviews and in newspaper articles from El Espectador (The Spectator) and La Liga Contra el Silencio (The League Against Silence).[27–31] In addition, government parties (LEG 1 and LEG 2) were opposed to the tax on SSB, and they were a majority in Congress. The media (MED 2) were also strongly opposed to the taxes. In Colombia, major media companies belong to the same economic conglomerates that also own the sugar mills and SSB producing companies.

The actors who do not have a defined position are scarce; on the side of the government (GOV 2), it was said that the tax on SSB was a necessary initiative but not part of their agenda at the time of data collection. On the other hand, in the past, the SSB industry (IND 3) has declared itself in opposition to the tax.

To understand the type of linkages and interests between actors, a map of relationships was developed (figure 2). The connections represented by a solid line are political interests which arise from belonging to the same political party, sharing an ideology and supporting decision-making aligned to group interests. The black dotted lines represent economic interests based on commercial relationships, and the dotted grey lines represent combined political and economic interests. The white points are the actors who favour the initiative, the black points are the ones who are against it, and the grey points are those who have an undefined position.

Figure 2 shows, on the left side, the actors who favour the initiative and who are politically linked; the interviewees stated that tax policies are required to modify risk factors associated with SSB consumption. On the right side, we find actors who oppose the initiative, and who have an economic bond; these have given testimonies that state that their greatest motivation to oppose the initiative is the protection of their commercial interests.

Definition of the SSB consumption problem

The discourse of civil society organisations, legislators from independent parties and academics, who are the main pioneers in the discussion on SSB taxation in Colombia, is aligned with behaviours described in the scientific literature, where the so-called 'health taxes' are described as promoting a decrease in risk factors for NCDs.[16–18 23–25] An analysis in the scientific literature, of the positions of relevant policy actors, shows an agreement on the fact that those who consume SSB on a daily basis have a greater probability of developing diabetes mellitus or coronary disease, when compared with those who consume fewer SSBs.[32–34] The consequences of this pattern, according to the informants, show that the NCDs developed due to this consumption are risk factors for greater complications and for mortality when facing COVID-19.[35] In the case of Colombia, according to the documentary analysis, the severity of the problem lies in the fact that more than 30% of the Colombian population consumes SSB on a daily basis, and this consumption is among the five highest in Latin America.[36–40]

Those who were opposed to an increase in SSB taxation promoted more education and counselling on overweight and obesity for the general population, based on the strengthening and enforcement of the 2009 Law 1355. In this Law, obesity and chronic non-transmissible diseases are defined as a public health priority and measures are adopted for their control, care and prevention.[41] For this reason, opponents to SSB taxation believe that actions are required to inform and educate the consumer, to improve decision-making for better lifestyles, highlighting the need for physical activity, recreation, sports, as well as informing on the risks of a sedentary lifestyle and favouring school environments that offer a balanced and healthy diet. The legislators belonging to the party in power (Democratic Center), who had majority in the government, and therefore, with greater representativeness in Congress, stated that SSB consumption does

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

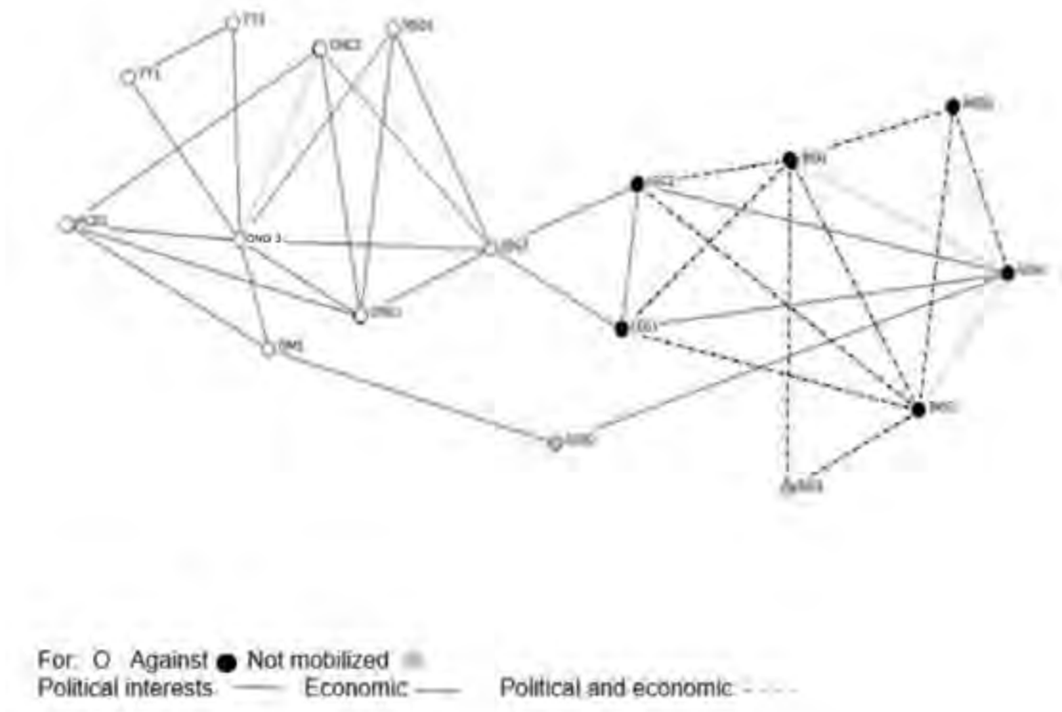


Figure 2 Map of relationships according to interests of key groups, with respect to a 20% tax on SSB, Colombia, 2021. Source: Base don 6.0 UCINET. SSB, sugar-sweetened beverages.

not involve a considerable sugar intake nor is it a health priority.

With respect to possible opportunities to solve the SSB problem, our interviewees mainly mention two options: first, the approval of an increased tax on SSB, and second, the strengthening and enforcement of Law 1355. The first alternative, according to the actors that promote it, is part of a series of measures based on evidence that suggests that the tax is a cost-effective way to decrease SSB consumption.

The proposal for SSB taxation was presented to Congress by members of opposition parties in 2016, 2018 and 2019, promoted by a coalition of 37 NGOs, with additional support from medical associations, researchers and national universities. They created the Alliance for Dietary Health that received financing from Bloomberg Philanthropies, with support from members of Congress from opposing centre and left wing parties and disseminated through independent media channels.[42–45] In Colombia, a round of four sessions is needed to transform an initiative into a law at the National Chamber of Deputies. Two sessions should be approved at the Chamber of Representatives and the other two at the Senate. This process ends with the presidential approval. At all times, the initiative has not gone beyond the first debate of the four that are needed for it to become a law.

Legislators belonging to the party in power (Democratic Center) believe that when the tax is put into effect, it will help generate income to cover the nation's tax deficit. This argument has also been proposed by the Colombian tax system and the Commission of Experts on Tax Benefits (Secretary of Finance), who have recommended including it in the tax reform that was debated in 2021.[46–48]

Social and political context

According to the testimonies of our interviewees who favour the tax increase, the main opponents, who are connected to the food and beverage industries, know how to take advantage of their relationship with the government to defend economic and political interests. The interviewees stated that a frequent strategy of influence was to approach high ranking public officials and ask them to be spokespersons for the industry. The SBB companies are used to working with lobbying companies, have greater availability of financial resources and are increasingly involved in the country's decision-making processes.

> The SSB industry finances campaigns for members of Congress and presidential candidates, and then has political control over these actors; this is a pro-industry government and there is direct communication

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

BMJ Global Health

between the president's office and trade unions. (Government official).

The interviewees from Congress who opposed the tax on SSB have different relationships with the SSB industry. They criticised the sources of funding from the political actors who promote it, in particular international foundations such as Bloomberg Philanthropies, and the fact that they use their resources to exert pressure on the independent media. Those opposing SSB taxes, who are in agreement with the SSB industry, stated that they were a target for political persecution and considered that, if this initiative was once again presented, it had to be led by the government.

Since the problem was analysed in the context of the pandemic, for most informants, COVID-19 and the subsequent financial crisis it brought about meant a change in context that could open a window of opportunity for the tax, not to solve the health problem associated with SSB consumption, but to raise funds for the government. According to our interviewees, the inequities in access to health services grew with the pandemic. Our interviewees also said that the financial crisis in the health system got worse and the health issues for people with comorbidities became more visible, which leads to the need for additional financial resources.[49]

Another argument that was brought to light by the documentary search is the tax deficit, which in 2022 reached 7.8% of the GDP.[50] Faced with this situation, the government filed on 5 April 2021, a tax reform project in which the tax on SSB was not included, but basic family provisions would be taxed. The initiative led to social protest for more than 2 months.[51] This process has not ended; a new proposal for tax reform was presented in July 2022 that included a gradual implementation of SSB tax policy. Although the left wing coalition won the legislative and executive elections of 2022, no special tax on SSB has been implemented.

Barriers and opportunities

Table 2 presents the barriers to and opportunities for the introduction of an increase in SSB taxation in Colombia, organised according to the actors' positions. The barriers identified by different actors, with the link between the opponents and the connections between interests, as shown in figure 2, is what has managed to block the initiative so far.

Table 2 Barriers and opportunities for the 20% tax on SSB, according to the actors' positions, Colombia, 2021

Position	Barriers	Opportunities
For	▶ Lack of political will in members of Congress and the Presidency of the Republic. ▶ Corporate interference in decision-making through different strategies such as the use of the revolving door and lobbying, as in the case of a representative of the SSB industry who was designated as ambassador in 2020. ▶ The SSB industry's ability to have political influence, which is used to block public health initiatives such as the tax policy. ▶ Security and cybersecurity violations, and intimidation of activists, academics and promoters of the tax on SSB. This was the case of an NGO that denounced being the victims of political spying for their support of the ssb tax. ▶ The topic continues not to be a political priority and has not been considered within the tax package proposed by the Internal Revenue Secretary after 2021. ▶ Lobbying is not regulated in the different governmental sectors	▶ A more favourable pro tax scenario was expected with the renewal of Congress during the 2022 elections, where the left wing could have a majority in the legislative chambers, and a pro tax strategy could be defined. ▶ The economic crisis caused by the COVID-19 pandemic and the need for financial resources to be allocated to the health sector. However, the SSB tax has not received enough political support after 2021. ▶ Support from the academic sectors through transfer of academic knowledge to public debates and providing scientific evidence that is free from conflict of interest. The case of the invitation of the University of Antioquia by the government, to design front-of-package labelling of caloric meals, is an example of this. ▶ Including experts in the debate, such as the Commission of Experts on Tax Benefits and *Fedesarrollo* (Foundation for Higher Education and Development), who have expressed an interest in the topic. Organising coalitions and alliances, with defined functions for each member. ▶ Generate spaces for an exchange of experiences at the regional level, with participation from different groups that are promoting the tax on SSB in Colombia and Latin America.
Against	▶ The pandemic has generated a closure of small and medium businesses, for which unemployment increased; for this reason, it is not convenient at this time to have more taxes. ▶ There is a lack of in-depth studies to have greater evidence of the effectiveness of this type of measure. ▶ A need for alternatives to SSBs for the population affected by a scarcity of drinking water.	▶ To provide incentives for the industry to produce low-sugar beverages. ▶ The initiative has to be proposed by the government, and there needs to be consensus between representative chambers and actors who are not allied to the corporations. ▶ Limited support from political parties with ability to exert influence on decision-making.

Source: Developed by the authors.
NGOs, non-governmental organisations; SSB, sugar-sweetened beverages.

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

The barriers most mentioned by the actors who favour the initiative were the lack of political will on the side of the government and the traditional parties, the interference of the SSB industry through lobbying and a series of strategies including the provision of incentives, the creation of research institutes and persecution and violation of the privacy of actors who favoured the initiative, using technologies or intimidation. Due to these barriers, an increase in SSB taxation is still not part of the legislative priorities in the country.

The future opportunities that were identified in our analysis were the renewal of Congress and the presidency, in 2022, as well as a new proposal for tax reform in order to deal with the crisis of the COVID-19 pandemic, and a greater connection between the associations that are interested in supporting the initiative. In this scenario, it becomes necessary to take advantage of the opportunities found in the planned strategies.

On the other hand, the opponents to the measure consider it is not a propitious moment to apply new taxes on the SSB industry, which has been affected by the pandemic, for example, with an increase in unemployment in the country. Opponents also pointed to problems such as the lack of drinking water in some regions, for which innocuous alternatives must be guaranteed, and where SSBs are a safe option for the population. Therefore, for these opponents, reducing the consumption of SSB would put the population at risk. The solutions discussed by the opponents to SSB taxation, in order to address the health issues associated with the consumption of SSB, were self-regulation by the SSB industry, as well as support and consensus between the government, SSB industry and traditional righ-wing parties for this type of initiatives (table 2).

DISCUSSION

This study's results suggest that the topic of the tax on SSB in Colombia has not found favourable conditions for its development and approval, since it continues to be stagnant, there is a lack of explicit support from the government, in addition to opposition from the right-wing legislative branch.[52 53] Just as in other countries, the SSB industry uses strategies that have symbolic effects, such as: delegitimising the established scientific evidence; lobbying with legislators or decision-makers; taking legal actions against the tax; intimidating activists and researchers; developing negative public information campaigns, carrying out political substitution (self-regulation and voluntary initiatives); using aggressive marketing strategies and prices and making donations to community groups, in order to influence decision-making.[54]

Our results confirm that the political feasibility of a tax on SSB in Colombia is limited, since there seem to be more barriers than opportunities for its progress through the cycle of public policies. The use of scientific evidence from other countries to support the policy has been insufficient to progress in the implementation of SSB taxation in the country.[55]

The described situation confirms the presence of actions opposed to SSB taxation, which have been observed in other middle-income and high-income countries where the SSB industry is diversifying its portfolio through new products (juices, milk products and vegetal protein drinks), and purchasing regional companies and convenience stores.[56] In addition, in Colombia, the closeness between the SSB industry and the government, through campaign financing and the use of a revolving door, allows for greater participation of actors from the corporative and political sectors in the blocking of public policies,[57] the distortion of the public agenda, and the protection of their economic and political interests.

Another limiting factor for the initiative to be kept on the agenda, is the lack of consensus among decision makers involved in the definition of the usage of the financial resources generated by the tax. The experiences of cases such as Mexico and Chile have generated some criticism. The most recurrent expressions of disapproval question its effectiveness because of the supposed limited effects on the reduction of obesity caused by SSB consumption. This has turned it into a central point of debate, since the implementation of a tax on SSB in both countries does not comply with the WHO's recommendations.[5 52 57]

The economic crisis caused by the COVID-19 pandemic and the changes in the government that took place in 2022 in Colombia are still expected to lead to changes with regard to the implementation of SSB taxation.[53 56] These political changes could be seen as a window of opportunity, where actors supporting the initiative could form a coalition and strengthen their individual positions, pushing to increase the feasibility of the initiative. Unfortunately, this political scenario has not been entirely leveraged.[57 58]

In July, 2021, the Law of Front of Package Labeling was approved in Colombia, contributing to the protection of the population's health, despite strong opposition from commercial actors and their third parties.[16] The adoption of such a law shows the importance of keeping the topic on the agenda and the relevance of the social mobilisation of a large spectrum of actors, with actions to exert an influence on Congress, seeking support from actors of different parties.

This work has limitations such as the possibility of bias in the selection of interviewees, since the main actors who oppose the tax did not agree to being interviewed. Given that this is a qualitative study, its conclusions are not easily generalised in other contexts. In spite of the above, this study is valuable because it identified the barriers to the introduction of a tax on SSB in Colombia as well as opportunities that could help with its adoption. Nevertheless, this work can serve as a gateway to future studies analysing political actors who could exert influence and governmental transitions that could favour the implementation of food policies in countries like Colombia.

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

CONCLUSION

Challenges to the implementation of an increase in SSB taxation in Colombia have been influenced by different actors from the civil society, academics and policy-makers, and by the social and political context in the country during the COVID-19 pandemic. The applied conceptual approach suggests that governmental changes related to presidential and congressmen elections in 2022 were not enough to create new opportunities to advance the topic and place it on the agenda. A more consistent and focused effort is needed, by governmental and social actors, in order to increase its success. Topics such as conflict of interest in decision-making, and the analysis of the revolving door phenomenon at governmental levels, require the definition of new strategies to decrease the influence of the SSB industry.

Twitter Paula Andrea Cárdenas-Torres @_Pau95, Emanuel Orozco-Nuñez @emanuelorozcone and Christian Paul Torres-de la Rosa @christianptorre

Acknowledgements We thank all key persons who accepted being interviewed, sharing with us their time and experiences around this complex topic. To all of them, we offer our sincere gratitude.

Contributors PAC-T planned the study and wrote the first draft. EO-N is responsible for the overall content, assessed all stages of the research, cowrote the first draft and has been responsible for follow-up. ACDM provided theoretical advice and corrected several versions of the draft. CPT coassessed research and corrected all versions of the document. EMP-T provided theoretical advice and participated in discussions and drafts corrections.

Funding The research project was financed by the scholarship that Paula Andrea Torres received from the National Council for Science and Technology of Mexico.

Competing interests None declared.

Patient and public involvement Interviewees and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Consent obtained difrectly from interviewees.

Ethics approval The research project was revised and approved by the Ethics Committee of the National Institute of Public Health of Mexico (CI627 folio Y98) and by the Physical Education Institute of the University of Antioquia in Colombia (ACEI 04-2021).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

ORCID iDs
Paula Andrea Cárdenas-Torres http://orcid.org/0000-0003-3095-7543
Emanuel Orozco-Nuñez http://orcid.org/0000-0002-6550-7385
Anahí Cristina Dreser-Mansilla http://orcid.org/0000-0001-9019-2330
Christian Paul Torres-de la Rosa http://orcid.org/0000-0002-3287-5413
Eliana María Pérez-Tamayo http://orcid.org/0000-0002-2086-3626

REFERENCES

1 Brownell KD, Warner KE. The perils of ignoring history: big tobacco played dirty and millions died. How similar is big food? *Milbank Q* 2009;87:259–94.
2 Malik VS, Hu FB. Fructose and cardiometabolic health: what the evidence from sugar-sweetened beverages tells us. *J Am Coll Cardiol* 2015;66:1615–24.
3 Ferretti F, Mariani M. Sugar-sweetened beverage affordability and the prevalence of overweight and obesity in a cross section of countries. *Global Health* 2019;15:30.
4 Organización Panamericana de la Salud (OPS). La Tributación de Las Bebidas Azucaradas en La Región de Las Américas. 2021. Available: https://iris.paho.org/bitstream/handle/10665.2/53562/9789275323007_eng.pdf?sequence=1&isAllowed=y [Accessed 07 Jun 2021].
5 Gómez-Dantés O, Orozco-Núñez E, Torres-de la Rosa CP, *et al*. Stakeholder analysis of the deliberation of an increase to the excise tax on sweetened beverages in Mexico. *Salud Publica Mex* 2021;63:436–43.
6 Hutchinson Health Canada H, Kumanyika S. Building momentum: lessons on implementing a robust sugar sweetened beverage tax. Available: www.wcrf.org/buildingmomentum [Accessed 04 Oct 2023].
7 Organización de Las Naciones Unidas para La Alimentación Y, La Agricultura (FAO), Organización Panamericana de la Salud/Organización Mundial de la Salud (OPS/, OMS). Políticas Y Programas Alimentarios para Prevenir El Sobrepeso Y La Obesidad Lecciones Aprendidas. 2018. Available: http://www.fao.org/3/i8156es/I8156ES.pdf [Accessed 07 Jun 2021].
8 Organización Mundial de la Salud. Assessing national capacity for the prevention and control of noncommunicable diseases: report of the 2019 global survey. 2020. Available: https://www.who.int/publications/i/item/ncd-ccs-2019 [Accessed 07 Jun 2021].
9 World Cancer Research Fund International. NOURISHING and MOVING policy databases. Available: https://policydatabase.wcrf.org/level_one?page=nourishing-level-one [Accessed 06 Oct 2023].
10 Bascuñán J, Cuadrado C. Efectividad de Los Impuestos a Bebidas Azucaradas para Reducir Niveles de Obesidad: Resumen de Evidencia para Políticas. *Medwave* 2017;17:e7054.
11 Colchero MA, Rivera-Dommarco J, Popkin BM, *et al*. In Mexico, evidence of sustained consumer response two years after implementing a sugar-sweetened beverage tax. *Health Aff (Millwood)* 2017;36:564–71.
12 Nakamura R, Mirelman AJ, Cuadrado C, *et al*. Evaluating the 2014 sugar-sweetened beverage tax in Chile: an observational study in urban areas. *PLoS Med* 2018;15:e1002596.
13 Alvarado M, Unwin N, Sharp SJ, *et al*. Assessing the impact of the barbados sugar-sweetened beverage tax on beverage sales: an observational study. *Int J Behav Nutr Phys Act* 2019;16:13.
14 Díaz-García J, Valencia-Agudelo GD, Carmona-Garcés IC, *et al*. Grupos de Interés E Impuesto al Consumo de Bebidas Azucaradas en Colombia. *Lect Econ* 2020;93:155–87.
15 La liga contra el silencio. Una Multinacional de la Ciencia en Colombia para Los Intereses de la Industria: Liga Contra El Silencio. 2019. Available: https://ligacontraelsilencio.com/2019/10/31/una-multinacional-de-la-ciencia-en-colombia-para-los-intereses-de-la-industria/ [Accessed 01 Oct 2020].
16 Mialon M, Gaitan Charry DA, Cediel G, *et al*. 'I had never seen so many lobbyists': food industry political practices during the development of a new nutrition front-of-pack labelling system in Colombia. *Public Health Nutr* 2021;24:2737–45.
17 Hernández Bonilla JM. Un Voto en Contra del Impuesto a Bebidas Endulzadas en El Congreso Puede Costar de 50 a 100 Millones. Vorágine; 2021. Available: https://voragine.co/un-voto-en-contra-del-impuesto-a-bebidas-endulzadas-en-el-congreso-puede-costar-de-50-a-100-millones/ [Accessed 07 Jun 2021].
18 Reich MR. The politics of reforming health policies. *Promot Educ* 2002;9:138–42.
19 Walt G, Shiffman J, Schneider H, *et al*. Doing' health policy analysis: methodological and conceptual reflections and challenges. *Health Policy Plan* 2008;23:308–17.
20 Campos PA, Reich MR. Political analysis for health policy implementation. *Health Syst Reform* 2019;5:224–35.
21 Thow AM, Abdool Karim S, Mukanu MM, *et al*. The political economy of sugar-sweetened beverage taxation: an analysis from seven countries in sub-Saharan Africa. *Glob Health Action* 2021;14:1909267.
22 Sainsbury E, Magnusson R, Thow AM, *et al*. Explaining resistance to regulatory interventions to prevent obesity and improve nutrition: a case-study of a sugar-sweetened Beverages tax in Australia. *Food Policy* 2020;93:101904.

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

23 Reich M. Applied political analysis for health policy reform. *Curr Issues Public Heal 2* 1996;4:186–91. Available: https://www.researchgate.net/publication/266217932_Applied_Political_Analysis_for_Health_Policy_Reform
24 Mesa X, Murcia J. El Análisis de Redes Sociales –ARS – Como Recurso Metodológico para El Estudio formal de Redes de Políticas Públicas. *Espac Abierto* 2019;28:109–26. Available: https://www.redalyc.org/journal/122/12264369007/12264369007.pdf
25 Pérez Tamayo EM, Aguirre Henao CD, Echavarría Rodríguez IC, *et al*. Análisis de Políticas Públicas Alimentarias Y Nutricionales Colombianas: Aproximación a Las Posturas Epistemológicas, Teóricas Y Metodológicas en Los Años 2000-2015. *Rev La Fac Derecho y Ciencias Políticas* 2020;50:192–214.
26 Zurbriggen C. La Utilidad del Análisis de Redes de Políticas Públicas. *Argumentos (Méx)* 2011;24. Available: http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0187-57952011000200008
27 Jiménez Ospina A, Narváez Olaya AM. Coca-Cola, Qué hay Detrás de Tus Advertencias? El Espectador; 2018. Available: https://www.elespectador.com/colombia-20/analistas/coca-cola-que-detrástras-de-tus-advertencias-article/ [Accessed 06 Jul 2021].
28 Redacción salud. La Ong que Resultó Siendo UN Grupo de lobby de Las Industrias del Azúcar Y Glifosato. El Espectador; 2019. Available: https://www.elespectador.com/salud/la-ong-que-resulto-siendo-un-grupo-de-lobby-de-las-industrias-del-azucar-y-glifosato-article-864197/ [Accessed 06 Jul 2021].
29 El 'Agridulce' Imperio del lobby en El Congreso de Colombia: Liga Contra El Silencio. La Liga Contra El Silencio. 2018. Available: https://ligacontraelsilencio.com/2018/08/23/el-agridulce-imperio-del-lobby-en-el-congreso-de-colombia/ [Accessed 06 Jul 2021].
30 El Dulce Y Ultraprocesado Círculo que Rodea a Iván Duque - Cerosetenta. La Liga Contra El Silencio. 2019. Available: https://cerosetenta.uniandes.edu.co/el-dulce-y-ultraprocesado-circulo-que-rodea-a-ivan-duque/ [Accessed 06 Jul 2021].
31 Donaciones Dulces Aceitan La Política en Colombia. Liga Contra El Silencio. 2019. Available: https://ligacontraelsilencio.com/2019/08/29/donaciones-dulces-aceitan-la-politica-en-colombia/ [Accessed 06 Jul 2021].
32 Jácome A. Impuestos que Previenen La Enfermedad. *Rev Med* 2016;38:299–301. Available: http://revistamedicina.net/ojsanm/index.php/Medicina/article/view/115-1/1397
33 Ramírez-Vélez R, Ojeda ML, Tordecilla MA, *et al*. El Consumo regular de Bebidas Azucaradas Incrementa El Perfil Lipídico-Metabólico Y Los Niveles de Adiposidad en Universitarios de Colombia. *Rev Colomb Cardiol* 2016;23:11–8.
34 Empresas de Bebidas Azucaradas Incumplen Acuerdos de Venta en Colegios. La Liga Contra el Silencio; 2019. Available: https://ligacontraelsilencio.com/2019/05/23/empresas-de-bebidas-azucaradas-incumplen-acuerdos-de-venta-en-colegios/ [Accessed 15 Jun 2021].
35 Gobierno de México. La Jarra del Buen Beber. La Importancia de Mantenerte bien Hidratado. Procuraduría Federal del Consumidor; 2017. Available: https://www.gob.mx/profeco/documentos/la-jarra-del-buen-beber-la-importancia-de-mantenerte-bien-hidratado?state=published [Accessed 24 Sep 2020].
36 Khandpur N, Cediel G, Obando DA, *et al*. Sociodemographic factors associated with the consumption of Ultra-processed foods in Colombia. *Rev Saude Publica* 2020;54:19.
37 Bernal Camargo DR, Bernal Camargo NM. Derecho al Consumo Informado: El Caso de Las Bebidas Azucaradas en Colombia. *Repert Med Cir* 2020;29:84–92.
38 Bejarano-Roncancio J, Gamboa-Delgado EM, Aya-Baquero DH, *et al*. Los Alimentos Y Bebidas ultra-Procesados que Ingresan a Colombia Por El Tratado de Libre Comercio: ¿Influirán en El peso de Los Colombianos? *Rev Chil Nutr* 2015;42:409–13.
39 Cárdenas Sánchez DL, Calvo Betancur VD, Flórez Gil S, *et al*. Consumption of sugary drinks and sugar added to Beverages and their relation ship with nutritional status in young people of Medellin (Colombia). *Nutr Hosp* 2019;36:1346–53.
40 Redacción salud. El Consumo de Bebidas Azucaradas se Relaciona con una Muerte Prematura. EL ESPECTADOR. 2019. Available: https://www.elespectador.com/salud/el-consumo-de-bebidas-azucaradas-se-relaciona-con-una-muerte-prematura-article-845849/ [Accessed 15 Jul 2021].
41 Ministerio del Interior y de Justicia. Ley 1355 de 2009. Bogotá; 2009. Available: www.imprenta.gov.co [Accessed 12 Sep 2020].
42 Cámara de Representantes. Ponencia para primer debate en Comisión Tercera de Cámara de Representantes del Proyecto de Ley 159 de 2018. 2019. Available: http://www.secretariasenado.gov.co/legibus/legibus/gacetas/2019/GC_0298_2019.pdf [Accessed 15 Jun 2021].
43 Cámara de Representantes. Proyecto de Ley 171 de 2019. 2019. Available: http://www.secretariasenado.gov.co/legibus/legibus/gacetas/2019/GC_0761_2019.pdf [Accessed 15 Jun 2021].
44 Monsalve MM. Impuesto a Bebidas Azucaradas Reduciría La Obesidad Entre El 6 Y El 12% en Colombia. EL ESPECTADOR; 2018. Available: https://www.elespectador.com/salud/impuesto-a-bebidas-azucaradas-reduciria-la-obesidad-entre-el-6-y-el-12-en-colombia-article-798352/ [Accessed 15 Jun 2021].
45 Fernández C, Suárez R. Estudio Confirma que Impuestos Saludables Mejorarían La Salud Y Los Ingresos de Los Países. Salud - ELTIEMPOCOM; 2019. Available: https://www.eltiempo.com/salud/estudio-confirma-que-impuestos-saludables-mejorarian-la-salud-y-los-ingresos-de-los-paises-348784 [Accessed 15 Jun 2021].
46 Oviedo J. Análisis: ¿Cómo Debe Ser La Reforma Tributaria de 2021? EL ESPECTADOR; 2020. Available: https://www.elespectador.com/politica/analisis-como-debe-ser-la-reforma-tributaria-de-2021-article/ [Accessed 15 Jun 2021].
47 Reforma Tributaria: Propuesta de la academia Incluye Sobretasa al IVA a Canasta familiar de Los Ricos. Revista Semana; 2020. Available: https://www.semana.com/economia/articulo/reforma-tributaria-propuesta-de-la-academia-incluye-sobretasa-al-iva-a-canasta-familiar-de-los-ricos/202049/ [Accessed 15 Jun 2021].
48 Smetters K, Rosenbloom D, Arnold B, *et al*. Informe de la Comisión de Expertos en Beneficios Tributarios. 2021. Available: https://www.dian.gov.co/dian/Documents/Informe-Comite-Expertos-DIAN-OCDE2021.pdf [Accessed 15 Jun 2021].
49 Unidad salud El Tiempo. Reforma a La Salud en Colombia: lo que Debe saber del Polémico Proyecto. EL TIEMPO; 2021. Available: https://www.portafolio.co/economia/reforma-a-la-salud-en-colombia-lo-que-debe-saber-del-polemico-proyecto-551626 [Accessed 20 Jun 2021].
50 Salazar C. Esta Reforma Tributaria, Tal Como La Presentó El Gobierno, no VA a PASAR en El Congreso. Periódico La republica; 2021. Available: https://www.larepublica.co/economia/esta-reforma-tributaria-tal-como-fue-presentada-no-va-a-pasar-en-el-congreso-3158477 [Accessed 20 Jun 2021].
51 Analitik V. Invamer: Desaprobación de Iván Duque Llega al 63,2% en Colombia. 2021. Available: https://www.valoraanalitik.com/2021/04/22/invamer-desaprobacion-de-ivan-duque-llega-al-63-2/ [Accessed 20 Jun 2021].
52 Carriedo A, Koon AD, Encarnación LM, *et al*. The political economy of sugar-sweetened beverage taxation in Latin America: lessons from Mexico, Chile and Colombia. *Global Health* 2021;17:5.
53 James E, Lajous M, Reich MR. The politics of taxes for health: an analysis of the passage of the sugar-sweetened beverage tax in Mexico. *Health Syst Reform* 2020;6:e1669122.
54 The World Bank. Taxes on sugar-sweetened Beverages: international evidence and experiences. Washington DC; 2020. Available: https://openknowledge.worldbank.org/bitstream/handle/10986/33969/Support-for-Sugary-Drinks-Taxes-Taxes-on-Sugar-Sweetened-Beverages-Summary-of-International-Evidence-and-Experiences.pdf?sequence=6 [Accessed 29 Jun 2021].
55 Baker P, Jones A, Thow AM. Accelerating the worldwide adoption of sugar-sweetened beverage taxes: strengthening commitment and capacity: comment on "the untapped power of soda taxes: Incentivizing consumers, generating revenue, and altering corporate behavior". *Int J Health Policy Manag* 2018;7:474–8.
56 Organización Panamericana de la Salud. Experiencia de México en El Establecimiento de Impuestos a Las Bebidas Azucaradas Como Estrategia de Salud Pública. México; 2015. Available: https://iris.paho.org/handle/10665.2/18390 [Accessed 29 Jun 2021].
57 Ojeda E, Torres C, Carriedo Á, *et al*. The influence of the sugar-sweetened beverage industry on public policies in Mexico. *Int J Public Health* 2020;65:1037–44.
58 Kingdon JW. *Agendas, alternatives, and public policies*. 2nd ed. Estados Unidos de America: Person, 2014.

BMJ Global Health: first published as 10.1136/bmjgh-2023-012074 on 9 January 2024. Downloaded from https://gh.bmj.com on 28 July 2025 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

ciss

Artículo original

Stakeholder analysis of the deliberation of an increase to the excise tax on sweetened beverages in Mexico

Octavio Gómez-Dantés, MC, M en SP,[1] Emanuel Orozco-Núñez, MA,[1]
Christian Paul Torres-de la Rosa, M en SP,[1] Mariana López-Santiago, M en SP.[2]

Gómez-Dantés O, Orozco-Núñez E, Torres-de la Rosa CP, López-Santiago M. Stakeholder analysis of the deliberation of an increase to the excise tax on sweetened beverages in Mexico. Salud Publica Mex. 2021;63:436-443.
https://doi.org/10.21149/11762

Abstract

Objective. To present the results of a stakeholder analysis used to construct a map of the actors involved in the deliberation of a proposal to increase the tax on sugar-sweetened beverages (SSB) in Mexico from 10 to 20 percent per liter. **Materials and methods.** A literature review and interviews to key actors were implemented. The analysis of the actors' power and position was made using *Policymaker*. **Results.** There was concern for the obesity epidemic among all stakeholders, but little consensus on the way to solve it. Researchers and non-governmental organizations (NGO) support an increase in the tax on SSB, while government officials and industry representatives oppose this measure. **Conclusion.** Supporters of an increase to the tax on SSB need to build a coalition in order to force government officials to support this policy and successfully confront the soda industry, which has a solid opposing strategy and enormous financial resources to influence public opinion and congressmen.

Keywords: health policy; stakeholder participation; sugar-sweetened beverages; taxes

Gómez-Dantés O, Orozco-Núñez E, Torres-de la Rosa CP, López-Santiago M. Análisis de grupos de interés sobre la deliberación del incremento al impuesto a bebidas azucaradas en México. Salud Publica Mex. 2021;63:436-443.
https://doi.org/10.21149/11762

Resumen

Objetivo. Presentar los resultados de un análisis de grupos de interés para definir un mapa de los actores involucrados en la deliberación de una propuesta para incrementar el impuesto a bebidas azucaradas (BA) en México del 10 al 20% por litro. **Material y métodos.** Se revisó la literatura y se entrevistó a actores clave. El análisis del poder y posición de los actores se realizó con el programa *Policymaker*. **Resultados.** Se identificó una amplia preocupación por la epidemia de obesidad, pero poco consenso sobre cómo resolverla. Los investigadores y las Organizaciones No Gubernamentales (ONG) apoyan un incremento en el impuesto a las BA, mientras que los funcionarios gubernamentales y los representantes de la industria se oponen a dicha medida. **Conclusión.** Quienes apoyan un incremento al impuesto deben crear una coalición que fuerce a los funcionarios gubernamentales a apoyar el aumento y confrontar exitosamente a la industria, la cual cuenta con una estrategia sólida y recursos financieros abundantes para influir en la opinión pública y en los legisladores.

Palabras clave: política de salud; participación de los interesados; bebidas azucaradas; impuestos

(1) Instituto Nacional de Salud Pública. Cuernavaca, Morelos, Mexico.
(2) Servicios de Salud de Quintana Roo. Chetumal, Quintana Roo, Mexico.

Received on: June 23, 2020 • **Accepted on:** December 21, 2020 • **Published online:** May 3, 2021
Corresponding author: Emanuel Orozco. Center for Health Systems Research, National Institute of Public Health. Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
email: emanuel.orozco@insp.mx

License: CC BY-NC-SA 4.0

Gómez-Dantés O, Orozco-Núñez E, Torres-de la Rosa CP, López-Santiago M. Stakeholder analysis of the deliberation of an increase to the excise tax on sweetened beverages in Mexico. Salud Publica Mex. 2021; 63(3):436-443. https://doi.org/10.21149/11762

Excise taxes on certain unhealthy products have been successfully used to control the spread of diseases associated to their high intake. The classic case has been taxes on tobacco consumption, the benefits of which have been demonstrated through economic analysis.[1] Despite these documented benefits, there are major differences among political actors in low- and middle-income countries (LMIC) regarding the need to impose taxes on sugar-sweetened beverages (SSB) in order to reduce their consumption.[2,3] This debate becomes relevant due to the existence of an epidemic of non-communicable diseases (NCD) in LMIC associated to a high intake of SSB.

Mexico is going through two epidemics linked to the consumption of SSB: overweight/obesity and diabetes. According to a recent study, the combined prevalence of overweight and obesity in adults aged 20 years and older reached 75.2 percent, the highest among all OECD countries, while the prevalence of diabetes in this same age group reached almost 10 percent.[4] In addition to its health impact, the estimated annual cost of diabetes in Mexico is 7.7 billion dollars.[5]

The association between these epidemics and a high consumption of SSB was well documented in the past decade.[6] Mexico, in fact, has one of the highest consumptions of SSB in the world: 139.4 L per capita in 2013 (1.15 soft drink cans per capita per day).[7,8]

The high consumption of SSB and the high prevalence of NCD gave the Mexican government the rationale to propose a reform to the Law on Special Tax on Production and Services (IEPS, in Spanish)) to establish a one-peso tax on SSB.[9] This tax would increase the average price of these beverages by 10 percent. This proposal was passed by Congress in October 2013 and enacted in January 2014.

The establishment of an excise tax on SSB was associated with a 6.3 percent reduction in the consumption of these beverages in 2014 in relation to the trends observed in the 2008-2012 period.[10-12] These reductions were higher in low-income households, urban areas, and households with children. This decline was also associated with a 16.2 percent increase in the consumption of bottled water.

According to an article published in 2016, a 10 percent reduction in the consumption of SSB in Mexico would prevent 189 300 cases of diabetes, 20 400 cases of cerebrovascular disease and heart attack, and 18 900 deaths between 2013 and 2022, and would generate 983 million dollars in savings.[13] Projections based on these and other studies suggest that an increase of the excise tax to 20 percent should double the impact of the current tax, reducing the prevalence of obesity by 6.8 percent by 2024 and preventing between 171 thousand and 267 thousand cases of diabetes by 2030.[14]

The objective of this study was to analyze the policy process and the position and power of the political actors involved in the discussion of a proposal to increase the current excise tax to SSB in Mexico from 10 to 20 percent.

The study was developed during 2018, the last year of the administration of president Peña Nieto (2012-2018). This means that in the present administration, headed by president López Obrador (2018-2024), the composition of the group of actors that could be involved in debate around a proposal to increase the tax on SSB will probably change. However, we believe that the information provided by this study remains relevant, given that more than half of the actors will still be involved in a new round of discussion of this policy proposal in the near future. In addition, the reasons provided by the different group of actors for supporting or opposing a change in the excise tax on SSB will still be useful for those involved in the implementation of this type of policy proposals elsewhere.

Materials and methods

In this analysis we refer to the policy process, defined as the procedure for identifying, defining and seeking solutions to public issues.[15,16] A practical way to represent it is through the 'policy cycle', which describes how an issue moves from the recognition of a social problem to the design, adoption, implementation, and evaluation of a public policy that seeks to solve it.[17,18] In this paper, we focus on the two initial stages of this cycle (agenda setting and policy formulation), which include the identification and framing of the issue, its incorporation into the national policy agenda, the design of a potential solution, and its debate in the legislature and other political circles.

Two types of analysis were used in this project: a context analysis and a stakeholder analysis. The context analysis was used to identify the epidemiological and political 'enabling factors' that place the problem of excessive consumption of SSB on the national policy agenda. We borrowed the notion of enabling factors from Andersen's behavioral model of families. According to this model, enabling factors are those forces that facilitate individual, collective, or environmental change based on their level of availability.[19-21] In this paper we looked for factors in Mexico that facilitated the identification of excessive consumption of SSB as a major problem and the design of a policy to solve it.

However, enabling factors cannot by themselves guarantee the adoption of a public policy. Adoption requires certain 'driving factors,' which are defined as the forces that trigger change in an organization or system.[22,23] In this particular case, the driving factors were identified through a stakeholder analysis of the deliberation procedures to increase the excise tax on

SSB in Mexico from 10 to 20 percent. This analysis implies the identification of the actors involved in the discussion of this policy proposal, the position they hold in favor of or against it, and their level of power. The deliberation procedure is defined as the back-and forth communication among parties that have interests that are shared and others that are opposed to a particular policy, with the purpose of reaching an agreement.[24]

To document the context analysis, we carried out a thematic literature review. We searched and reviewed newspapers, grey literature, scientific literature, and non-governmental organizations' notes. For the grey literature and newspaper search we used the key words 'SSB', 'taxes to SSB' and 'excise tax to SSB'. For the scientific literature search we used the key words 'SSB', 'taxes to SSB', 'effect of price on SSB consumption', and 'stakeholder analysis'. The period for the search was 2014-2017.

In order to identify key stakeholders, we consulted three sources of information: government documents, newspaper articles, and scientific manuscripts. We also examined documents and minutes of the Mexican Congress (proposals, presentations, and reports) developed in the 2012-2014 period, during which the discussion on the tax on SSBs took place in Mexico, and identified the actors who participated in it, 35 in total. We then sent to all of them an invitation to participate in an interview to explore their thoughts about the current tax and their position regarding a possible tax increase. We received a positive response to this invitation from 18 of them. They all signed a letter of informed consent and agreed to have the session audio recorded, guaranteeing the confidentiality and ethical use of the information. The study protocol was approved by the Ethics in Research Committee of the National Institute of Public Health of Mexico. The interviews were done from March to July 2018.

We developed a semi-structured guide for the interviews to key informants. A total of 18 key actors were interviewed: three officials of the Ministry of Health (MoH) working in areas directly associated to the discussion on taxes on SSBs (Deputy Secretary Ministry of Health Promotion and Disease Prevention, and Federal Commission for Protection against Sanitary Risks [*Comisión Federal para la Protección contra Riesgos Sanitarios*, Cofepris]); one official of the Ministry of Finance; two congressmen from parties with opposing views regarding taxes on SSBs; one representative of a multilateral organization; two representatives of NGOs involved in issues related with overweight/obesity; five representatives of the industry, two involved in the production of SSBs and three involved in their commercialization, and, finally, four researchers involved in nutrition-related research related to nutrition.

We asked each informant to identify those actors in our inventory who, in their view, would support or oppose the increase to the tax on SSB, and to evaluate their level of power. We also asked them to add the names of any important actors that might been left out of the list, but no name was added. We also asked them to define their own position regarding a potential increase to the SSB tax and the reasons for their support or opposition.

For the analysis, we used the *Policymaker* software, a tool that helps conduct stakeholder analyses and design political strategies to support a policy.[25] *Policymaker* is based on five analytical steps: 1) policy content; 2) actors; 3) opportunities and barriers; 4) strategies, and 5) impacts of the strategies.

With the collected information, we built a "players position map", using as reference the level of power of each actor and the level of support or opposition (or indifference) to the proposed policy. The actors' power was established using a set of questions included in *Policymaker*. The answers to these questions provided information, for each actor, on access to financial, organizational, and symbolic resources to influence policies, as well as on easy and direct access to decision makers and to the media. Based on the answers, *Policymaker* rates the power of each actor as 'high', 'medium' or 'low'.

Results

Context analysis

We analyzed two contextual factors which we believe have created a window of opportunity for the adoption of a policy to impose a higher excise tax on SSB in Mexico: i) the nutritional transition in Mexico and ii) the worldwide awareness about the impact of SSB on the increasing global prevalence of overweight/obesity and diabetes.

Awareness regarding the need to control the consumption of SSB through various policy measures, including taxation, first stemmed from the evidence on the nutrition transition experienced by middle-income countries in the past decades. This transition is characterized by a shift from a high prevalence of undernutrition to a high prevalence of overweight/obesity and nutrition-related NCD.[26-28]

In Mexico, the prevalence of stunting in children under five declined from 26.9 percent in 1988 to 13.6 percent in 2012, while the prevalence of overweight/obesity in adults aged 20 years and older increased from 33.0 percent in 1988 to 75.2 percent in 2018.[4,29,30]

The evolution of overweight/obesity in Mexico has been documented through national surveys imple-

mented in 2000, 2006, 2012, 2016, and 2018 (figure 1).[4,31] The resulting measurements have been widely disseminated and have played a crucial role in the framing of the problem of overweight/obesity and its consequences, its discussion in policy circles, and its incorporation into the national health agenda.[4,29,32-37]

The other contextual factor that is creating a window of opportunity to increase the tax on SSB in Mexico is the international consensus around the possibility of reducing the consumption of these products through the use of, among other things, fiscal policies. The supporters of these measures refer to the success of tobacco taxes worldwide and to the initial documented positive effects of SSB taxes.[38,39]

The World Health Organization (WHO) had suggested for years a lower intake of sugar but had refrained from supporting taxes on SSB. However, in 2016, this agency published a report suggesting a 20 percent tax on SSB in order to reduce global overweigh/obesity, diabetes, and tooth decay.[40] Globally, soda taxes have gained momentum as powerful interventions to discourage sugar consumption and thus reduce the growing burden of overweight/obesity. Available evidence shows that they discourage the consumption of SSBs, incentivize the purchase of healthier products, and generate revenue to support health promotion programs and curative services.[12-14,41,42]

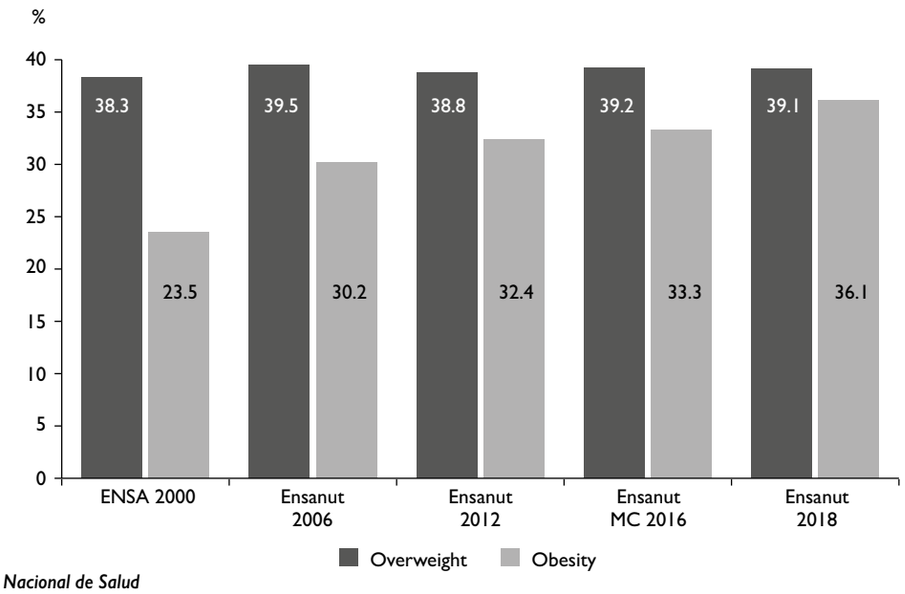
Stakeholder analysis

The adoption of a policy requires certain 'driving factors' to leverage the 'enabling conditions' in order to push this new policy measure. In this case, the driving factors or driving actors for an increase to the tax on SSB were identified through a stakeholder analysis.

The 18 key actors in our study were clustered in six groups: government officials (Gov), congressmen (CM), representatives of multilateral organizations (MO), representatives of non-governmental organizations (NGO), representatives of the industry (IND), and researchers (Res).

As illustrated in figure 2, seven actors strongly supported an increase to the excise tax on SSB to 20 percent: the four researchers, the two NGO representatives, and the representative of the multilateral organization. One of the researchers had high political power, while the two NGOs representatives and the representative of the multilateral organization had medium political power. One government official with high political power (Gov1) showed medium support to the increase in the tax. This was also the case of one congressman, who had medium political power (CM2).

As expected, the strongest opposition to the tax came from the representatives of the industry, four of whom had high political power. One government official



ENSA: *Encuesta Nacional de Salud*
Ensanut: *Encuesta Nacional de Salud y Nutrición*
Ensanut MC: *Encuesta Nacional de Salud y Nutrición de Medio Camino*
Source: references 4 and 31

Figure 1. Prevalence of overweight and obesity in adults according to National Health and Nutrition Surveys. Mexico 2000-2018

High support	Medium support	Low support	Non-mobilized	Low opposition	Medium opposition	High opposition
Res 1	Gov 1		Gov 2	Gov 4		Ind 1
Res 2	CM 2		Gov 3	CM 1		Ind 2
Res 3						Ind 3
Res 4						Ind 4
NGO 1						Ind 5
NGO 2						
MO						

High power Medium power Low power

SSB: Sugar-sweetened beverages

Figure 2. Position map of key actors in the negotiation of an increase to the excise tax on SSB to 20% in Mexico, 2018

(Gov4) and one legislator (CM1), both with high political power, showed low opposition to the proposed policy.

Finally, the two government officials working at Cofepris (Gov 2 and 3) did not manifest support or opposition to the increase to the tax on SSB.

The general image of the map shows a balanced situation. However, a slightly higher number of actors supported the increase to the tax, but the actors opposing this policy measure had a greater political power. Those supporting the policy measure argued that scientific evidence has shown that high consumption of SSB is one of the main risk factors associated to overweight/obesity and diabetes. For these reasons, according to them, the government should design policy instruments, including taxes, to reduce the consumption of these products. They also argued that the higher the tax, the greater the reduction of their consumption and of the health damages generated by them.

Fiscal procedures, according to these same supporters, should be complemented with additional control measures, such as regulation of SSB advertisements, implementation of labelling procedures for these beverages, increasing accessibility to drinking water, and promotion of physical activity. These measures could be partly financed with resources gathered through a higher excise tax.

According to the representative of the multilateral organization, this policy proposal is consistent with WHO's suggestions. A successful implementation of a higher tax on SSB, in addition, would have a major positive impact on the region, since more Latin American countries would be willing to follow this example.

NGO representatives argued that an additional benefit of consumers' mobilization around this measure would be the empowerment of citizens, who would then be willing to participate more actively in support of other measures to improve their health.

The high government official who supported this policy measure stated that its promotion in Congress is the responsibility of the Ministry of Finance, the government area in charge of imposing taxes. The role of the MoH should be limited to providing evidence in support of this measure.

Several arguments were offered by those actors opposing an increase in the excise tax on SSB to 20 percent in Mexico, mainly the representatives of the industry. It

is important to mention that most of these arguments were consistently presented by all members of this opposing group, a fact that expresses the existence of a common and coordinated strategy to confront this potential policy measure.

The main argument presented by this group is that the caloric input of SSB is not enough to produce the levels of overweight/obesity registered in Mexico and that these beverages are a key component of the Mexican diet, especially in poor households. They also argue that the tax on SSB did not modify the consumption patterns of these products or the caloric input of the Mexican population. According to them, the limited initial effects that have been registered will disappear as regular consumption patterns reestablish after a brief period of time. For these reasons, an increase in the excise tax would generate a major financial burden on the poorest households without producing health benefits.

The representatives of the industry also stated that the main purpose of a rise in the tax on SSB is to increase fiscal income. They argue that this measure would have a negative impact on economic activity, since it would particularly affect the retail sector, strongly dependent on SSB sales. In any case, the role of the government, they argued, should be limited to providing the consumers with information. Excessive intervention, according to them, restricts personal choice, a key component of well-performing markets and a right of citizens.

One government official stated that, given the fact that there is no consensus around the need to increase the excise tax on SSB, further research is needed to establish the appropriate level of the proposed tax.

According to government actors who refused to take a position regarding this issue, it is important to avoid conflicts with the industry, especially since there is a national pact among all economic actors to limit additional taxes. They also stated that non-coercive measures that impact the levels of overweight/obesity, such as the promotion of physical activity and nutritional advice, should be favored over compulsory actions.

The congressman who opposed the implementation of an increase in the excise tax argues that, given the enormous consequences of such a measure, a major agreement among all political parties should be reached.

Discussion

Fiscal policies are being used worldwide for public health purposes. In addition to discouraging the purchase of certain products (tobacco, SSB), they stimulate behavioral changes. This stakeholder analysis shows that certain key actors (academics, NGOs) support an increase to the excise tax to 20 percent, while others (industry representatives) strongly oppose it. Both sides use evidence to support their positions. The proponents of the increase to the excise tax invoke the evidence gathered from scientific journals, while those opposing this measure resort to evidence generated expressly by the SSB industry. The soda industry is also known for consistently hiding evidence that documents the harmful effects of sugar consumption, just as the tobacco industry did with cigarettes and other tobacco products.[43]

The main argument of those supporting an increase to the excise tax on SSB in Mexico is that there is evidence that demonstrates that fiscal measures to reduce the consumption of SSBs are very cost-effective and can further reduce the consumption of these beverages and improve health conditions.[44] They also argue that this fiscal measure should be complemented with measures to promote physical activity and a healthy diet, improve access to drinking water, and enforce detailed labelling of SSB. These complementary measures could be financed with the resources generated by the increased excise tax, although in Mexico financial authorities have opposed the earmarking of tax revenues.

Those opposing this measure argue that the tax on SSB did not modify the consumption patterns of these products or the caloric input of the Mexican population. For this reason, an increase in the tax would generate additional financial burdens on households without producing health benefits, as well as major problems to the convenience stores sector, which is strongly dependent on SSB sales. They insisted that the key to addressing the challenge of overweigh/obesity in Mexico is the promotion of healthy lifestyles.

Finally, the government representatives were divided. The area in charge of health promotion and disease prevention at the MoH showed a modest support to an increase to the tax on SSB, while the area in charge of the protection against sanitary risks stated that this topic lies outside its area of competence. Other representatives, concerned about the potential political consequences of a confrontation with the powerful SSB industry, avoided taking a position.

The stakeholder map shows a balanced distribution of actors. However, the soda industry seems to concentrate more political leverage, due to its access to huge financial resources to influence public opinion and government officials and key congressmen through the media and lobbying procedures.[45] These measures are the core components of a soda industry's strategy, designed years ago following the example of the tobacco industry in its fight against cigarette taxes.[46] This strategy has been adapted to the present political

circumstances of Mexico and enriched with information regarding its successful implementation in several states of the USA and various countries.[47]

Those in favor of increasing the tax on SSB have solid documentation on the overweight/obesity epidemic, scientific evidence of its effects on the consumption of these beverages, and proofs of the positive impact of this measure on the consumption patterns of SSB. They have also used in their promotion campaigns the experiences of other middle-income countries that have recently adopted major fiscal measures.[48] The researchers and NGO representatives interviewed for this project believe that only a major coalition and an extended social mobilization to push this new tax forward could convince the Mexican government to support this policy.

In Mexico, the problem of overweight/obesity, and its impact on health has been well documented, and several proposals to address this problem have been designed and implemented.[49] These proposals include an excise tax of 10 percent on SSB. Evidence has shown that higher taxes on these beverages could further reduce their consumption, generating additional health benefits. For this reason, the idea of increasing the excise tax on SSB to 20 percent has been recently discussed in various policy circles.

This stakeholder analysis shows that the leading supporters of an increase to the excise tax on SSB in Mexico are researchers and NGOs involved in the fight against overweight/obesity, holding scientific evidence as their chief asset. The main opponent is the soda industry, which has a solid opposing strategy and enormous financial resources to influence public opinion, government officials, and congressmen through the media and lobbying procedures. Finally, the government shows a cautious position towards increasing the excise tax, and would only support such a measure if its proponents are able to build a solid and large coalition and mobilize public opinion to push this policy forward in the Mexican congress.

There is an increasing consensus in academic, NGO, and global policy circles around the need to impose taxes on SSB. The available evidence shows that this measure reduces the consumption of these beverages, as well as obesity rates.[31,42] For this reason, the WHO recommended imposing a 20 percent excise tax on these products. However, evidence and recommendations are not enough to guarantee the implementation of health policies: active promotion of these and other measures by powerful and influential actors is also required. In order to guarantee the implementation of a policy, it is necessary to: i) identify and document the problem that this policy intends to address; ii) design a solid proposal to address this problem, and iii) mobilize key actors to push this proposal forward in policy circles.

Declaration of conflict of interests. The authors declare that they have no conflict of interests.

References

1. Lewit E, Coate D. The potential for using excise taxes to reduce smoking. J Health Econ. 1982;1(2):121-45. https://doi.org/10.1016/0167-6296(82)90011-X
2. Muth N, Dietz W, Sheela N, Johnson R, American Academy of Pediatrics, Section ON Obesity, *et al*. Public policies to reduce sugary drink consumption in children and adolescents. Pediatrics. 2019;143(4):e20190282, https://doi.org/10.1542/peds.2019-0282
3. Chaloupka F, Powell L, Warner K. The use of excise taxes to reduce tobacco, alcohol, and sugary beverage consumption. Annu Rev Public Health. 2019;40:187-201. https://doi.org/10.1146/annurev-publhealth-040218-043816
4. Shamah-Levy T, Vielma-Orozco E, Heredia-Hernández O, Romero-Martínez M, Mojica-Cuevas J, Cuevas-Nasu L, *et al*. Encuesta Nacional de Salud y Nutrición 2018-19: Resultados Nacionales. Cuernavaca: Instituto Nacional de Salud Pública, 2020. Disponible en: https://ensanut.insp.mx/encuestas/ensanut2018/doctos/informes/ensanut_2018_informe_final.pdf
5. Basto-Abreu A, Barrientos-Gutiérrez T, Rojas-Martínez R, Aguilar-Salinas CA, López-Olmedo N, De la Cruz-Góngora V, *et al*. Prevalencia de diabetes y descontrol glucémico en México: resultados de la Ensanut 2016. Salud Publica Mex. 2020;62:50-9. https://doi.org/10.21149/10752
6. Malik V, Popkin B, Bray G, Després J, Willett W, Hu F. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes a meta-analysis. Diabetes Care. 2010;33(11):2477-83. https://doi.org/10.2337/dc10-1079
7. Cherukupalli R. Growth rates and aggregates: bringing data to the soda wars [Internet]. Lancet Global Health blog. 2016 [cited August 21, 2017]. Available from: http://globalhealth.thelancet.com/2016/06/10/growth-rates-and-aggregates-bringing-data-soda-wars
8. World Health Organization. Guideline: Sugars intake for adults and children [Internet]. Geneva: World Health Organization, 2015 [cited August 21, 2017]. Available from: http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf?ua=1
9. Centro de Estudios de las Finanzas Públicas. Medidas fiscales y extra fiscales para contrarrestar el consumo de bebidas saborizadas en México [Internet]. Mexico: Cámara de Diputados, 2015 [cited August 21, 2017]. Available from: http://www.cefp.gob.mx/publicaciones/nota/2015/abril/notacefp0142015.pdf
10. Colchero A, Molina M, Guerrero-López CM. After Mexico implemented a tax, purchases of sugar-sweetened beverages decreased and water increased: Difference by place of residence, household composition, and income level. Composition, and Income Level. The Journal of Nutrition.2017;147(8):1552-7. https://doi.org/10.3945/jn.117.251892
11. Colchero A, Popkin BM, Rivera JA, Ng SW. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. BMJ. 2016;352:H6704. https://doi.org/10.1136/bmj.h6704
12. Colchero A, Salgado J, Unar-Munguía M, Hernández-Ávila M, Rivera-Dommarco J. Price elasticity of the demand for sugar sweetened beverages and soft drinks in Mexico. Econ Hum Biol. 2015;19:129-37. https://doi.org/10.1016/j.ehb.2015.08.007
13. Sánchez-Romero LM, Penko J, Coxson PG, Fernández A, Mason A, Morán AE, *et al*. Projected impact of Mexico's sugar-sweetened beverage tax policy on diabetes and cardiovascular disease: A modeling study. PLoS Med. 2016;13(11):e1002158. https://doi.org/10.1371/journal.pmed.1002158
14. Colchero A, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, evidence of sustained consumer response two years after implementing a

sugar-sweetened beverage tax. Health Aff (Millwood). 2017;36(3):564-571. https://doi.org/10.1377/hlthaff.2016.1231
15. Reich M. The politics of reforming health policies. Promotion & Education. 2002;9(4): 138-42. https://doi.org/10.1177/175797590200900401
16. Birkland T. An introduction to the policy process. Theories, concepts, and models of public policy making. London: Routledge, 2019.
17. Roberts MJ, Hsiao W, Berman P, Reich MR. The health-reform cycle. In: Roberts MJ, Hsiao W, Berman P, Reich MR. Getting health reform right. A guide to improving performance and equity. Oxford: Oxford University Press, 2004:2139.
18. Andersen RM. Behavioral model of families' use of health services. Chicago: Center for Health Administrations Studies, University of Chicago, 1968.
19. Andersen R. National health surveys and the behavioral model of health services use. Med Care. 2008;46(7):647-53. https://doi.org/10.1097/MLR.0b013e31817a835d
20. Mercer SL. Enabling factors [Internet]. Encyclopedia of Public Health. 2016 [cited August 21, 2017]. Available from: http://www.encyclopedia.com/doc/1G2-3404000298.html
21. Gómez-Dantés O, Reich M, Garrido-Latorre F. Political economy of pursuing the expansion of social protection in health in Mexico. Health Syst Reform. 2015;1(3):207-16. https://doi.org/10.1080/23288604.2015.1054547
22. Brugha R, Vasvasovszky Z. Stakeholder analysis: a review. Health Pol Plan. 2000;15(3):239-46. https://doi.org/10.1093/heapol/15.3.239
23. Varvasovszky Z, Brugha R. How to do (or not to do) a stakeholder analysis. Health Pol Plann. 2000;15(3):338-45.
24. Shonk K. What is negotiation? [Internet]. Harvard Law School. 2020 [cited May 28, 2020]. Available from: https://www.pon.harvard.edu/daily/negotiation-skills-daily/what-is-negotiation/
25. Reich M. Policy Maker 4 Software. Computer Assisted Political Analysis. Version 4.0. Boston: Polimap, 2012.
26. Popkin BM. The nutrition transition: An overview of world patterns of change. Nutr Rev. 2004; 62(7):140-3. https://doi.org/10.1111/j.1753-4887.2004.tb00084.x
27. Popkin BM. The shift in stages of the nutrition transition in the developing world differs from paste experiences. Public Health Nutr. 2002;5(1A):204-14. https://doi.org/10.1079/PHN2001295
28. Rivera J, Barquera S, Campirano F, Campos I, Safdie M, Tovar V. Epidemiological and nutritional transition in Mexico: rapid increase of non-communicable chronics diseases and obesity. Public Health Nutr. 2002;5(1A):113-22. https://doi.org/10.1079/PHN2001282
29. Rivera JA, Barquera S, González-Cossío T, Olaiz G, Sepúlveda J. Nutrition transition in Mexico and in other Latin American countries. Nutr Rev. 2004;62(7):149-57. https://doi.org/10.1111/j.1753-4887.2004.tb00086.x
30. Pérez-Ferrer C, McMunn A, Zaninotto P, Brunner EJ. The nutrition transition in Mexico 1988-2016: the role of wealth in the social patterning of obesity by education. Public Health Nutr. 2018;21(13):2394-401. https://doi.org/10.1017/S1368980018001167
31. Barquera S, Campos-Nonato I, Hernández-Barrera L, Pedroza A, Rivera-Dommarco J. Prevalence of obesity in Mexican adults 2000-2012. Salud Publica Mex. 2013;55(suppl 2):S151-60 [cited May 28, 2020]. Available from: http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0036-36342013000800012&lng=es&nrm=iso
32. Cabrera-Escobar MA, Veerman JL, Tollman SM, Bertram MY, Hofman KJ. Evidence that tax on sugar sweetened beverage reduces the obesity rate: a meta-analysis. BMC Public Health. 2013;13:1072. https://doi.org/10.1186/1471-2458-13-107
33. Villagómez P. Desigualdades nutricionales en México: un drama en construcción [Internet]. Nexos. 2018 March 8 [cited April 20, 2018]. Available from: https://economia.nexos.com.mx/?p=1134
34. Rivera-Dommarco J, Cuevas-Nasu L, González de Cossío T, Shamah-Lvy T, García-Feregrino R. Desnutrición crónica en México en el último cuarto de siglo: Análisis de cuatro encuestas nacionales. Salud Publica Mex. 2013; 55(suppl 2):S161-9.
35. Rivera-Dommarco JA, Hernández-Ávila M, Aguilar-Salinas CA, Vadillo-Ortega F, Rendón-Murayama C. Obesidad en México: Recomendaciones para una política de Estado. Mexico City: Academia Nacional de Medicina, 2013.
36. Rivera JA, González de Cossío T, Pedraza S, Aburto TC, Sánchez TG, Martorell R. Childhood and adolescent overweight and obesity in Latin America: a systematic review. Lancet Diabetes & Endocrinology. 2014; 2(4):321-32.
37. Bader P, Boisclair D, Ferrence R. Effects of tobacco taxation and pricing on smoking behavior in high risk populations: A knowledge synthesis. Int J Environ Res Public Health. 2011;8(11):4118-39.
38. Chaloupka FJ, Straif K, Leon ME, Working Group, International Agency for Research on Cancer. Effectiveness of tax and price policies in tobacco control. Tob Control. 2011; 20(3):235-8. https://doi.org/10.1136/tc.2010.039982
39. Wan L, Watson E, Arthur R. Sugar taxes: the global picture in 2017 [Internet]. England: William Reed Business Media, 2017 [cited April 23, 2018]. Available from: https://www.beveragedaily.com/Article/2017/12/20/Sugar-taxes-The-global-picture-in-2017
40. World Health Organization. Fiscal policies for diet and prevention of no communicable diseases. Geneva: WHO, 2016.
41. Schwendicke F, Stolpe M. Taxing sugar-sweetened beverages: impact on overweight and obesity in Germany. BMC Public Health. 2017;17(1):88. https://doi.org/10.1186/s12889-016-3938-4
42. Nakhimovsky S, Feigl A, Avila C, O'Sullivan G, Macgregor-Skinner E, Spranca M. Taxes on sugar-sweetened beverages to reduce overweight and obesity in middle-income countries: A systematic review. PLOS ONE. 11(9):e0163358. https://doi.org/10.1371/journal.pone.0163358
43. Sassi F, Belloni A, Mirelman AJ, Suhrcke M, Thomas A, Salti N, *et al*. Equity impacts of price policies to promote healthy behaviours. The Lancet Taskforce on NCDs And Economics. 2018;391(10134):P2059-70. https://doi.org/10.1016/S0140-6736(18)30531-2
44. Pfister K. Leaked: Coca Cola's worldwide political strategy to kill soda taxes. Observer. 2016 Oct 14 [cited July 6, 2018]. Available from: http://observer.com/2016/10/leaked-coca-colas-worldwide-political-strategy-to-kill-soda-taxes
45. Ojeda E, Torres C, Carriedo A, Mialon M, Parekh N, Orozco E. The influence of the sugar-sweetened beverage industry on public policies in Mexico. Int J Public Health. 2020;65:37-1044. https://doi.org/10.1007/s00038-020-01414-2
46. Jacobs A, Richtel M. She took on Colombia's soda industry. Then she was silenced [Internet]. The New York Times. 2017 Nov 13 [cited July 17, 2018]. Available from: https://www.nytimes.com/2017/11/13/health/colombia-soda-tax-obesity.html
47. Garfield L. A 50% 'sin' tax on soda in Dubai could have global consequences. Business Insider. 2017 Oct 3 [cited May 8, 2018]. Available from: http://www.businessinsider.com/uae-dubai-sugar-diabetes-tax-soda-energy-drinks-tobacco-2017-10
48. Caro J, Corvalán C, Reyes M, Silva A, Popkin B, Smith-Taillie L. Chile's 2014 sugar-sweetened beverage tax and changes in prices and purchases of sugar-sweetened beverages: An observational study in an urban environment. Plos Med. 2018;15(7):e1002597. https://doi.org/10.1371/journal.pmed.1002597
49. Kearns CE, Glantz SA, Schmidt LA. Sugar industry influence on the scientific agenda of the National Institute of Dental Research's 1971 Nacional Caries Program: A historical analysis of internal documents. PLOS Medicine. 2015;12(3):e1001798. https://doi.org/10.1371/journal.pmed.1001798

International Journal of Public Health
https://doi.org/10.1007/s00038-020-01414-2

ORIGINAL ARTICLE

The influence of the sugar-sweetened beverage industry on public policies in Mexico

Enai Ojeda[1] · Christian Torres[1] · Ángela Carriedo[2] · Mélissa Mialon[3] · Niyati Parekh[4] · Emanuel Orozco[1]

Received: 4 February 2020 / Revised: 15 June 2020 / Accepted: 16 June 2020
© Swiss School of Public Health (SSPH+) 2020

Abstract

Objective The objective of this study was to map and describe the different corporate political activity (CPA) strategies used by the sugar-sweetened beverage (SSB) industry to influence public health policymaking geared toward decreasing the consumption of SSB in Mexico.

Methods We applied an existing approach to identify and monitor the CPA of the SSB industry. A documentary analysis was conducted for two main actors in the SSB industry, for the period 2017–2019, and was triangulated with eleven semi-structured interviews with key informants in public health nutrition and from the SSB industry. The information was analyzed using an existing framework for categorizing the CPA.

Results Although data were found for six CPA strategies, the SSB industry mainly highlighted its economic importance and spoke openly against the 2014 SSB tax. We documented the industry's relationships with governmental bodies and civil society actors to promote corporate social responsibility and gain public support.

Conclusions The SSB industry in Mexico uses a variety of strategies, directly or through third parties, to influence public policies related to the prevention and control of obesity and non-communicable diseases.

Keywords Soft drink industry · Health policy · Corporate political activity · Non-communicable diseases

Introduction

Extensive evidence exists at the global level regarding the relationship between the consumption of food products high in sugar, fat, and sodium, and non-communicable diseases (NCDs) such as diabetes and some types of cancer, among others (Braverman-Bronstein et al. 2019). Latin

This article is part of the special issue "Market-driven forces and Public Health".

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00038-020-01414-2) contains supplementary material, which is available to authorized users.

✉ Emanuel Orozco
emanuel.orozco@insp.mx

Enai Ojeda
enaiojeda@gmail.com

Christian Torres
ciss09@insp.mx

Ángela Carriedo
angela_carriedo@yahoo.com

Mélissa Mialon
melissa_mialon@hotmail.fr

Niyati Parekh
np31@nyu.edu

[1] Instituto Nacional de Salud Pública, Av Universidad 655, Cuernavaca, Morelos, Mexico

[2] World Public Health Nutrition Association, London, UK

[3] University of São Paulo, São Paulo, Brazil

[4] New York University, New York, US

Published online: 25 July 2020

Ojeda E, Torres C, Carriedo Á, Mialon M, Parekh N, Orozco E. The influence of the sugar-sweetened beverage industry on public policies in Mexico. Int J Public Health. 2020;65(7):1037-1044. https://doi.org/10.1007/s00038-020-01414-2

America is particularly affected by a high prevalence of NCDs associated with the consumption of ultra-processed products (Popkin 2004; PAHO 2015)

Public policies have been implemented to reduce the consumption of such products and to prevent and control obesity and NCDs. Some examples are: increased taxes on sugar-sweetened beverage (SSB); front-of-package labeling; regulation of food marketing targeted to children; and school food guidelines and physical activity programs (Popkin 2013). Nevertheless, developing and implementing these policies has been a challenging task for many countries, due to the influence of the food and beverage industry (Popkin 2013). The tactics of the food and beverage industry, to affect or influence public health policymaking, research and practice, are similar to those used by the tobacco and alcohol industry (Moodie et al. 2013; Ulucanlar et al. 2016; Mialon et al. 2015; Madureira Lima and Galea 2018; Hawkins and McCambridge 2014). It has been widely documented that the tobacco and food industries have a negative influence on public health (Brownell and Warner 2009).

Mialon et al. (2015) proposed a framework for classifying what is called the corporate political activity (CPA) of the food industry, based on existing knowledge of the CPA of tobacco and other industries. The framework identified six broad CPA strategies that could influence (or have the power to affect) the development of public health interventions, directly or indirectly, and include: information and messaging; financial incentive; constituency building; legal; policy substitution; fragmenting and destabilizing the opposition. These strategies have been used by corporations to protect their commercial interests, increase their financial gain, and influence public policies, which could block public health efforts to manage the growing epidemic of obesity and NCDs (Hastings 2012; Barquera et al. 2018; Moscetti and Taylor 2018).

There is evidence of the use of CPA strategies by the food industry in France, Fiji, Australia, Thailand, and Latin America (Mialon and Mialon 2017; Mialon and Mialon 2018; Mialon et al. 2016a, b; Mialon et al. 2017; Jaichuen et al. 2018; Mialon and Gomes 2019). In these cases, the industry has funded research, promoted deregulation, established alliances with the media and decision-makers, among other practices, which could delay the development of public health policies. In Mexico, the food and SSB industry has used some of these practices to oppose public health initiatives (Charvel et al. 2015; Barquera et al. 2013; Barquera et al. 2018; Scott et al. 2016).

However, little is known about the influence of the food and SSB industry on the formulation and implementation of public policies and its CPA in Latin America, particularly in Mexico (Gómez 2019; Mialon and Gomes 2019; Carriedo 2017; Barquera et al. 2018).

This study aims to map and describe the different CPA strategies used by the SSB industry to influence public health policymaking geared toward decreasing the consumption of SSB in Mexico.

Methods

We applied an analytical approach and methodology to systematically identify and monitor the food industry's CPA, developed by INFORMAS, the International Network for Food and Obesity/Non-Communicable Diseases Research, Monitoring and Action Support (Mialon et al. 2015). This approach and the CPA categorization are based on ample evidence from the CPA of the tobacco, alcohol, and food industries, to influence public health policy, research and practice, and have been implemented in different studies of the food industry's CPA.

A documentary analysis was carried out by the research group for two major actors of the SSB industry in Mexico that are also considered part of the "food industry" actors. These data were triangulated with eleven semi-structured interviews with key informants.

We selected the two key players in the Mexican SSB market, in consultation with public health experts and as identified by different research and media outlets (Calvillo and Székely 2018; Donaldson 2015; Carriedo 2017). Coca-Cola (Industria Mexicana de Coca-Cola) is a transnational company that produces, imports, and commercializes SSB (among other products) in Mexico. It is the largest distributor of SSB in the country. The National Association of Soft Drinks and Carbonated Water Producers (ANPRAC, Spanish acronym) is a trade association with 99 members from the beverage industry in Mexico.

As recommended by INFORMAS, we identified publicly available information (see Online Resource), including the Web pages and Twitter accounts of the selected industry actors. In addition, we collected information from the Web pages of the Mexican government, the Senate of the Republic, and the Chamber of Deputies. We searched for news articles in two newspapers with national circulation. All data were published between January 2017 and May 2019 and were all collected between March and May 2019.

For the interviews, the research group, after consultation with experts and other researchers, identified key organizations and people who have participated in public health policymaking, as well as representatives of the private sector. Other individuals were identified using the snowball sampling method. The first author conducted eleven semi-structured interviews between April and May 2019. Three interviewees included representatives of non-governmental organizations (NGOs) working on the prevention of NCDs;

three were representatives of the SSB industry; one was a political adviser; three were academics; and one was a legislator. An interview guide was developed and piloted once.

We sent invitations by e-mail and scheduled interviews with those who agreed to participate. Three of the interviews were done over the phone and the rest face-to-face. All participants signed a letter of informed consent to participate, and to have the session audio-recorded, guaranteeing the confidentiality and ethical use of the data. The study protocol was approved by the Ethics in Research Committee of the National Institute of Public Health of Mexico, on March 11, 2019 (approval number S46).

For both the documentary analysis and interviews, we conducted a thematic analysis, based on the CPA framework proposed by Mialon et al. (2015). Disagreement on codification was resolved through discussion within the research group. All data were collected in Spanish by a native speaker, and illustrative examples have been translated into English in this manuscript.

Results

The results are presented thematically according to the six CPA strategies of the food industry. Throughout the analysis, these categories were found not to be mutually exclusive, as explained in the approach proposed by Mialon et al. (2015). We have allocated a code starting with a letter A (for ANPRAC) or C (for Cola-Cola) to the industry material presented in this publication (Online Resource).

Strategy one: information and messaging

Lobby

NGO representatives and academics mentioned that lobbying is a regular practice carried out by employees from the SSB industry and other representatives, such as Chambers of Commerce or trade associations. Informants from the SSB industry corroborated the support of associations for this practice.

The documentary analysis confirmed that ANPRAC members were registered in 2019 as lobbyists, both at the Chamber of Deputies and at the Chamber of Senators at the Congress (A1, A2).

Stress the economic importance of the industry

The SSB industry has highlighted its role in the number of jobs it generates and the sector's economic contribution, not only directly but also through the support to other industries along their supply chain. The SSB industry also highlighted its role as a contribution to the national Gross Domestic Product (GDP). Coca-Cola reported generating 1.4% of the national GDP and more than 98,000 direct jobs, along with more than a million indirect ones, through the operation of its 67 bottling plants, 350 distribution centers, and 54 wastewater treatment plants (C7).

Promote deregulation

ANPRAC argued that the SSB tax would affect the poorest segment of the population and that it would not achieve a decrease in the consumption of SSB, nor improve health (A11, A15, A30). No evidence of this practice was found for Coca-Cola. The interviewees identified that the SSB industry particularly opposed the tax, pointing to the negative impacts on the economy and on the number of jobs that would be lost. Also, the SSB industry criticized the lack of transparency around the use of the SSB tax revenues for public health actions. An informant from the SSB industry said:

> *The money raised was not used for the cause for which it was collected (…) It was not even dedicated to water fountains and much less to public health topics in the country.*

Frame the debate on diet and public health-related issues

The documentary analysis and the interviews indicated that the SSB industry promoted individual and parent's responsibility for their well-being and individual choices for the selection and consumption of products (A44, C31, C32). The SSB industry also mentioned energy unbalance and sedentary lifestyle as causes of obesity (A40, A57, A58, C31). Moreover, the SSB industry emphasized its interest in being part of the solution to the problem of obesity. For this reason, it promoted its broad product portfolio that includes beverages low in calories or without calories (A47, C26, C31). As part of their actions on corporate social responsibility, both actors promoted physical activity and nutrition education (A39, A90, C33, C34).

Shape the evidence based on diet and public health-related issues

ANPRAC participated in a forum about preventive actions for health and organized an event on obesity and health (A102, A105). Also, *ANPRAC* funded a research study to disqualify the effect of the SSB tax on SSB sales (A96). Our interviewees mentioned that the funding of studies is a mechanism by which the SSB industry seeks to influence

decision-making. This mechanism was used during the implementation of the SSB tax:

> *They hired academics: clearly, the studies have their biases, and although some results are similar [to ours], how they present them shows that they are against those taxes. [Academic].*

Health campaigns were also sponsored by the SSB industry, for example, through the organization of a "Movement for a Healthy Life" (*MOVISA*, Spanish acronym). Moreover, Coca-Cola and other actors from the SSB industry launched a health promotion campaign in 2017 called "Check and Select." The campaign aimed at educating the population on the use of front-of-package labeling and was carried out together with the government's Health Secretariat and the Federal Commission for Protection Against Public Health Risks (Comisión Federal para la Protección de Riesgos Sanitarios) (C46).

Strategy two: financial incentives

With the information available online, we did not find any documentation confirming the use of financial incentives, such as the SSB industry donating to political parties or providing gifts to policymakers. Most of the informants stated not having heard about this type of practice, so limited examples were identified here. One representative of an NGO explained that this practice was carried out in Mexico:

> *Many times [lobbying] comes with gifts, trips, where even a financial incentive is given, or they are invited to the industries, they are shown around, invited to breakfasts.*

Strategy three: constituency building

Establish relationships with key opinion leaders and health organizations

Coca-Cola, together with the Mexico City government and the Sports Institute *(Instituto* del Deporte), organized the 2018 Powerade Mexico City Triathlon (C63). It also established links with the Interior Ministry (*Secretaría de Gobernación*) for the project "Sports Glories, Football School of Life" and with the Mexican Red Cross, through nutrition workshops for health professionals (C60). We found that *The Coca-Cola Foundation* donated a million US dollars to the Mexican Red Cross for a health unit and a nursing school and made donations for humanitarian aid after the 2017 earthquake in Mexico (C61, C62). Coca-Cola presented in 2019 the beverage "ISOLITE" as the official beverage of the Red Cross (C58, C59).

The Mexican Federation of Diabetes endorsed a book on hydration from Coca Cola (C55) and was financed by companies from the food and SSB industry. Sometimes, this association had its opinion aligned with those companies on health-related topics and promoted their products.

Seek involvement in the community

Seeking involvement in the community is one of the most noteworthy practices developed by the SSB industry in Mexico. In general, this practice appeared through what is called "corporate social responsibility," and it is carried out through third parties, such as foundations, civil society organizations, or government actors. Some examples are presented in Table 1. A recurrent practice of the SSB industry is to point to their actions to protect the environment. For some interviewees, the environmental initiatives are merely emerging because of the criticism directed at the SSB industry for its contribution to plastic pollution and their seizing of water in certain zones in the country, in part due to the production of their beverages.

Representatives of the SSB industry declared supporting social causes through monetary or in-kind donations. A participant from the SSB industry described the situation as follows:

> *If you approach the industry to present a social project or something to them, they will probably support you. Of course: part of the sponsorship for us is the presence of our brand.*

Establish relationships with policymakers

An important mechanism in the establishment of relationships with policymakers is called "revolving doors," where ex-representatives of the industry work for the government or vice versa. An interviewee from an NGO mentioned the case of an *ANPRAC* employee who used to be a member of Congress in 2018.

Several informants stated that the Mexican Observatory of Non-Transmissible Diseases (*OMENT*, Spanish acronym), a body established by the Ministry of Health to monitor and evaluate the obesity policy, had significant participation of SSB industry representatives in their working groups, as also reported by Barquera et al. (2018) and Calvillo and Székely (2018). Interviewees perceived more relationships and openness between the SSB industry and decision-makers during the 2012–2018 presidential period than the current government; nevertheless, these relationships seemed to continue. An NGO representative stated:

Table 1 Examples of the practice "seek involvement in the community" of the sugar-sweetened beverage industry in Mexico 2017–2019

"The companies that are part of the National Association of Soft Drinks and Carbonated Water Producers (*ANPRAC,* Spanish acronym) are an example of recycling on a global scale. They have invested in new technologies and built recycling plants, which process 53.9% of the total PET recycling industry in Mexico." (A115)
"We are a social actor that is committed to the well-being of Mexicans; in the last five years, we have invested more than 730 million pesos in social responsibility programs." (A121)
"We replenish more than 100% of the water we use in the manufacturing process of our products." (C156)
"In 10 years, we have managed to reforest more than 63 thousand hectares by planting more than 77 million trees." (C128)
"The National Program of Reforestation and Water Harvest" (*PNRCA*, Spanish acronym) was created to return to nature all the water that the Coca-Cola Mexican Industry uses in its products." (C91)
"In collaboration with the 'Sustainable Schools' civil association, we implement the Hydration Centers program in almost 1,500 basic level schools." (C80)

There is still interference from the industry, but now the channel is not so clear. We believe it is through previously existing connections.

We noted the connections between the SSB industry and key decision-making actors occurring when the SSB tax and front-of-package labeling were discussed in Mexico. Such connections were led by business associations such as ANPRAC, ConMéxico, and CONCAMIN, as mentioned by our interviewees.

Establish relationships with the media

The most explicit relationship between the SSB industry and the media is through payments for advertising on television and newspapers, since this is an important source of income for the media. An NGO representative mentioned that the SSB industry and the media are part of the same business groups in Mexico, such as the Business Coordinating Board (Consejo Coordinador Empresarial).

Our interviewees suggested that these relationships might explain why journalists regularly support the SSB industry's interests in the content of their publications. An academic said:

[The journalist] is still saying that what is needed is education and all, but he was clearly debating against the tax on soft drinks; he writes for [a national newspaper].

Strategy four: legal strategies

Influence on the development of trade and investment agreements

The only example we found through the interviews of the "influence on the development of trade and investment agreements" CPA practice was the involvement of the SSB industry, together with other allies in the food industry, during negotiations for the free trade agreement between Mexico, the USA, and Canada (T-MEC) in 2018. They tried to block the implementation of nutrition warning labels on foods and beverages. An academic stated about this event:

We know that ConMéxico was sending information to the US. during the negotiations [of the free trade agreement, now T-MEC]; they sent a proposal for a clause in the treaty so that foods and beverages could not be labeled.

Strategy five: policy substitution

Two cases of policy substitution by the SSB industry were found in the documentary analysis and the interviews: the Code for the Self-Regulation of Advertising of Foods and Non-Alcoholic Beverages, targeting children (C161), designed by the food industry in 2009; and the implementation of the nutrition front-of-package labeling based on the Guideline Daily Amounts model, also developed by the food industry. Coca-Cola reported being the first SSB industry to voluntarily implement this label in 2010 (C162).

Interviewees mentioned that since the implementation of the front-of-pack labeling, the restrictions on advertising food to children, and the SSB tax in 2014, the SSB industry changed the sizes of its SSB, to counteract the effects of these policies. The SSB industry has emphasized the fact that it has reformulated its products and diversified its offer of beverages, including products with lower sugar content, no added sugar, low in calories, light, or "more natural." These reformulation initiatives could be attempts to substitute mandatory regulation.

Strategy six: fragmentation and destabilization of the opposition

Create multiple voices against the public health measures

Informants identified Queremos Mexicanos Activos (We Want Active Mexicans) and *MOVISA* as organizations financed by the SSB industry. MOVISA included companies and other organizations from the food and SSB industry and was created by the industry after discussions on SSB tax increases (C164) (C165). These organizations participated in the *OMENT* working groups and focused on the lack of physical activity as a cause of obesity. An NGO representative expressed the following:

> *The discourse of the representative [from Queremos Mexicanos Activos] was always along the line that Mexicans find excuses to avoid physical activity. They presented it as a theme of individual responsibility or lack of personal interest.*

In our interviews, academics and NGO representatives corroborated that the SSB industry had support from Chambers of Commerce, Confederations of Industries, business groups and trade associations, to defend their interests.

> *They establish alliances, and I think that is when they are the strongest; there is ConMéxico, which involves several soft drink industries, and I think that is where they become more important when they join. [Academic].*

Infiltrate, monitor, and distract public health advocates, groups, and organizations

Two people alluded to a case of surveillance in 2016 of activists and advocates for the SSB tax in Mexico; this case was published in The New York Times (Perlroth 2017). NGO representatives commented that the SSB industry monitored actors that promoted regulations or measures that could go against its interests. An interviewee from an NGO mentioned that industry lobbyists had attended events organized by NGOs:

> *[The events] are full of lobbyists from the industry, and on many occasions, what have they done? During or after our event, they give out their own 'policy briefs' to the participants.*

This infiltration and monitoring of the activities of public health advocates were one of the most criticized strategies by NGOs representatives and academics in our interviews since it is oriented toward the interests of the industry.

Discussion

The triangulation of documents and interviews showed that the SSB industry primarily used the "information and messaging," "constituency building," "fragmentation and destabilization," and "policy substitution" strategies in Mexico. "Financial incentives" and "legal" strategies were barely mentioned.

In the "information and messaging" strategy, the arguments against the SSB tax were often found in several sources. The emphasis of the industry on the lack of physical activity being the main cause of obesity, while minimizing the contribution of the SSB, was an argument repeatedly found in documents and during the interviews. Another practice employed by the SSB industry was to stress its importance in the economy, emphasizing the number of jobs it generates. The economic importance of the SSB industry also meant that it has economic and, as we demonstrated, political powers.

The strategy "constituency building" was one of the most recurrent. Through this strategy, the SSB industry protected its interests by establishing relationships with decision-makers. The SSB industry also supported diverse organizations and communities, which allows it to improve its image and influence public opinion and decision-makers, as well as to get backing for their opinions on regulatory measures.

The results identified for Coca-Cola in this study coincide with other analyses of the CPA of the company in other studies (Mialon and Gomes 2019; Gómez 2019; Mialon and Mialon 2018; Mialon et al. 2016a, b). The use of the "information and messaging," "constituency building," and "policy substitution" strategies by the company, documented in this study, was also reported in a pilot study in 2018/2019 for fifteen countries in Latin America, including Mexico (Mialon and Gomes 2019). This also coincides with the findings of the CPA of Coca-Cola in France, Fiji, and Australia (Mialon and Mialon 2018; Mialon et al. 2016a, b; Mialon et al. 2016a, b). As it has been leaked in the press, the SSB industry has a coordinated strategy to avoid, deflect, and delay regulations that interfere with their commercial interest, and it has been a driving principle of the corporation globally (Pfister 2016).

As our results demonstrated, the SSB industry used CPA strategies to influence the formulation and implementation of public policies, both directly and indirectly. We suggest the continuous monitoring of the SSB industry practices and also the evaluation of government actions, as Nieto et al. (2019) since these public efforts contribute to reduce the prevalence of NCDs.

This study has limitations such as the limited sample of actors, focusing only on two SSB industry actors in

Mexico. We also did not collect historical data, which could have helped us understand the context of the practices described in this manuscript. It is important to note that negotiations are held behind closed doors, often excluding the participation of the academic sector or civil society, which means that we may have missed crucial information in our analysis. Given that interviewees shared examples that were not captured in publicly available documents, we note the need for improving transparency and accountability measures both for the SSB industry and for the government. In particular, transparency tools could be used in policymaking related to the prevention and control of obesity and NCDs in Mexico. The tool proposed by the WHO (2017) for the prevention and management of conflicts of interest in the development of nutrition policies and the implementation of nutrition programs could be used as guidance for the Mexican government, to better prevent any undue influence from the SSB industry. Additionally, the recent efforts of the academic and civil society organizations with the Código Nutricia (Barquera et al. 2020), to improve transparency mechanisms around policymaking and ethical practices among scholars, should be considered as an essential step toward achieving better practices.

The approach to monitoring the CPA of the food industry has been used extensively and supports its strength to identify and categorize industry interference in public health policy, research, and practice. Some actions identified in our research tend to overlap within categories, which illustrate how some activities are simultaneously blended in the process. This makes it difficult to separate one from another. Nevertheless, it provides a better understanding of how the CPA strategies look like in the particular case of the policy formulation and implementation in Mexico. We recognize further in-depth analysis of such CPA to be useful to improve policymaking processes and push back the commercial influence on public health efforts to reduce NCDs. Late during our data analysis, we learned that another, more recent, framework for classifying the CPA of the food industry was developed (Mialon et al. 2018), but this was not adopted in the current study due to time constraints. This framework uses slightly different categories than those presented here and could be used in future studies of the CPA.

The results and lessons learned from this case could contribute to strengthening transparency and accountability mechanisms in public health policymaking, research and practice to reduce the high prevalence of NCDs and obesity and avoid interference of the SSB industry.

Funding The project did not count with funding.

Compliance with ethical standards

Conflict of interest All authors declare no conflict of interest.

Ethical approval "All procedures performed in this study followed the guidance of the Ethics in Research Committee of the National Institute of Public Health, Mexico, and was approved on March 11, 2019, with the ID S46 and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards."

References

Barquera S, Campos I, Rivera J (2013) Mexico attempts to tackle obesity: the process, results, push backs and future challenges. Obes Rev 14:69–78. https://doi.org/10.1111/obr.12096

Barquera S, Balderas N, Rodríguez E et al (2020) Código Nutricia: nutrición y conflicto de interés en la academia. Salud Publica Mex 62:313–318. https://doi.org/10.21149/11291

Barquera S, Sanchez-Bazan K, Carriedo A et al (2018) The development of a national obesity and diabetes prevention and control strategy in Mexico: actors, actions and conflict of interests. In: UK Health Forum (ed). Public health and the food and drinks industry: The governance and ethics of interaction. Lessons from research, policy and practice. UK Health Forum, UK, pp 18–30

Braverman-Bronstein A, Camacho-García-Formentí D, Zepeda-Tello R et al (2019) Mortality attributable to sugar sweetened beverages consumption in Mexico: an update. Int J Obes. https://doi.org/10.1038/s41366-019-0506-x

Brownell KD, Warner KE (2009) The perils of ignoring history: big tobacco played dirty and millions died. how similar is big food. Milbank Q 87:259–294. https://doi.org/10.1111/j.1468-0009.2009.00555.x

Calvillo A, Székely A (2018) La trama oculta de la epidemia: obesidad, industria alimentaria y conflicto de interés. In: El Poder del Consmidor. https://elpoderdelconsumidor.org/wp-content/uploads/2018/02/la-trama-oculta-d-la-epidemia-obesidad-2018.pdf. Accessed 20 Jan 2020

Carriedo A (2017) A policy analysis of the 2014 Mexican soda tax. Ph.D. thesis London School of Hygiene and Tropical Medicine, London. https://doi.org/10.17037/PUBS.04648204

Charvel S, Cobo F, Hernández-Ávila M (2015) A process to establish nutritional guidelines to address obesity: lessons from Mexico. J Public Health Policy 36(4):426–439

Donaldson E (2015) Advocating for Sugar-sweetened Beverage Taxation | A case study of Mexico. In: Johns Hopkins Bloom. Sch. Public Heal. https://www.jhsph.edu/departments/health-behavior-and-society/_pdf/Advocating_For_Sugar_Sweetened_Beverage_Taxation.pdf Acceded 20 Jan 2020

Gómez EJ (2019) Coca-Cola's political and policy influence in Mexico: understanding the role of institutions, interests and divided society. Health Policy Plan 34:520–528. https://doi.org/10.1093/heapol/czz063

Hastings G (2012) Why corporate power is a public health priority. BMJ 2012(345):e5124. https://doi.org/10.1136/bmj.e5124

Hawkins B, McCambridge J (2014) Industry actors, think tanks, and alcohol policy in the United Kingdom. J Public Health 104:1363–1369. https://doi.org/10.2105/AJPH.2013.301858

Jaichuen N, Phulkerd S, Certthkrikul N et al (2018) Corporate political activity of major food companies in Thailand: an assessment and policy recommendations. Glob Health 14:1–11. https://doi.org/10.1186/s12992-018-0432-z

Madureira Lima J, Galea S (2018) Corporate practices and health: a framework and mechanisms. Globalization and Health 14:21. https://doi.org/10.1186/s12992-018-0336-y

Mialon M, Gomes F, da S (2019) Public health and the ultra-processed food and drink products industry: corporate political activity of major transnationals in latin America and the Caribbean. Public Health Nutr 22:1898–1908. https://doi.org/10.1017/S1368980019000417

Mialon M, Julia C, Hercberg S (2018) Nutri-score saga in France: how food industry actors tried to influence public health policies and public opinion. World Nutr 9:109–120. https://doi.org/10.26596/wn.201892109-120

Mialon M, Mialon J (2018) Analysis of corporate political activity strategies of the food industry: evidence from France. Public Health Nutr 21:3407–3421. https://doi.org/10.1017/S1368980018001763

Mialon M, Mialon J (2017) Corporate political activity of the dairy industry in France: an analysis of publicly available information. Public Health Nutr 20:2432–2439. https://doi.org/10.1017/S1368980017001197

Mialon M, Swinburn B, Allender S, Sacks G (2017) 'Maximising shareholder value': a detailed insight into the corporate political activity of the Australian food industry. Aust N Z J Public Health 41:165–171. https://doi.org/10.1111/1753-6405.12639

Mialon M, Swinburn B, Allender S, Sacks G (2016a) Systematic examination of publicly-available information reveals the diverse and extensive corporate political activity of the food industry in Australia. BMC Public Health. https://doi.org/10.1186/s12889-016-2955-7

Mialon M, Swinburn B, Wate J et al (2016b) Analysis of the corporate political activity of major food industry actors in Fiji. Glob Health 12:1–14. https://doi.org/10.1186/s12992-016-0158-8

Mialon M, Swinburn B, Sacks G (2015) A proposed approach to systematically identify and monitor the corporate political activity of the food industry with respect to public health using publicly available information. Obes Rev 16:519–530. https://doi.org/10.1111/obr.12289

Moscetti C, Taylor A (2018) From participation to power: how the sugar-sweetened beverage industry shapes policy through multi-stakeholders coalitions. In: UK Health Forum (ed). Public health and the food and drinks industry: The governance and ethics of interaction. Lessons from research, policy and practice. UK Health Forum, United Kingdom, pp 102–109

Moodie R, Stuckler D, Monteiro C et al (2013) Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. Lancet 381:670–679. https://doi.org/10.1016/S0140-6736(12)62089-3

Nieto C, Rodríguez E, Sánchez-Bazán K et al (2019) The INFORMAS healthy food environment policy index (Food-EPI) in Mexico: an assessment of implementation gaps and priority recommendations. Obes Rev 20(S2):67–77. https://doi.org/10.1111/obr.12814

Pan American Health Organization (2015) Alimentos y bebidas ultraprocesados en América Latina: tendencias, efecto sobre la obesidad e implicaciones para las políticas públicas. https://iris.paho.org/xmlui/bitstream/handle/123456789/7698/9789275318645_esp.pdf?sequence=5&isAllowed=y. Accessed 20 Jan 2020

Perlroth N (2017) Programas de espionaje fueron usados contra promotores de un impuesto a los refrescos en México. In: New York Times. https://www.nytimes.com/es/2017/02/11/espanol/america-latina/programas-de-espionaje-fueron-usados-contra-impulsores-de-un-impuesto-a-los-refrescos-en-mexico.html

Pfister K (2016) Leaked: Coca-Cola's Worldwide Political Strategy to Kill Soda Taxes. In: Medium. https://medium.com/cokeleak/leaked-coca-colas-worldwide-political-strategy-to-kill-soda-taxes-9717f361fb04 Accessed 01 May 2020

Popkin BM (2013) Bellagio declaration 2013: countering big food's undermining of healthy food policies. Obes Rev 14:9–10. https://doi.org/10.1111/obr.12104

Popkin BM (2004) The nutrition transition in the developing world. Dev Policy Rev. https://doi.org/10.1111/j.1467-8659.2003.00225.x

Scott C, Carriedo A, Knai C (2016) The Influence of the Food Industry Public Health Governance. Insights from Mexico and the United States. In: Kenworthy N, MacKenzie R, Lee K (eds) Case Studies on Corporations and Global Health Governance: Impacts, Influence and Accountability, Rowman & Littlefield Publishers, 1st edn, pp 41

Ulucanlar S, Fooks GJ, Gilmore AB (2016) The policy dystopia model: an interpretive analysis of tobacco industry political activity. PLoS Med. https://doi.org/10.1371/journal.pmed.1002125

World Health Organization (2017) Draft approach for the prevention and management of conflicts of interest in the policy development and implementation of nutrition programmes at country level decision-making process and tool 1. Management of conflicts of interest for public officials. https://www.who.int/nutrition/consultation-doi/nutrition-tool.pdf?ua=1. Accessed 20 Jan 2020

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

PUBLIC HEALTH 156 (2018) 140–146

Available online at www.sciencedirect.com

Public Health

journal homepage: www.elsevier.com/puhe

Original Research

Qualitative analysis of governance trends after health system reforms in Latin America: lessons from Mexico

A. Arredondo [a,*], E. Orozco [a], A.L. Recaman [b]

[a] National Institute of Public Health, Mexico
[b] University La Salle, Cuernavaca, Mexico

ARTICLE INFO

Article history:
Received 12 September 2017
Received in revised form
7 December 2017
Accepted 20 December 2017

Keywords:
Trends
Evidence
Reforms
Health governance

ABSTRACT

Objective: Health policies in Latin America are centered on the democratization of health. Since 2003, during the last generation of reforms, health systems in this region have promoted governance strategies for better agreements between governments, institutions, and civil society. In this context, we develop an evaluative research to identify trends and evidence of governance after health care reforms in six regions of Mexico.

Methods: Evaluative research was developed with a retrospective design based on qualitative analysis. Primary data were obtained from 189 semi-structured interviews with purposively selected health care professionals and key informants. Secondary data were extracted from a selection of 95 official documents on results of the reform project at the national level, national health policies, and lines of action for good governance. Data processing and analysis were performed using ATLAS.ti and PolicyMaker.

Results: A list of main strengths and weaknesses is presented as evidence of health system governance. Accountability at the federal level remains prescriptive; in the regions, a system of accountability and transparency in the allocation of resources and in terms of health democratization strategies is still absent.

Conclusion: Social protection and decentralization schemes are strategies that have allowed for improvements with a proactive role of users and civil society. Regarding challenges, there are still low levels of governance and difficulties in the effective conduct of programs and reform strategies together with a lack of precision in the rules and roles of the different actors of the health system.

© 2017 The Royal Society for Public Health. Published by Elsevier Ltd. All rights reserved.

Introduction

The reforms carried out to improve the production, financing, and distribution of health services require an analysis of the strengths and weaknesses that have occurred in their implementation. This is particularly necessary and relevant in the case of the different universal coverage schemes that have been implemented in the last 20 years in Latin America. The case of Mexico can be illustrative, especially because of the

* *Corresponding author*. Instituto Nacional de Salud Publica-Mexico, Av Universidad 655. Col. Sta Maria Ahuacatitlan, Cuernavaca CP 62508, Mexico.
E-mail address: armando.arredondo@insp.mx (A. Arredondo).
https://doi.org/10.1016/j.puhe.2017.12.019
0033-3506/© 2017 The Royal Society for Public Health. Published by Elsevier Ltd. All rights reserved.

PUBLIC HEALTH 156 (2018) 140–146

broad and intense project of reforms that have been implemented and evaluated in the last decade.[1–3]

Although principles of equity, financial protection, and quality of care have been advanced, these reforms have not changed the traditional segmentation of health service provision in three subsystems: health services for the insured population (public services for the population of the formal economy); the subsystem for the uninsured population (public services for population outside the formal economy and with the highest levels of marginalization); and the subsystem for the population with purchasing power (private sector). The subsystem of public health services for the uninsured, and particularly the priority programs for the most marginalized groups, is the object of analysis of this manuscript.[4,5]

As with most Latin American countries (including Colombia, Chile, Brazil, and Argentina),[6] since the 1980s, Mexico implemented policies governed by the principle of decentralization and social protection schemes, under which low-cost essential services packages were implemented for low-income populations outside the formal economy. Under this principle, and as part of the latest generation of health reforms, the National System of Social Protection in Health (SNPSS) was created, which sought to achieve greater coverage of medical care to improve health equity in a period ranging from 2004 to 2012.[7]

The strategy privileged by the Mexican government to achieve universal coverage has been the extension of coverage of public insurance. This includes two approaches; the first one is to cover the uninsured population with purchasing power and is mainly directed to the urban population that does not participate in the formal economy. To this end, modifications were made to the General Health Law and the Social Security Law, leading to the creation of the Family Health Insurance in the mid-1990s.[8]

The second aspect was the creation of financial protection instruments granted through public insurance for the population without purchasing power and the creation of conditioned support programs. To this end, the General Health Law was amended in 2003 to create the Popular Health Insurance (SPS), while implementing intersectoral programs of conditioned support operated through focused standards. Both strategies of this second approach were framed in a model of integrated healthcare services. Derived from these initiatives, the Mexican government declared having reached universal coverage of public health insurance in 2012 at a meeting of the World Health Organization.[9,10]

These kind of strategies in the area of extension of insurance and social protection programs in health for populations without purchasing power have been implemented by several Latin American countries with segmented health systems similar to the Mexican health system. This is why we consider it is relevant to assess what has been done in Mexico and obtain lessons on what can be practical in policy analysis. In this sense, we decided to review a set of indicators of the production and financing of health services aimed at the universalization of medical care. The long-term strategic approach has been essentially to address the problems of equity, quality, access, and coverage of the National Health System, emphasizing its insurance strategies for low-income users.[11–13]

Taking into account all the elements raised previously, this manuscript presents results of governance indicators based on health reform. We highlight the strengths and weaknesses found in the Mexican experience of reform to looking for the main lessons learned that can help understand the other Latin American countries with similar reforms.

Methods

An evaluative research was developed with a retrospective design based on qualitative analysis. The changes, levels, trends, and effects of reform strategies on the governance of the public health system were the objects of analysis. The methodology of this study was based on a literature review including the analysis of documents such as official statistics and databases on financial resources and on in-depth interviews with key personnel in selected regions.

Study population and characteristics of selected regions

The population under analysis was the uninsured population in Mexico. The analysis was delimited for six regions of Mexico. The characteristics of the regions in Fig. 1 showed heterogeneity for the indicators of marginalization (per capita income and public services), public health insurance (infrastructure), epidemiological backwardness, political party in power at the regional level (noting that during the evaluation period, the political party of the right remained in power at the

Region	Total Population	Marginalization Index	Public Health Assurance Index	Epidemiological backwardness Index	Political party in the government	Indigenous Population Index
Region A	712,029	Low	Medium	Low	Left	Low
Region B	711,235	High	High	Medium	Center	Low
Region C	2,858,359	High	Medium	High	Center	High
Region D	7,844,830	Low	High	Low	Right	Low
Region E	3,967,889	High	Low	High	Center-Right	High
Region F	2,395,272	High	High	High	Center-Left	Medium

Fig. 1 – Characteristics of selected regions. Consejo Nacional de Población – Instituto Nacional de Estadística y Geografía, 2000–2005. Secretaría de Salud, Anuarios Estadísticos sobre Daños a la Salud, 1998–2005. Información para la Rendición de Cuentas, México, 2006–2013. Censo de Población 2010–2015.

federal level), and index of indigenous population, as macro indicators of socio-economic development. One relevant aspect of governance was that the marginalization index was not a barrier to public insurance, since regions B and F showed high rates of marginalization combined with high performance in public insurance. The rates of epidemiological backwardness and the original population represented greater challenges in all cases, since the highest index of marginalization coincided with the greatest epidemiological backwardness, which is usually more pressing among the indigenous population.

Document review and sources of information

We reviewed a series of documents on the main approaches and guidelines and indicators of reforms in all regions in order to develop a descriptive analysis on the public health services for the uninsured and to identify the distinctive characteristics of the health programs aimed at the most marginalized population in Mexico. Thirty-five sources of basic information were selected for the analysis.

Interviews with key informants

Senior level managers were selected in the regions (ministers of health at the regional level, planning and evaluation directors, SPS directors, and directors of decentralization units), as well as local representatives and users. The governance analysis included results on nine governance indicators. These indicators were defined according to the lines of strategic action that the health democratization axis proposed in the reform program started in 2001 in Mexico at the national level.[14] The interviews were recorded and transcribed for the subsequent processing and analysis of information with the support of Atlas.ti and PolicyMaker software.

Indicators and scale development

Based on the analysis of the interviews, we developed governance indicators related to the conduct and accountability of various initiatives. Based on the explicit references to the different themes that were explored, we developed a scale to assess the level or degree of each indicator in four categories of the effect of the governance indicator at the regional level: high = +++, medium = ++, low = +, and null = −.

Results

We present the results from in-depth interviews with 189 key stakeholders of all regions under study to characterize governance indicators and identify some of their potential effects after health care reforms (see Tables 1 and 2). It is important to highlight that these results are part of the first technical report of the health reform evaluation project in Mexico.

In relation to the governance trends at the regional level, regions D and F present a medium to high degree of impact of changes in the different indicators of good governance described in Table 2; regions B and C from low to medium; and regions A and E from null to low impact changes. The most favorable indicators were presented in the identification of reform strategies, through the request of greater mechanisms of transparency in the use and allocation of resources, as well as greater spaces of participation for the social actors in decision-making in the field of health, especially in programs with a high component of community participation. These points were exemplified by different informants as follows:

> … *I was in the health center and they asked me to participate as health promoter, they asked me if I'm interested, but the truth is*

Table 1 – Characteristics of the participants by region of Mexico.

Region	Type of informant							
	Health Secretaries[a]	Planning officials[b]	Administration officials[c]	Service providers[d]	Legislators[e]	Leaders of CSOs[f]	Users[g]	Total
Region A	1	5	5	5	2	2	10	30
Region B	1	4	4	4	2	2	10	27
Region C	1	6	5	6	2	2	10	32
Region D	1	6	6	5	2	3	10	33
Region E	1	7	6	6	1	4	10	35
Region F	1	5	5	5	3	3	10	32
Total	6	33	31	31	12	16	60	189

CSOs, Civil Society Organizations.
[a] Ministers of health at regional level.
[b] Management personnel of the planning area of the regional health system.
[c] Management personnel of the administration and finance area of the regional health system.
[d] Directors of public institutions that offers health services for uninsured population.
[e] Members of the legislative health commission.
[f] Representatives of CSOs related with health programs at regional level.
[g] Users of health services insured under SPS coverage.
Arredondo A. et al., Primer Informe Técnico. Proyecto Equidad, Gobernanza y Financiamiento en Salud a partir de la reforma de la salud en México. INSP, Actualización de indicadores 2010–2015.

Table 2 – Indicators of good governance in health in six regions of Mexico.

Indicators	Region A	Region B	Region C	Region D	Region E	Region F
Identification and use of regulatory frameworks of reform strategies	–	+	+	++	+	++
Participation in local decision-making	+	+	–	++	–	++
Capacity of regional management and reassignment of resources	–	+	++	+++	+	+++
Accountability with the participation of regional and municipal actors	–	–	–	++	–	++
Participation of all actors in the management of new sources of financing	–	+	+	++	++	++
Interaction between social actors: suppliers, users, governments, and CSOs.	–	–	+	++	+	+++
Transparency in the management of public programs and resources	+	+	–	+++	–	++
Mediation mechanisms to support vulnerable/priority groups	–	+	++	+++	++	++
Level of agreement and political stability between actors and their interactions	+	+	+	+++	–	+++

CSOs, Civil Society Organizations.
High = +++; medium = ++; low = +; null = –.
Arredondo A. et al., Primer Informe Técnico. Proyecto Equidad, Gobernanza y Financiamiento en Salud a partir de la reforma de la salud en México. INSP, Actualización de indicadores 2010–2015.

not accepted because the doctors and nurses never explain anything to us and I think they just want us to help them do things they don't want to do. But they never ask us if we are happy as they take care of us or help us. In my family no one is very happy because the doctors especially do not treat us respectfully and almost never explain what is happening when we get sick. So they ask us for help, we really don't like that, to help them in what they ask us … (User of health services, region A).

… and I have diabetes and of course accept to participate in a program to bring all of my family and check if they have or may have the same problem. Almost all the family and friends participated, in some meetings we were invited to at the health center to learn more about diabetes and other diseases that we can have and how to avoid them. In the afternoon, after work hours, we like to come to the activities of the health center. We also play foot-ball matches with the doctors and we always beat them, although they seldom… (User of health services, region F)

The least favorable indicators refer to participation in new financing sources and an active role in monitoring mechanisms for transparency and allocation of resources by the local level and civil society organizations. The main weaknesses were observed in regions A, B, C, and E, with high-medium impact; followed by regions D and F with low or null impact depending on the indicator (Table 2). Some examples of points expressed include:

… we know the strategy of reform and main lines of action very well, but it is not clear how we are going to manage resources and if the federation will recognize it. Another thing that we do not understand is how to implement the democratization of health schemes and who will decide what to do, will the central level continue to decide or will they give us more freedom… (Secretary of Health, region A).

… this reform project is the best thing that can happen to us in this state. During some time we proposed new coordination schemes between the three levels of government and it is a historical moment that we have in most municipalities coinciding between the three levels of government. In our scenario we have summoned diverse civil society actors and their role is increasingly active and proactive, we hope to continue on this path … (Secretary of Health, region D.)

Indicators that predispose to poor governance include difficulties in planning the operation of priority health programs. This was expressed by the majority of social actors, particularly users and providers at the municipal level, as highlighted below:

… We cannot change resources for plans at the local level. Directors at the federal level assign us resources, tasks and goals that we sometimes cannot fulfill them because the problems in our state are different or not so similar to what they want us to try. It is difficult to plan for our local health problems and needs if the resources they give us are conditioned to the achievement of what interests their programs and not us. So it is very difficult to interact and have agreements. Moreover, we almost never manage to have an agreement and the work plans follow the order of the planning directors at the federal level … (Planning Manager, region C.)

It also highlighted the conflict of different levels of government in the conduct of health programs, the discretionary allocation of resources, and especially the political use of priority health programs; passive social participation, led by health providers, generated little room for action in different communities, especially in the most marginalized communities (see Table 3).

… We do have interest in participating with the health center. The problem is that we don't have much time to have meetings and most participants are men. This is what we don't understand, because if we are a group of women who care about our teenage children and the health of the girls, we do not feel comfortable and safe. Although the doctors are very educated, but they don't trust us and sometimes we don't understand and sometimes we don't understand what they tell us or feel they don't understand us. They also don't have much time, so we don't understand why they tell us to do tasks together … (OCS leader, region B.)

… We have formed several groups, we have the diabetes group, the sanitation group of the streets and houses, the group of health promoters in the community, the adult support group, and in all of them there are always many people involved. What motivates us a lot is how they tell us each month what we spend and how much money we have for the next month. Resources come from

Table 3 – Indicators of poor health governance in six regions of Mexico.

Indicators	Region A	Region B	Region C	Region D	Region E	Region F
Lack of awareness of the operation of priority health programs	+++	++	++	+	++	–
Conflict at different levels of government	+++	++	++	+	+++	+
Absence of mechanisms to monitor the use of resources	+++	++	+	+	+++	+
Assignment of resources with discretion	+++	+++	++	+	+++	++
Interests in function of political parties in the federal, regional-municipal power	++	+++	+	+	+++	++
Provider-led social participation (passive participation and no decision-making power)	+++	+++	++	+	+	+
Impossibility to negotiate resources and reallocate health spending	+++	+++	++	+	++	–
Disinterest of actors in the comprehensive-interinstitutional approach to common health problems at the regional level	+++	+++	++	+	+++	–
Lack of participation spaces and financing management	+++	++	++	+	++	–

High = +++; Medium = ++; Low = +; Null = –.
Arredondo A. et al., Primer Informe Técnico. Proyecto Equidad, Gobernanza y Financiamiento en Salud a partir de la reforma de la salud en México. INSP, Actualización de indicadores 2010–2015.

many sources and also from the community. I think that more people come to the group every day. This can be seen in the afternoons in the health centers where we all get together once a week to see how we are doing and who should do what … (OCS leader, region D.)

As a result of in-depth interviews and the review of key documents, we highlight the main findings. These results are presented in five effect categories for the six regions as a whole, differentiating strengths and weaknesses (see Table 4). The role of greater responsibility in the monitoring of health programs has resulted in higher levels of effectiveness and achievement of goals by the region level. Some improvements in the coordination between levels of government and the development of monitoring mechanisms favored the participation and influence of the federal government in monitoring the performance of regional health systems. Among the strengths, favorable changes in terms of financing and production of services were highlighted at the regional level (see Table 4).

Discussion

Information on health governance for the Mexican case may be illustrative of the way in which various reform policies have been implemented and influenced the governance of the health system. This corresponds to the first wave of reforms promoted since the 1980s with the policy of decentralization of health services, which consolidation in Mexico took from 1985 to 1997.[15] This process represents an important antecedent of the reforms restated in 2003, which required different adjustment schemes and levels of governance or agreement between actors and orders of government for the subsequent implementation of strategies of universal coverage and social protection in health.

Regarding the results of the nine governance indicators that were evaluated in this study for 2004–2012, the effects of the reform strategies depended on the region of the country. For example, those regions with the greatest number of inhabitants, the largest public insurance, the same political party in power at the federal-regional level, and the highest index of epidemiological backwardness were the regions with the best governance indicators, above all in terms of active participation of all social actors (federal-state-local governments, users of health services, community leaders, and civil society organizations). This participation is mainly reflected in the proactive role of these actors in mechanisms of accountability, allocation of resources, and a better balance between local needs and use of resources allocated from the federal level.

One factor that we would like to highlight for its possible effects on favorable governance results was the coincidence of the political parties in power. That is, in those regions where the same party governed at the federal state and local levels, the results were much more favorable. Obviously, this points to the political feasibility of the reform projects. Certainly, these results are similar to a first governance assessment that was carried out in 2003[16] but which was limited to the three regions of the country that participated during the pilot phase of the new social protection schemes and strengthening of decentralization. In the 2003 measurement, the governance results were of lesser degree of scope and improvement, especially regarding the role of civil society organizations, users, community leaders, and the local level of government.

In that first stage of evaluation of the reform pilot, the governance indicators were grouped into managerial capacity, management capacity, and social participation capacity. In that instance, the region presenting the best progress was that in which the same political party governed in the three levels of government. Conversely, in the region with different political parties in power in each of the three levels of government, progress was practically null, presenting even some level of blockade to the implementation of new reform schemes. This last element was no longer observed in the current measurement of governance for the period 2004–2012.

Regarding the results of the effects of social protection schemes and decentralization on governance stemming from the reform, we can say that since the decentralization agreements between regional and federal governments were formalized, one of the main points of agreement was the transfer of resources and responsibilities from the federal government to the regions, particularly in relation to human resources, infrastructure, medical care, and financing.[17,18]

Table 4 – Strengths and weaknesses for all regions in some indicators of the effects of social protection and decentralization on governance based on health reforms.

Effect indicators	Strengths	Weaknesses
Changes in coordination mechanisms between federal and regional levels for institutional arrangements	- Adequate levels of coordination and greater margin for decision-making in regional governments that assume without discussion the proposed programs from the central level and where there is no conflict of political parties. - The new agreements allow greater adaptation by the regional level in the care model and in the reallocation of financial resources.	- In situations of conflict between political parties at the levels of federal government vs regional, agreements do not advance, and there are low levels of coordination and generation of conflict between levels of government, blocking, halting, or conditioning the implementation of priority programs.
Changes in coordination mechanisms between regional and municipal/jurisdictional levels	- The priority health programs are more effective in performance and there is greater efficiency in the allocation of resources according to health needs at the regional level. - Broad participation of civil society groups that monitor a better balance between resources and needs at the local level.	- The regional and municipal levels sometimes do not handle accurately and clearly the models of care and technical models of analysis that underlie priority health and reform programs.
Instruments of coordination between the three levels of government	- Comprehensive analysis of the effectiveness and fulfillment of health goals in the technical documents of regional and federal government reports. - Management agreements and follow-up of indicators of performance evaluation, transparency, and accountability. Citizen observatory only at the federal level.	- Availability of instruments for evaluating performance, transparency, and accountability at the regional and municipal level. - There are no management agreements between regional and municipal level.
Degree of influence of the federal government in the monitoring, follow-up, and performance of the regional health system	- Role of very active and decisive participation, especially in priority health programs (SPS, Mother-Child Program, etc.) and in the implementation of the national health program.	- Passive role in priority health programs that do not depend directly on the central level of the Ministry of Health. Index of coresponsibility very low in most regions and municipalities.
Effects of new federal health programs on coordination mechanisms	- Changes in mechanisms of production and financing in health. - Generation and promotion of new financing alternatives and new decision-making roles by regional and municipal levels of government and OCSs.	- Design, monitoring, evaluation, and excessive control from the central level, both in reform strategies and priority health programs. - Confusing effects when interacting with the same resources of other health programs.

OCSs, Civil society organizations; SPS, Popular Health Insurance.
Arredondo A. et al., Primer Informe Técnico. Proyecto Equidad, Gobernanza y Financiamiento en Salud a partir de la reforma de la salud en México. INSP, Actualización de indicadores 2010–2015.

Although this process implied a redistribution of power among actors and orders of government, the actors have faced some challenges such as the absence of mechanisms to solve the segmentation of the health system and the need for an effective reorganization of power relations among governments, institutions, and users of health services.

Another remaining aspect in spite of the reconsideration of the intergovernmental relations promoted by decentralization was that the federal executive power preserved the vertical power structure, which is based on a great diversity of formal and informal faculties of the federal level over the regional and municipal levels. The course of recent years shows that the government, public health institutions, and society have not yet clearly and structurally consolidated the new mechanisms through which they will establish their relationship and the new rules of political exchange for optimal strategies of reform.[19]

Intergovernmental relations for agreements between different levels of government depend to a large extent on which political parties hold power. In regions where the governing party is the same as the one holding federal power, intergovernmental relations continue under the same power structure of the center to regions and municipalities. In the regions where leftist parties rule, intergovernmental relations have been rethought, mainly in the case of Mexico City, the capital of the country, and the federal government, with different levels of negotiation, agreements, and disagreements. There have even been situations where federal health programs were questioned and rethought both in their organizational and financial structures.

Regarding the agreements and coordination between different levels of government as a function of political parties in power, some important effects were observed at the levels of governance. The main weaknesses were the low levels of coordination between the federal and regional levels, when political parties at different levels of government are different. When political parties from the center govern at the regional level and from the right govern at the federal level, the

disagreement is lower and therefore the level of governance is greater. On the other hand, when there are different political parties in power at the regional and municipal level, the levels of agreement and governance are very low.

In terms of participation in health and the role of users, the Mexican case shows that these depended to a great extent on the type of health program in which services are requested, the pattern to which users belong, the type of financial responsibility, and the model of care. For example, users affiliated to SPS showed a passive role regarding the services received, especially at the level of individual health. Users assigned to health services linked to conditioned support programs such as IMSS-Oportunidades (now PROSPERA Social Inclusion Program), had a more active participation, led by the same users/community leaders and with an individual and collective approach on health conditions and preventive programs.

Conclusions

To conclude, we would like to highlight the main strengths and weaknesses found in governance based on health reforms in the Mexican case. Such strengths and weaknesses identified in the implementation of strategies programs of decentralization, social protection, and universal coverage in health are relevant findings for the monitoring of similar reform programs in other Latin American countries (LACs). Our results could guide on the opportunities and barriers that are faced by social actors to improve the levels of governance. In fact, we want to make sure that governments (executive and legislative at all levels), civil society, health institutions, and employers find the optimal degree of agreement for a better management of health reform programs for each country.

As main lessons learned to advance in the area of governance and democratization of health for LACs, we suggest placing greater emphasis on the following actions: 1) development of transparency schemes in the rendering of accounts by health provider institutions; 2) promote the design and implementation of a 'Citizen Observatory' on health reforms, which guarantees greater participation of all social actors; and 3) periodic review program for management agreements between different levels of government and civil society actors.

Author statements

Ethical approval

The basic protocol of this project was reviewed and approved by the Committee on Health Research of the National Institute of Public Health.

Funding

This project received funding from the International Development Research Centre (grant number 280015).

Competing interests

None declared.

REFERENCES

1. Secretaría de Salud. *Programa de Reforma del Sector Salud, 2007–2012, 2013–2018*. Poder Ejecutivo Federal, México: Secretaría de Salud; 2016. p. 1–56.
2. Consejo Nacional de Población. *Situación actual de las y los jóvenes en México. Diagnóstico sociodemográfico*. México, D.F: CONAPO; 2016. p. 93–115.
3. *Constitución Política de los Estados Unidos Mexicanos*. 133 edición. México, D.F.: Porrúa; 2015. p. 173–8.
4. Diario Oficial de la Federación-Instituto Mexicano del Seguro Social. *Acuerdo por el que la Coordinación General del programa IMSS- Oportunidades. Reglas de operación del programa IMSS-Oportunidades*. Segunda Edición 2005. p. 24–7.
5. Diario Oficial de la Federación. *Reglamento Interno del Consejo Nacional de Protección Social en Salud*. 2017. p. 1–5.
6. Willis E, Garman CCB, Haggard S. The politics of decentralization in Latin America. *Lat Am Res Rev* 1999;**34**(1):45–56.
7. Secretaría de Salud. *Seguro Popular*. Edición especial, gaceta Interna de la SSA. Noviembre; 2015. p. 5–7.
8. 16 edición actualizada *Ley General de Salud*. México, D.F: Editorial Porrúa; 2014. p. 1–18.
9. Arredondo A, Orozco E, Aviles R. Evidence on equity, governance and financing after health care reform in Mexico: lessons for Latin American countries. *Saude Soc* 2015;**24**(Suppl. 1):158–71. São Paulo.
10. Arredondo A, Orozco E. Governance and equity from health care reform in Mexico. *Int J Health Plann Manag* 2008;**23**:37–49.
11. Arredondo A, Orozco E, Cuadra M, Cicero M, Zamudio E, De Icaza E. *Temas Selectos en Sistemas de Salud: Costos, Financiamiento, Equidad y Gobernanza. Conceptos, tendencias y evidencias*. Univ de Yucatán; 2012. p. 25–39. ISBN: 968-7019-16-6.
12. Instituto Nacional de Salud Pública. *Encuesta Nacional de Nutrición 2012*. Cuernavaca, Morelos: INSP; 2014. p. 62–85.
13. PND. *Plan Nacional de Desarrollo 2013-2018. Sector Social, Salud y Educación. Programa Nacional de Salud*. México: Poder Ejecutivo Federal; 2015. p. 18–21.
14. Frenk J. La democratización de la salud. Una visión para el futuro del sistema de salud en México. *Gac Med Mex* 2001;**137**(3):281–90.
15. Londoño Juan Luis, Frenk Julio. Structured pluralism: towards an innovative model for health system reform in Latin America. *Health Policy* 1997;**41**:1–36.
16. Arredondo-López A, Orozco-Nuñez E, Castañeda X. Gobernanza en sistemas de salud y participación social en México a partir de la reforma del sector. *Hitos Cienc Econ Adm* 2005;**29**:5–12.
17. King Gary. Public policy for the poor? *Lancet* 2009;**373**:1447–54.
18. Laurell Asa Cristina. Los seguros de salud mexicanos. Una cobertura universal incierta. *Ciênc Saúde Coletiva* 2011;**16**(6):2.795–806.
19. PND. *Plan Nacional de Desarrollo 2013–2018. Sector Social, Salud y Educación. Programa nacional de Salud*. México: Poder Ejecutivo Federal; 2015. p. 23–9.

ciss

Artículo original

Mapeo político de la discriminación y homofobia asociadas con la epidemia de VIH en México

Emanuel Orozco-Núñez, M en Antrop Soc,(1) Jacqueline Elizabeth Alcalde-Rabanal, D en C,(1)
José Arturo Ruiz-Larios, L en Soc,(2) Héctor Sucilla-Pérez, M en Gerencia y Liderazgo en Salud,(3)
Rodrigo García-Cerde, L en Antrop Soc.(1)

Orozco-Núñez E, Alcalde-Rabanal JE, Ruiz-Larios JA, Sucilla-Pérez H, García-Cerde R. Mapeo político de la discriminación y homofobia asociadas con la epidemia de VIH en México. Salud Publica Mex 2015;57 supl 2:S190-S196.

Resumen

Objetivo. Presentar un mapeo político sobre discriminación y homofobia asociadas con la epidemia del virus de la inmunodeficiencia humana (VIH) en entornos institucionales públicos. **Material y métodos**. Se realizó un mapeo político con actores clave en seis estados de México, a quienes se les aplicó una entrevista semiestructurada para explorar la discriminación y homofobia asociadas con el VIH. La información se sistematizó mediante matrices de contenido por categorías y el software *PolicyMaker*. **Resultados**. Se documentaron prácticas discriminatorias y homofóbicas lesivas a la integridad como la denostación, la burla y los crímenes de odio. La mayoría de actores se manifestaron en contra de la discriminación y la homofobia; algunos de ellos influyeron de manera importante en la formulación de políticas para prevenir la discriminación y la homofobia. Sin embargo, los marcos normativos estatales fueron poco específicos. **Conclusiones**. Son persistentes las prácticas discriminatorias y la homofobia asociadas con el VIH, por lo cual se requiere mayor atención en los estados y es necesario impulsar políticas para prevenirlas, así como la observancia del cumplimiento de las leyes estatales.

Palabras clave: políticas de salud; discriminación; homofobia; virus de la inmunodeficiencia humana; México

Orozco-Núñez E, Alcalde-Rabanal JE, Ruiz-Larios JA, Sucilla-Pérez H, García-Cerde R. Discrimination and homophobia associated to the human immunodeficiency virus epidemic. Salud Publica Mex 2015;57 suppl 2:S190-S196.

Abstract

Objective. To describe a political mapping on discrimination and homophobia associated to human immunodeficiency virus (HIV) in the context of public institutions in Mexico**. Materials and methods**. The political mapping was conducted in six Mexican states. Stakeholders who were involved in HIV actions from public and private sectors were included. Semistructured interviews were applied to explore homophobia and discrimination associated with HIV. Information was systematized using the *Policy Maker* software, which is a good support for analyzing health policies. **Results**. Discriminatory and homophobic practices in the public domain occurred, damaging people´s integrity via insults, derision and hate crimes. Most stakeholders expressed a supportive position to prevent discrimination and homophobia and some of them had great influence on policy-making decisions. It was found that state policy frameworks are less specific in addressing these issues. **Conclusions**. Homophobia and discrimination associated to HIV are still considered problematic in Mexico. Homophobia is a very sensitive issue that requires further attention. Also, an actual execution of governmental authority requires greater enforcement of laws against discrimination and homophobia.

Key words: health policy; discrimination; homophobia; human immunodeficiency virus; México

(1) Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
(2) Secretaría de Salud. México.
(3) Centro Nacional para la Prevención y Control del VIH/sida, Secretaría de Salud. México.

Fecha de recibido: 11 de septiembre de 2014 • **Fecha de aceptado:** 7 de abril de 2015
Autora de correspondencia: Dra. Jacqueline Elizabeth Alcalde Rabanal. Instituto Nacional de Salud Pública.
Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
Correo electrónico: jacqueline.alcalde@insp.mx

Alcalde-Rabanal JE, Orozco-Núñez E, Ruiz-Larios JA, Sucilla-Pérez H, García-Cerde R. Mapeo político de la discriminación y homofobia asociadas con la epidemia de VIH en México. Salud Publica Mex. 2015;57(supl 2):S190-S196. https://doi.org/10.21149/spm.v57s2.7608

La discriminación hacia las personas que viven con VIH (PVV) y la homofobia son prácticas lesivas de los derechos humanos fundamentales. Esta naturaleza estigmatizante hacia las personas tiene efectos negativos en la integración social[1] y en la calidad de vida de quienes la sufren.[2] Si bien la homofobia vinculada con las personas que viven con VIH ha sido ampliamente documentada, son escasos los estudios para identificar oportunidades para prevenirla en el ámbito de la política gubernamental. En México, desde los inicios de la epidemia del VIH, el gobierno ha impulsado el acceso universal al tratamiento antirretroviral, así como políticas y leyes contra el estigma, la discriminación, la inequidad de género y la homofobia; sin embargo, aún persisten retos importantes de política en este campo.[3,4]

En América Latina se han realizado algunos esfuerzos para visibilizar los efectos negativos de la discriminación asociada con el VIH, los cuales han derivado en planes de acción de alcance nacional.[5] Para el caso de México, los esfuerzos gubernamentales se han direccionado hacia dos vertientes: a) la protección de los derechos humanos de grupos vulnerables, dentro de los cuales se encuentran las PVV y la población clave de mayor riesgo,[6,7] y b) la formulación de leyes para la prevención y proscripción de la discriminación. No obstante, prevalece en los ámbitos social y político la percepción de que estos esfuerzos resultan insuficientes ante la documentación de situaciones que parecen contravenir los principios que fundamentan el marco jurídico para prevenir la discriminación y la homofobia hacia las PVV.[8]

Por lo anteriormente expuesto, el artículo tiene como objetivo presentar un mapeo político sobre discriminación y homofobia asociadas con la epidemia del VIH en entornos institucionales públicos en México.

Material y métodos

El proyecto de investigación "Mapeo político y revisión del marco normativo para la prevención del VIH y fortalecer las acciones contra el estigma, la discriminación y la homofobia en México" fue evaluado por el Comité de Ética del Instituto Nacional de Salud Pública y aprobado para su ejecución en noviembre de 2012.

Se realizó un mapeo político en seis estados de la República Mexicana. Los estados se seleccionaron buscando representar la diversidad de escenarios estatales relacionados con la epidemia del VIH: dos estados fronterizos del norte con presencia de migrantes y usuarios de drogas inyectables en uno de ellos, un estado del centro y uno del occidente con presencia de grupos religiosos tradicionalistas, uno del sur con turismo sexual y uno del sureste con incidencia de VIH en pueblos originarios.*

En cada estado se realizaron entrevistas semiestructuradas a actores clave involucrados en el tema de VIH, identificados mediante la técnica de bola de nieve. Para las entrevistas se utilizó una guía que exploró discriminación, homofobia y derechos humanos asociados con el VIH; también se realizaron preguntas improvisadas con el objetivo de profundizar la información de algún tópico particular de los temas explorados.

Los actores entrevistados se agruparon en las siguientes categorías (cuadro I):

- Sector gubernamental: representantes de los ayuntamientos y proveedores de los servicios estatales de salud.
- Instancias de derechos humanos: representantes de las comisiones estatales y nacional de derechos humanos.
- Organizaciones de la sociedad civil (OSC): activistas pertenecientes a la comunidad lésbico-gay, bisexual, travesti y transexual y, en menor grado, por voluntariado. Alrededor de la tercera parte de los informantes de este grupo fueron al mismo tiempo PVV.
- Poder Legislativo estatal: diputados o sus asesores de las comisiones de salud y derechos humanos.

* La información se presenta de esta forma para asegurar la confidencialidad de la información por ser el tema del VIH altamente sensible socialmente.

Cuadro I
NÚMERO DE INFORMANTES QUE PARTICIPARON EN EL MAPEO POLÍTICO SOBRE DISCRIMINACIÓN Y HOMOFOBIA ASOCIADAS CON LA EPIDEMIA DEL VIH EN MÉXICO, 2013

Región	*Tipo y número de los informantes*			
	Gobierno estatal	*Derechos humanos*	*OSC*	*Poder legislativo*
Norte 1	3	1	3	1
Norte 2	3	3	5	1
Sur 1	4	2	1	2
Sureste 1	2	0	10	4
Occidente 1	3	1	6	0
Centro 1	2	1	4	1
Total	17	8	29	9

Fuente: elaboración propia con información de entrevistas del estudio Mapeo político y revisión del marco normativo para la prevención del VIH, 2012

Se contactó a los informantes por vía telefónica o correo electrónico para consultar su interés de participar en el estudio y, con base en su respuesta, se programaron las entrevistas en cada estado. En todos los casos, antes de iniciar la entrevista, se procedió a leer el consentimiento informado. Las entrevistas (53) fueron grabadas y transcritas con un procesador de textos. Para su análisis se elaboraron matrices de contenido por categorías, las cuales coadyuvaron a precisar información específica de los temas abordados según el tipo de actor.

Se consideraron como categorías de análisis: a) percepciones sobre la discriminación y homofobia hacia PVV y población clave de mayor riesgo; b) el sector, la posición y el poder de los actores; c) la capacidad de influencia de los actores, y d) marco normativo respecto a la discriminación y la homofobia.

El sector ubicó al actor según la instancia a la que pertenece, su posición, su apoyo para la prevención de la discriminación hacia las PVV o por pertenecer a poblaciones clave de mayor riesgo; el poder consideró la capacidad para movilizar recursos o influir en la toma de decisiones en distintos ámbitos de la vida pública. La estrategia metodológica para el mapeo político se diseñó a partir de los tópicos descritos por Reich,[9] los cuales son, a su vez, el marco conceptual del software empleado para el análisis: *PolicyMaker*.* El software permitió organizar la información de los actores políticos en tablas estandarizadas y en un diagrama de influencia. Este análisis se fortaleció con información primaria proveniente de las entrevistas.

Para describir el marco normativo sobre discriminación y homofobia se revisaron la Ley Federal para Prevenir y Eliminar la Discriminación, el Programa de Acción Específico sobre VIH 2007-2012 y apartados de la Constitución Política nacional. En los estados seleccionados se revisó la Constitución Política de cada estado, los bandos de Policía y Buen Gobierno estatal y municipal, así como notas de prensa local. En cada documento se identificaron textos que abordaron de manera directa o indirecta los temas de discriminación y homofobia.

Resultados

Informantes del sector gubernamental condenaron verbalmente la discriminación hacia las PVV. En contraste, la prensa local reportó situaciones discriminatorias en dependencias gubernamentales dirigidas a personas de la comunidad gay, a personas que ejercen trabajo sexual y a activistas en favor de derechos sexuales y de identidad de personas con opciones sexuales diferentes a la heterosexual. Actores de OSC y de derechos humanos identificaron expresiones discriminatorias en encuentros convocados por asociaciones religiosas para discutir temas como "familia", "valores", "buenas costumbres" y "moral". En estos encuentros se condenaron los derechos sexuales, reproductivos y de identidad de la población gay. Si bien las entrevistas con actores religiosos fueron reducidas, se identificaron figuras prominentes con posturas críticas a prácticas discriminatorias y favorables al uso del condón y los derechos de parejas del mismo sexo.

Se identificaron situaciones discriminatorias sutiles expresadas en prácticas que promueven valores discriminatorios y que resultan lesivas para la comunidad gay y para las PVV. Se reportaron ejemplos de expresiones emitidas por decisores gubernamentales y líderes religiosos que ridiculizan a estos grupos de población y buscan acotar derechos para el matrimonio o la adopción de niños.

Informantes de OSC y derechos humanos destacaron que estas expresiones han generado respuestas locales en defensa de los derechos de las PVV y poblaciones clave de mayor riesgo. Algunas OSC han influido en la emisión de recomendaciones de instancias de derechos humanos estatales y federales, o bien desataron movilizaciones que favorecieron la visibilidad de los grupos afectados. Al respecto, destacaron dos ejemplos de gobernadores estatales que tuvieron que reconocer derechos de los grupos a los que cuestionaron, implementando instancias gubernamentales para favorecer el ejercicio de sus derechos.

La expresión más extrema de homofobia referida por informantes de OSC, derechos humanos y servicios de salud fueron los crímenes de odio (homicidios con un uso excesivo de violencia) contra miembros de la comunidad gay, que se reportaron en cuatro de las entidades federativas visitadas. En los testimonios recabados fue recurrente la denostación de las víctimas en la prensa escrita que califica estos casos como crímenes pasionales. Sin embargo, buena parte de los informantes reconoció que en estos homicidios hubo omisión de documentación, ocultamiento de pruebas y falta de acción expedita. Para los activistas, la tipificación de crímenes de odio ha implicado una tarea de lucha para la procuración de justicia, que derivó en la validación de esta categoría de crímenes ante instancias judiciales. Para activistas de los estados que participaron en el estudio, estos eventos se volvieron emblemáticos por los efectos alcanzados en la opinión pública que condenó la ocurrencia de crímenes como consecuencia de la violencia extrema contra la co-

* Reich M. Policy Maker 4 Software: Computer Assisted Political Analysis. Version 4.0. Boston: Polimap.com. 2012. Programa computacional.

munidad homosexual. La ocurrencia de los crímenes de odio plantea la necesidad de prevenir la discriminación por homofobia desde la agenda pública nacional y estatal.

Mapeo político

El marco normativo de referencia para establecer el contenido de la política fue el Programa de Acción Específico sobre VIH 2007-2012, el cual se presenta en el cuadro II. Éste propone como uno de sus objetivos disminuir la discriminación hacia la población clave de mayor riesgo, dentro de la cual se encuentran las PVV.

Los mecanismos que estableció el programa de acción para cumplir con el objetivo de disminuir el estigma y la discriminación son la promoción de valores favorables a la inclusión, el respeto de los derechos humanos y la disponibilidad de servicios de salud. Este objetivo de ser parte de un plan de alcance nacional tuvo una alta prioridad, fue parte de la agenda pública nacional e hizo explícita la urgencia de dar mayor continuidad a las acciones de prevención de la discriminación y la homofobia.

Posición y poder de los actores

En el cuadro III se enlistan los actores clave del análisis y se describe su sector, posición (a favor o en contra) y poder ante las políticas de prevención de la discriminación y la homofobia. Si bien ninguno expresó una posición en contra de estas políticas, se observó que los poderes legislativos estatales tuvieron reservas para manifestarse más allá del discurso de respaldado en el marco normativo vigente.

Los actores que expresaron una posición abierta en contra de la discriminación y la homofobia fueron proveedores y funcionarios del sector salud, de las OSC y de la Comisión Nacional de Derechos Humanos (CNDH). Los actores con una posición medianamente a favor fueron la representación religiosa y las Comisiones Estatales de Derechos Humanos (CEDH). El valor en contra asignado a los poderes legislativos consideró la escasa legislación estatal relacionada con la prevención de la discriminación y la homofobia, así como la baja respuesta que se tuvo para participar en el presente proyecto de investigación.

En cuanto al poder de los actores, se observa en el mismo cuadro III que la mayoría de éstos tiene poder alto y está a favor de políticas para prevenir la discriminación y la homofobia. Llamó la atención en este mapeo el reconocimiento de los actores locales sobre la amplia capacidad de incidencia política de las OSC.

Apoyo de los actores a las políticas

En el cuadro IV se observa que la mayor parte de actores estatales se ubica en alto y mediano apoyo para la prevención de la discriminación y homofobia hacia las PVV, resultado que hace evidente la factibilidad política para implementar propuestas que protejan los derechos de las PVV. Los actores con mayor apoyo a las políticas para la prevención de la discriminación y la homofobia fueron el sector salud, las OSC y la CNDH. Es importante destacar que el poder alto de estos actores favoreció su involucramiento en acciones de búsqueda de mejores oportunidades de tratamiento y la formulación de políticas en contra de la discriminación y la homofobia a través de estrategias de abogacía a favor de los derechos humanos de las PVV.

El apoyo intermedio provino de la CEDH, de la representación de la iglesia católica y de medios de comunicación no oficialistas. Las CEDH expresaron limitaciones para la observancia de las recomendaciones que se emiten para combatir la discriminación y la homofobia, por lo que se demanda una mayor autonomía de éstas y mayor visibilidad de actores con posturas contra la homofobia. Por el contrario, los medios de comunicación han apoyado al sector salud, a otras áreas de gobierno y a las OSC con el trabajo de difusión y sensibilización en estos temas.

Cuadro II
METAS NACIONALES Y MECANISMOS PARA DISMINUIR LA DISCRIMINACIÓN Y HOMOFOBIA ASOCIADAS CON LA EPIDEMIA DEL VIH EN MÉXICO, 2013

Metas	*Prioridad / Agenda*	*Mecanismos*	*Indicadores*
Disminuir el estigma y la discriminación asociados con comportamientos de riesgo, género, sexualidades, uso de drogas, VIH, SIDA e ITS	Prioridad: alta	Promoción de valores que pongan en entredicho la discriminación y la homofobia	Verificación de la realización de campañas
	Agenda: pública	Disponibilidad de servicios de salud y personal adscrito para trabajar con PVV y poblaciones clave de mayor riesgo	Realización de cursos y actividades de sensibilización

Fuente: elaboración propia con información procedente del Programa de Acción Específico sobre VIH 2007-2012

Cuadro III
Sector, posición y poder de los actores frente a la discriminación y homofobia asociadas con la epidemia del VIH en México, 2013

Actores	*Sector*	*Posición*	*Poder*
Funcionarios estatales de los servicios de salud (actor I)	Subunidad del sector gubernamental	Favor	Alto
Personal operativo de los servicios de salud (actor II)	Subunidad del sector gubernamental	Favor	Medio
Organizaciones de la sociedad civil (actor III)	Organizaciones independientes no gubernamentales	Favor	Alto
Representación de la iglesia católica	Religioso	Favor	Alto
Comisiones estatales de derechos humanos (actor IV)	Unidad autónoma estatal	Favor	Medio
Comisión Nacional de Derechos Humanos	Unidad autónoma federal	Favor	Alto
Legisladores (actor V)	Poder legislativo estatal	Contra	Alto

Fuente: elaboración propia con información de entrevistas del estudio Mapeo político y revisión del marco normativo para la prevención del VIH, 2012

Los actores que manifestaron menor apoyo para la prevención de la discriminación hacia las PVV y poblaciones clave en mayor riesgo fueron los legisladores. Si bien se documentó participación legislativa con enfoque de derechos humanos en dos estados, estos informantes habían tenido relación con el sector salud y con activistas en favor de poblaciones clave en mayor riesgo. Ello sugiere la necesidad de un mayor involucramiento de los legisladores para la formulación de marcos normativos para prevenir la discriminación y la homofobia asociados con el VIH en los niveles estatal y municipal.

La revisión de las notas de prensa mostró que la mayor oposición provino de los presidentes municipales, lo que colocó a los ayuntamientos como el nivel de autoridad formal local de mayor proximidad con situaciones discriminatorias y homofóbicas. Fue en este nivel donde se reportó la obstrucción de actividades de promoción de derechos sexuales y reproductivos, así como de libertad de expresión y tránsito de la población homosexual y de aquélla de vive con VIH. En algunos casos se adujo como justificación la observancia de los llamados bandos de Policía y Buen Gobierno, lo cual derivó generalmente en situaciones donde se denostó la preferencia sexual y se ridiculizó a poblaciones clave en mayor riesgo.

Capacidad de influencia de los actores

En la figura 1 se presenta la capacidad de influencia de los actores para impulsar políticas de prevención de la discriminación y la homofobia asociadas con el VIH. El mapa muestra que la gran mayoría de los actores tiene influencia media o alta en torno a los temas analizados, lo que sugiere que el VIH es una necesidad de salud reconocida a nivel de los estados y que representa intereses con profundo contenido simbólico para los actores.

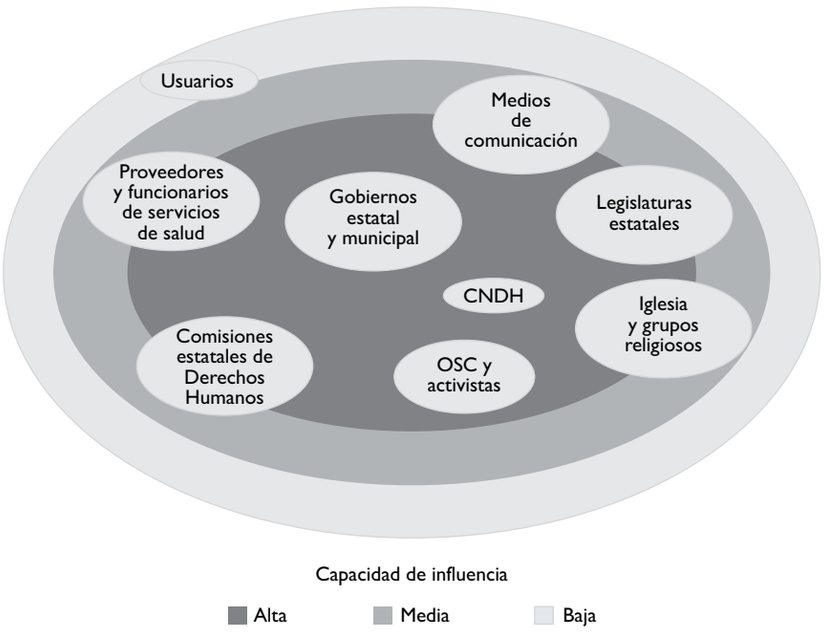
La capacidad de influencia de los actores, así como la competencia de sus agendas y valores, plantea la complejidad de por qué algunos favorecen y a la vez imponen barreras para la sensibilización en estos temas, como en el caso de medios de comunicación y grupos religiosos, donde existen posturas contrapuestas sobre valores y prácticas incluyentes.

Los proveedores de servicios y funcionarios del sector salud, la CNDH y las OSC movilizaron recursos en favor de las PVV, al tiempo que realizaron accio-

Cuadro IV
Apoyo de los actores para la prevención de la discriminación y la homofobia asociadas con la epidemia del VIH en México, 2013

Alto apoyo	*Mediano apoyo*	*Bajo apoyo*	*No movilizado*	*Baja oposición*	*Mediana Oposición*	*Alta oposición*
• Funcionarios de servicios de salud • Personal operativo de los servicios de salud • OSC • CNDH	• Comisiones estatales de derechos humanos • Iglesia católica • Medios de comunicación	• Poderes legislativos estatales		• Gobernadores • Iglesia católica • Medios de comunicación	• Presidentes municipales	

Fuente: elaboración propia con información de entrevistas del estudio Mapeo político y revisión del marco normativo para la prevención del VIH, 2012



Fuente: elaboración propia con información de entrevistas del estudio Mapeo político y revisión del marco normativo para la prevención del VIH, 2012

FIGURA 1. CAPACIDAD DE INFLUENCIA DE LOS ACTORES EN LAS POLÍTICAS PARA LA PREVENCIÓN DE LA DISCRIMINACIÓN Y HOMOFOBIA ASOCIADAS CON LA EPIDEMIA DEL VIH EN MÉXICO, 2013

nes de abogacía y defensoría de derechos humanos, sexuales y reproductivos. Estos grupos han mantenido vigente en la agenda la necesidad de fortalecer capacidades para garantizar la prevención del VIH y su atención médica, y para prevenir la discriminación asociada con esta enfermedad. Por su parte, las CEDH expresaron barreras a nivel local para vigilar el respeto a los derechos humanos de las PVV y a las poblaciones clave en mayor riesgo. Finalmente, los actores que participaron en el estudio reconocieron que los usuarios de los servicios de salud son los actores con menor influencia, y que ésta sólo se modifica cuando son activistas o representantes de OSC.

Discusión

Los resultados de la investigación muestran la persistencia de expresiones discriminatorias asociadas con el VIH en los estados y que se traducen en prácticas sociales lesivas para la salud y el bienestar de las PVV y las poblaciones clave en mayor riesgo.[10] Esta situación resulta preocupante si se considera que ocurre en un marco legal nacional que las sanciona y que el nivel estatal presenta vacíos normativos que favorecen la persistencia de prácticas discriminatorias asociadas con el VIH.

El mapeo realizado confirmó situaciones discriminatorias graduales que incluyeron denostación, burla y negación de servicios,[11,12] hasta formas violentas como los crímenes de odio,[13] que también han sido reportados en otros estudios.[14] La expresión de esta forma extrema de homofobia[15,16] ha sido motivo de preocupación para distintos actores por sus implicancias sociales y judiciales, y porque plantea un llamado a la reflexión para crear valores incluyentes alrededor del VIH[17] y las poblaciones clave de mayor riesgo.

El análisis político sugiere un escenario favorable para la promoción de políticas públicas para la prevención de la discriminación y la homofobia asociada con el VIH. El rol de los actores políticos es un aspecto que considerar como parte de este proceso, toda vez que buena parte de éstos mostraron capacidades de incidencia política que se han traducido en mecanismos de defensoría de derechos.

Una dimensión que hay que fortalecer es, sin duda, el enfoque de derechos humanos[18] en los niveles de gobierno estatal y municipal que les confiere mayor autonomía para la observancia del cumplimiento normativo en el ámbito público.[19] Debe impulsarse también la implementación de los reglamentos para operar la Ley Federal para Prevenir y Eliminar la Discriminación,[20,21] así como a nivel municipal es relevante desarrollar nor-

matividad específica en contra de la discriminación y la homofobia.[22] Finalmente, se considera fundamental eliminar prácticas sociales donde la ambigüedad favorece situaciones para la discriminación, sobre todo aquéllas que provienen de figuras públicas. En virtud de ello es relevante profundizar más en la problemática analizada con la finalidad de identificar oportunidades que favorezcan cambios tendientes a proteger los derechos de las PVV y poblaciones clave en mayor riesgo.[23,24]

Debido a que se trató de un estudio cualitativo y exploratorio, se reconoce que los resultados no se pueden generalizar a otros ámbitos y que, por tanto, este estudio no es representativo de la realidad nacional. Se sugiere investigar sobre el tema para poder generar mayor robustez del tipo de información analizada.

Conclusiones

El estudio presentado tiene relevancia en el análisis político explícito que posiciona en la agenda pública el tema de la discriminación y la homofobia asociadas con el VIH, más aún en el contexto mexicano donde éstas continúan siendo problemáticas. La homofobia es el tema más sensible para la discriminación en las diversas instituciones incluidas en el estudio, el cual requiere mayor atención ante la evidencia de crímenes de odio como expresión extrema de la discriminación.

Los resultados presentados dejan evidencia de la necesidad de fortalecimiento de las políticas públicas estatales con enfoque de derechos humanos en temas críticos de salud pública. Asimismo, es necesario el fortalecimiento del ejercicio de la autoridad gubernamental ante la denostación pública por una condición de salud, como lo es vivir con VIH, o de identidad sexual. Se considera que documentar barreras sociales y jurídicas de las políticas de salud es fundamental para mejorar su conducción y evaluación.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Wagner A, Hart T, McShane K, Margolese S, Girard T. Health care provider attitudes and beliefs about people living with HIV: Initial validation of the health care provider HIV/AIDS Stigma Scale (HPASS). AIDS and Behavior 2014;18(12): 2397-2409.
2. Barrientos J, Cárdenas M. Homofobia y calidad de vida de gay y lesbianas: una mirada psicosocial. PSYKHE 2013;22(1):3-14.
3. Ley federal para prevenir y eliminar la discriminación. México: Cámara de Diputados del H. Congreso de la Unión; Secretaría General; Secretaría de Servicios Parlamentarios, 2009 [Última reforma publicada DOF 20-03-2014] [consultado el 14 de agosto de 2014] Disponible en: http://www.diputados.gob.mx/LeyesBiblio/pdf/262.pdf
4. Mizuno Y, Borkowf C, Millet G, Bingham T, Ayala G, Stueve A. Homophobia and racism experienced by Latino men who have sex with men in the United States: correlates of exposure and associations with HIV risk behaviors. AIDS and Behavior 2012;16(3):724-735.
5. Cáceres C. Intervenciones para la prevención del VIH e ITS en América Latina y Caribe: una revisión de la experiencia regional. Cad Saúde Pública 2004;20(6):1468-1485.
6. Cuadra-Hernández S, Leyva-Flores R, Hernández-Rosete D, Bronfman-Pertzovsky M. Los derechos humanos en las normas sobre el VIH/sida en México y Centroamérica. 1993-2000. Salud Publica Mex 2002;44(6):508-518.
7. Moral-de la Rubia J, Valle de la O. Escala de actitudes hacia lesbianas y hombres homosexuales en México 1. Estructura factorial y consistencia interna. Revista Electrónica Nova Scientia 2011;3(2):139-157.
8. Ortiz-Hernández L, García-Torres I. Efectos de la violencia y la discriminación en la salud mental de bisexuales, lesbianas y homosexuales de la Ciudad de México. Cad Saudé Pública 2005;21(3):913-925.
9. Reich M. The politics of reforming health policies. Promotion and Education 2002;9 (4):138-142.
10. Halkitis P. Discrimination and homophobia fuel the HIV epidemic in gay and bisexual men. Director 2012;202:6176.
11. Wilson A, Hirokazu Y. Experiences of and responses to social discrimination among Asian and Pacific Islander gay men: Their relationship to HIV risk. AIDS Education and Prevention 2004;16(1)special issue:68-83.
12. Reynolds R. Social discrimination against men who have sex with men (MSM) implications for HIV policy and programs. Global Forum on MSM & HIV 2010 [consultado el 14 de agosto de 2014]. Disponible en: http://www.msmgf.org/files/msmgf/Advocacy/MMSSGF_Social_Discrimination_Policy_Brief.pdf.
13. Granados-Cosme JA, Torres-Cruz C, Delgado-Sánchez G. La vivencia del rechazo en homosexuales universitarios de la Ciudad de México y situaciones de riesgo para VIH/sida. Salud Publica Mex 2009;51:482-488.
14. Mercado-Mondragón J. Intolerancia a la diversidad sexual y crímenes por homofobia. Un análisis sociológico. Sociológica 2009;24(69):123-156.
15. Feyissa G, Abebe L, Girma E, Woldie M. Stigma and discrimination against people living with HIV by healthcare providers, Southwest Ethiopia. BMC Public Health 2012;12:522.
16. Nel J, Melanie J. Exploring homophobic victimisation in Gauteng, South Africa: Issues, impacts and responses. Acta Criminologica 2008;21(3):19-36.
17. Adebajo S, Eluwa G, Allman D, Myers T, Ahonsi B. Prevalence of internalized homophobia and HIV associated risks among men who have sex with men in Nigeria. Afr J Reprod Health 2012;16(4):21-28.
18. Barrientos J, Cárdenas M, Díaz J, Muñoz F. Derechos, políticas, violencia y diversidad sexual: segunda encuesta marcha por la diversidad sexual. Santiago 2011. Santiago, Chile: Universidad Católica del Norte/Movimiento por la Diversidad Sexual, 2011.
19. Arrivillaga-Quintero M, Alzate-Posada M, Useche- Aldana B. Políticas públicas, sistema de salud y mujeres con VIH/Sida en Colombia: Un análisis crítico. Gerencia y Políticas de Salud 2009;8(16).
20. Arend E. The politics of invisibility: homophobia and low-income HIV-positive women who have sex with women. J Homosex 2005;49(1):97-122.
21. Stangl A, Lloyd J, Brady L, Holland C, Baral S. A systematic review of interventions to reduce HIV-related stigma and discrimination from 2002 to 2013: how far have we come? J Int AIDS Soc 2013;16(Suppl 2):18734.
22. Lim F, Brown D, Sung Min J. Addressing health care disparities in the lesbian, gay, bisexual, and transgender population: A review of best practices. Am J Nurs 2014;114(6):24-35.
23. Palacios A, Bariffi F. La discapacidad como una cuestión de derechos humanos. Una aproximación a la Convención Internacional sobre los Derechos de las Personas con Discapacidad. Madrid: Ediciones Cinca, 2013.
24. Semugoma P, Beyrer C, Baral S. Assessing the effects of anti-homosexuality legislation in Uganda on HIV prevention, treatment, and care services. SAHARA-J: Journal of Social Aspects of HIV/AIDS 2012;9(3):173-176.

Capítulo 3.
Financiamiento y protección financiera

El financiamiento es una de las principales funciones de los sistemas de salud. A través de sus subfunciones (recaudación de ingresos, agrupación de fondos, compra de servicios y diseño de paquetes de beneficios), debe asegurar la disponibilidad de recursos suficientes para mejorar la salud de la población, con calidad, equidad, eficiencia y sostenibilidad. Además, debe evitar o disminuir el gasto directo del bolsillo por motivos de atención a la salud, y proteger a la población de los llamados gastos catastróficos o empobrecedores.

El análisis del financiamiento del sistema de salud, así como de la equidad en la asignación de los recursos, permite generar información necesaria para apoyar la toma de decisiones, algo especialmente relevante cuando se implementan reformas al sistema de salud. En este sentido, en el contexto de la reforma de 2003 y la creación del Centro Nacional de Equidad de Género y Reproductiva, se solicitó al CISS la generación de las Cuentas en Salud Reproductiva y de Equidad de Género. El objetivo fue corroborar la congruencia entre la asignación de recursos a los programas de salud sexual y reproductiva con las prioridades establecidas y los compromisos internacionales signados. Asimismo, esta información permitiría dar seguimiento financiero de estos programas. La información generada entre 2003 y 2017 se publicó en diversos artículos internacionales, de los cuales este capítulo incluye uno que brinda evidencia del gasto en programas de salud materna y planificación familiar a nivel nacional y por tipo de institución de 2003 a 2016.

La reforma a la Ley General de Salud que dio origen al Sistema de Protección Social en Salud (SPSS) en 2003 favoreció que en el CISS se desarrollara gran cantidad de evaluaciones y análisis sobre protección financiera. En este capítulo se incluyen cuatro artículos que analizan el gasto de los hogares por motivos de salud en diversos grupos sociales (población sin acceso a servicios de la seguridad social, indígenas, no indígenas, adultos mayores), que ofrecen evidencias sobre la concentración del gasto de bolsillo catastrófico, excesivo y empobrecedor en los hogares indígenas más pobres, en aquellos con algún miembro adulto mayor y en los hogares encabezados por mujeres. Otra de las publicaciones analiza los efectos a largo plazo del SPSS en la equidad en el gasto directo de bolsillo para la población mexicana pobre. En él, se muestra un efecto redistributivo positivo, principalmente durante la primera etapa de implementación del programa, seguido de otra etapa donde se observaron resultados adversos en términos de equidad vertical y reordenamiento entre las familias aseguradas. Finalmente, otro de estos manuscritos estimó el gasto de bolsillo de los hogares en la compra de medicamentos y generó evidencias sobre la existencia de mayor gasto en hogares sin seguridad social. Los estudios mencionados permitieron generar

evidencia clave para evaluar los avances de la reforma de 2003 en uno de sus objetivos centrales y proponen que, para lograr la equidad en el sistema de salud, se deben implementar mecanismos de protección financiera que aborden las desigualdades estructurales existentes entre grupos sociales.

El trabajo científico realizado en el CISS en los temas de financiamiento y protección financiera lo han posicionado como un actor relevante en la generación de información clave, necesaria no sólo para evaluar las políticas en salud, sino también para contribuir al diálogo entre los distintos niveles de gobierno del sistema de salud, así como entre los diferentes sectores de la sociedad.

Journal of Racial and Ethnic Health Disparities (2024) 11:3139–3149
https://doi.org/10.1007/s40615-023-01770-8

Inequitable Financial Protection in Health for Indigenous Populations: the Mexican Case

Edson Serván-Mori[1] · Sergio Meneses-Navarro[1,2] · Rocio Garcia-Diaz[3] · Laura Flamand[4] · Octavio Gómez-Dantés[1] · Rafael Lozano[5,6]

Received: 21 May 2023 / Revised: 14 August 2023 / Accepted: 18 August 2023 / Published online: 11 September 2023
© W. Montague Cobb-NMA Health Institute 2023

Abstract

Background There is an important gap in the literature concerning the level, inequality, and evolution of financial protection for indigenous (IH) and non-indigenous (NIH) households in low- and middle-income countries. This paper offers an assessment of the level, socioeconomic inequality and middle-term trends of catastrophic (CHE), impoverishing (IHE), and excessive (EHE) health expenditures in Mexican IHs and NIHs during the period 2008–2020.

Methods We conducted a pooled cross-sectional analysis using the last seven waves of the National Household Income and Expenditure Survey ($n = 315{,}829$ households). We assessed socioeconomic inequality in CHE, IHE, and EHE by estimating their Wagstaff concentration indices according to indigenous status. We adjusted the CHE, IHE, and EHE by estimating a maximum-likelihood two-stage probit model with robust standard errors.

Results We observed that, during the period analyzed, CHE, IHE, and EHE were concentrated in the poorest IHs. CHE decreased from 5.4% vs. 4.7% in 2008 to 3.4% vs. 2.9% in 2014 in IHs and NIHs, respectively, and converged at 2008 levels towards 2020. IHE remained unchanged from 2008 to 2014 (1.6% for IHs vs. 1.0% for NIHs) and increased by 40% in IHs and NIHs during 2016–2020. EHE plunged in 2014 (4.6% in IHs vs. 3.8% in NIHs), then rose, and remained unchanged during 2016–2020 (6.7% in IHs and 5.6% in NIHs).

Conclusion In pursuit of universal health coverage, health authorities should formulate and implement effective financial protection mechanisms to address structural inequalities, especially forms of discrimination including racialization, that vulnerable social groups such as indigenous peoples have systematically faced. Doing so would contribute to closing the persistent ethnic gaps in health.

Keywords Out-of-pocket expenditure · Financial protection in health · Indigenous · Inequality · Mexico

Introduction

Out-of-pocket health care expenditure (OOPHE) can negatively impact family well-being and deepen poverty as well as health inequities [1]. Health systems must take measures to ensure that all people, regardless of their economic, social, and racial or ethnic status, obtain dignified and effective health services that do not entail financial difficulties, much less, financial ruin [2].

Memorial dedication We dedicate this manuscript to our colleague, professor, and friend, Sandra Sosa-Rubí, PhD, who passed away in March 2021; Sandra consistently inspired us in our analysis of equity and financial protection in health during her fruitful lifetime.

✉ Sergio Meneses-Navarro
sergio.meneses@insp.mx

1 Center for Health Systems Research, The National Institute of Public Health, Cuernavaca, Mexico

2 The National Council of Humanities, Sciences and Technology, Del. Benito Juarez, Mexico

3 Tecnologico de Monterrey, School of Social Science and Government, Monterrey, Nuevo Leon, Mexico

4 Center for International Studies, The College of Mexico, Mexico City, Mexico

5 Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA

6 School of Medicine, National Autonomous University of Mexico, Mexico City, Mexico

Serván-Mori E, Meneses-Navarro S, García-Díaz R, Flamand L, Gómez-Dantés O, Lozano R. Inequitable financial protection in health for indigenous populations: the Mexican case. J. Racial and Ethnic Health Disparities. 2024;11(5):3139-3149. https://doi.org/10.1007/s40615-023-01770-8

Financial protection for population groups living in conditions of major vulnerability is key to achieving universal health coverage (UHC) [2]. Despite the fact that ethnic disparities are at the core of the international human rights agenda and the Sustainable Development Goals, indigenous peoples—particularly in Latin America and the Caribbean Region—continue to be one of the most marginalized groups, marked, among other characteristics, by poor health conditions [3]. These conditions are associated with persistent social exclusion that hinders their access to public health care, resulting in higher OOPHE to obtain essential health services, and represent a significant obstacle towards achieving health-equity goals [4].

The living and health conditions of the more than ten million indigenous peoples in Mexico [5] have historically been determined by social stratification resulting from colonial relations rooted in racist ideologies, among other factors [6, 7]. Seventy-five percent of the indigenous population resides in eight of the 32 states, located in central and southern Mexico (Chiapas, Estado de Mexico, Guerrero, Hidalgo, Oaxaca, Puebla, Veracruz, and Yucatan) [5, 8]. Unlike other countries in the region, racism in Mexico has taken on subtle nuances. As the country with the largest number of indigenous peoples in Latin America, since gaining its independence from Spain in the 19th century, Mexico has embraced the concept of *mestizaje* (mixed racial ancestry) as a symbol of its identity. The heritage of more than 60 ethnolinguistic groups has been highlighted as a source of ancestral symbolic wealth and has been seen as reflecting a glorious history. At the same time, the persistence of large, poor indigenous sectors has been portrayed as a burden on the country's development [9]. Public policies for the indigenous populations have been based on the premise that inequalities and backwardness are caused by cultural differences rather than by power differentials perpetuated by discriminatory ideologies of colonial origin. Mexico has sought to address them by integrating the indigenous communities into the national mestizo society [10]. This has resulted in profound social segmentation, with indigenous peoples suffering the greatest social and health lags. The maternal mortality rate in these communities, for example, is double the national average, and the life expectancy among indigenous populations at birth is 8 years lower than the national average [11].

Despite the advances in financial protection in health observed over the last two decades in low- and middle-income countries (LMICs) [12–14], OOPHE is growing at an annual rate of 6% [15]. Seventeen percent of the population in these countries falls or remains in poverty annually due to OOPHE [16], and inequities and lags in health persist in their most socially disadvantaged sectors [15], especially among indigenous populations [17]. This situation, exacerbated by the COVID-19 pandemic [18], threatens progress in health and the achievement of UHC in these countries [15].

Mexico's public health system is comprised of two sectors, public and private. The public component includes two segments: the social security institutions, which provide health care services to formal workers and their families (56 million people), as well as the Ministry of Health and other public agencies that serve the poor population, including the indigenous communities (69 million people) [19–21]. Finally, the private sector offers health care services to those with the capacity to pay.

The social security segment of the Mexican health system has essentially remained unchanged since the establishment of the Mexican Institute for Social Security in 1943 and the other social security agencies in the 1960s. The segment responsible for providing health care services to those without social security coverage, in contrast, has changed considerably over the past 20 years. In 2003, the Mexican Congress approved a reform to provide social protection in health to those lacking social security coverage by instituting the System for Social Protection in Health and its financial vehicle, Seguro Popular [22]. The latter guaranteed access to 294 essential services and 66 high-cost interventions. In 2015, over 50 million individuals were affiliated with this program.

After the election of December 2018, the new federal administration decided to dismantle Seguro Popular and in its place establish the Health Institute for Welfare (Instituto de Salud para el Bienestar, or INSABI). The new institute, launched in January of 2019, would negotiate agreements with Mexico's 32 states to provide health services to the population lacking social security coverage based on affiliate contributions [23].

Despite the conspicuous adversities in health confronted by indigenous populations, there is an important gap in the literature concerning the level, inequality, and evolution of financial protection in LMICs [24]. In a context of major changes in the Mexican health system, this study was conducted to bridge this gap [25]. It offers an assessment of the level, inequality and mid-term trends in catastrophic (CHE), impoverishing (IHE) and excessive (EHE) health care expenditures in Mexican indigenous (IH), and non-indigenous (NIH) households during the period 2008–2020. We also discuss the implications of these results for the Mexican health system and for other LMICs, emphasizing the importance of implementing policies that prioritize financial protection for disadvantaged groups, particularly indigenous populations, to attain UHC.

Methods

Design and Data

We conducted a pooled cross-sectional analysis using data from the last seven waves (2008 to 2020) of Mexico's biennial National Household Income and Expenditures Survey (ENIGH) (data available at https://www.inegi.org.mx/programas/enigh/), which is considered the gold standard for measuring health expenditure and income in Mexico. Its complex sample design allows for generating estimates at the national and sub-national levels [26]. After excluding 1.2% of households for providing incomplete data or implausible values in the variables of interest for this study, our analysis sample amounted to 315,829 Mexican households.

Outcome Variables

We first calculated the total quarterly household expenditure for each household h (THE_h) by adding expenditures on food and beverages (FE_h), health care (HE_h), transportation and communication, housing and services, personal care, and education, among others. In line with our previous work [27], we included the monetary and non-monetary components of household spending, with the latter based on household consumption, gifts received from other households, and institutional contributions such as government subsidies and transfers from private organizations. Household spending was calculated for the quarter prior to the survey and expressed in international PPP (purchasing power parity) in 2013 constant dollars. Following international guidelines on the classification of consumption by purpose [28], we calculated HE_h as total spending on medicines and other health products, as well as outpatient, hospitalization, and other services including laboratory analyses and dental care.

In accordance with previous studies [27], we analyzed three metrics of financial protection in health: catastrophic health care expenditure (CHE_h), impoverishing health care expenditure (IHE_h) and excessive health care expenditure (EHE_h). CHE_h was defined as a binary variable equal to 1 when health care spending was ≥ 30% of the household's capacity to pay (CTP_h) and zero otherwise. Thus, CTP_h was equal to THE_h-FE_h when the poverty line (PL) > FE_h and equal to THE_h-PL when the PL ≤ FE_h. The PL was calculated following Xu's approach [29]. According to this definition, the PL was estimated at 622.5 (95% CI: 619.6, 625.5) trimestral international dollars at constant prices, on average, for the entire period analyzed. FE_h included expenditure on food consumed or purchased outside the home, given its relevance in Mexican households [27]. IHE_h was defined as spending on health care that results in a household h falling below the prevailing PL or deepening its impoverishment if it is already poor [30], equal to one when $THE_h \geq PL$ and THE_h-$HE_h < PL$, and zero otherwise. Finally, EHE_h was equal to one when $CHE_h = 1$ and/or $IHE_h = 1$, and zero otherwise.

Since the last century, Mexico has classified people as "indigenous" in its population censuses based on linguistic and self-ascription criteria. For this study, we classified IHs using language criteria. This allowed us to identify a group of households inhabited by descendants of people who lived on the land prior to European colonization, sharing a specific cultural trait, facing similar access barriers to health care, and, frequently, experiencing discrimination by the dominant colonial society [31]. Households were identified as IHs if the head of household, a spouse, and/or an older relative such as the grandmother spoke one of the more than 65 indigenous languages of Mexico (e.g., Nahuatl or Mayan). To promote equality and respect for individual rights, some international organizations have advocated that indigenous peoples "self-identify." However, this policy has been criticized for being too open ended [32]. The fact that the language of an individual or a group is different from the predominant language imposed on the original peoples during the colonial process suggests that language remains a crucial criterion for more accurately identifying indigenous populations. Under this definition, 9.9% of the households analyzed were identified as indigenous.

Covariables

We recorded the following three sets of variables: (i) head of household: age, sex, educational level, employment during the month prior to the survey and marital status; (ii) household: composition (unipersonal, nuclear, extended, or composite), number of equivalent adults [33], family members aged 0–5 or ≥ 65 years, family members with disabilities, health insurance coverage (none, Seguro Popular from 2008 to 2018 and/or INSABI in 2020, social security or a mixture), a standardized factorial-asset, and housing-material index as a measure for socioeconomic status (SES) [34], where higher values indicated a larger number of assets and superior housing conditions, a THE_h below the PL, lacking twelve items on the food index due to financial restrictions, travel time (in hours) to the nearest hospital, the regular health care provider (the Ministry of Health, social security, the private sector, a mixture, or other), and participating in a social conditional/non-conditional transfer program; and (iii) area of residence: rural/urban (urban: ≥ 2500 inhabitants), a standardized factorial social deprivation index regarding municipal access

to basic public services, housing conditions, and income, where higher values indicated higher levels of municipal social development [35].

Statistical Analysis

All analyses were performed using the Stata v17MP statistical package. We first calculated the household characteristics described above (average or percentages with a 95% CI) and household spending according to indigenous status. We also estimated the amount (median-p50 and interquartile range-IQR) of THE, FE, HE, their distribution according to their monetary and non-monetary sources, and to the place of FE (outside or inside the home), the FE/THE ratio (%), and the prevalence of households with HE > 0; among these, we described total HE (p50 and IQR), its distribution by source, and the HE/CTP ratio (%).

Next, we analyzed the evolution of inequality in the risk of CHE, IHE, and EHE according to the SES of households with a HE > 0, estimating robust Wagstaff concentration indices [36, 37] for binary indicators by indigenous status.

Third, we adjusted the CHE, IHE, and EHE predictive margins (in % with 95% CI) according to indigenous status and survey year considering the truncation of our outcomes when HE > 0. To tackle this source of bias and obtain consistent, unbiased, and efficient estimators, we estimated maximum-likelihood two-stage probit, or Heckprobit, models with robust standard errors [38]. The first stage of the assessment, or selection-equation phase, was adjusted for indigenous status, age, educational level, employment status and civil status of the head of household, affiliation with a health insurance program, SES, participation in a social program, size and deprivation level of the area of residence, and fixed effects by state. The second, or structural-equation, stage was adjusted for indigenous status, affiliation with a health insurance scheme, time to the nearest hospital, the presence of household members aged ≤ 5 or ≥ 65, the interaction between indigenous status and the first four characteristics mentioned for this stage, and the survey year. Sensitivity analyses of our estimates were performed by modifying the cutoff thresholds on the HE/CTP ratio to ≥ 10% and ≥ 25%.

Results

When comparing IHs and NIHs during the study period, we found that the former tended to be headed by older people, a smaller percentage of whom were women, with less schooling, greater participation in the labor market, and with a higher percentage married or living in a common-law relationship (Table 1). A smaller percentage of IHs were unipersonal, while, in contrast, a higher proportion were extended households. IHs had a higher average number of equivalent adults, a greater number of members ≤ 5 and ≥ 65 years, as well as members with disabilities. A higher percentage of IHs lacked health insurance or were affiliated with Seguro Popular, while the percentage of households enrolled in social security was higher among NIHs. Also, notable was the lower SES of IHs, a higher proportion of whose members lived below the PL, and the fact that they were more likely to suffer from food shortages. Additionally, IHs were established in rural areas and suffered from a higher marginalization index (a summary measure of deprivation in education, health, housing, and access to other basic goods) [35]. They were farther from hospitals and more likely to participate in social programs.

Social security affiliation decreased between 2008 and 2020, dropping from 54.6 to 46.3% and from 26 to 20.1% in NIHs and IHs, respectively. While health insurance coverage for people without social security affiliation showed a sustained increase from 2008 to 2012, this was followed by a period of stagnation between 2014 and 2018, and then a sharp fall between 2018 and 2020 for both types of households (Appendix 3A). On average, coverage via social programs was twice as high for IHs as it was for NIHs during 2008–2020. In IHs, it rose steadily from 53.9% in 2008 to 65.9% in 2012, followed by a slow decline from 2012 to 2018 and a precipitous drop from 2018 to 2020 (59.2% to 51.9%) (Appendix 3B).

The median quarterly THE for the entire period analyzed was lower among IHs (US$1,738 vs. US$2,556.4) (Table 2). Of this total expenditure, 28.3% and 26.6% were non-monetary for IHs and NIHs, respectively. FE was also lower among IHs (US$857.2 vs. US$1008.8), with these households being more dependent on non-monetary sources (21.5% vs. 18.1%) and exhibiting a higher level of spending inside the household (82.9% vs. 76.9%). The median CTP was also lower in IHs (US$858.9 vs. US$1594.7), but not the FE/THE ratio, which was higher (50.3% vs. 40.5%). The probability of HE being > 0 was similar for both types of households (65%). Among the households whose HE > 0 in the period analyzed, median quarterly HE was lower in IHs (US$40.4 vs. US$53.4); these households also reported greater dependence on non-monetary sources (30.2% vs. 24.3%). The HE/CTP ratio was 20.5% higher for IHs as compared to their NIH counterparts.

Our concentration indices showed that, from 2008 to 2020, CHE, IHE, and EHE were most prevalent in households with the lowest SES (− 0.15, − 0.43, and − 0.20, respectively) (Table 3), being greater (in absolute values) in NIHs. On the other hand, IHs registered the greatest level of inequality for IHE (-0.26). The estimated indices also showed a significant decrease which, in the case of CHE, reached 47.2%. This decrease was largely attributable to its drop in NIHs while remaining unchanged in IHs.

Table 1 Main characteristics analyzed in indigenous and non-indigenous households, Mexico, 2008–2020

	Non-indigenous households	Indigenous households	*P*-val[a]
No of households	284,461	31,368	
%	90.07	9.93	
	Average of percentages (95% CI)		
Head of household			
Age (in yrs.), avg	49.62 (49.56, 49.68)	49.96 (49.78, 50.14)	< 0.001
Women, %	27.57 (27.40, 27.73)	21.02 (20.57, 21.47)	< 0.001
Schooling, %			
None	6.70 (6.61, 6.79)	18.83 (18.40, 19.26)	< 0.001
Elementary	33.47 (33.30, 33.65)	47.92 (47.37, 48.48)	< 0.001
Secondary	26.63 (26.47, 26.80)	20.00 (19.56, 20.45)	< 0.001
High school	14.22 (14.10, 14.35)	7.40 (7.11, 7.69)	< 0.001
College	18.97 (18.83, 19.11)	5.84 (5.58, 6.10)	< 0.001
Employed in the last month, %	76.39 (76.23, 76.54)	82.58 (82.16, 83.00)	< 0.001
Marital status, %			
Married/free union	68.93 (68.76, 69.10)	78.18 (77.72, 78.64)	< 0.001
Divorced/separated/widowed	23.43 (23.28, 23.59)	17.42 (17.00, 17.84)	< 0.001
Single	7.64 (7.54, 7.73)	4.40 (4.17, 4.62)	< 0.001
Household			
Composition, %			
Unipersonal	11.49 (11.38, 11.61)	6.93 (6.65, 7.21)	< 0.001
Nuclear	63.86 (63.69, 64.04)	63.40 (62.86, 63.93)	ns
Extended	23.56 (23.41, 23.72)	28.78 (28.28, 29.28)	< 0.001
Composite	1.08 (1.04, 1.12)	0.89 (0.79, 0.99)	< 0.001
No of equivalent adults, avg	2.56 (2.55, 2.56)	2.86 (2.85, 2.88)	< 0.001
Family members aged 0–5, %	27.51 (27.35, 27.68)	34.31 (33.78, 34.83)	< 0.001
Family members aged ≥ 65, %	22.60 (22.45, 22.76)	25.85 (25.37, 26.34)	< 0.001
Family members with a disability	19.38 (19.23, 19.52)	21.88 (21.42, 22.34)	< 0.001
Health insurance			
Nothing	11.98 (11.86, 12.10)	13.08 (12.71, 13.45)	< 0.001
Seguro Popular (SP) and/or Instituto de Salud para el Bienestar (INSABI)	27.26 (27.09, 27.42)	51.84 (51.29, 52.39)	< 0.001
Social security	42.44 (42.26, 42.62)	18.00 (17.57, 18.42)	< 0.001
Mixture	18.33 (18.19, 18.47)	17.08 (16.67, 17.50)	< 0.001
SES index (std)	0.12 (0.12, 0.12)	− 1.08 (− 1.09, − 1.07)	< 0.001
Below poverty line	8.64 (8.54, 8.74)	30.56 (30.05, 31.07)	< 0.001
Lack of food index	12.55 (12.47, 12.63)	20.75 (20.45, 21.04)	< 0.001
Travel time (hours) to the nearest hospital	0.66 (0.65, 0.66)	1.12 (1.10, 1.14)	< 0.001
Beneficiary of any social program[b], %	27.93 (27.77, 28.10)	57.22 (56.68, 57.77)	< 0.001
Area of residence			
Urban (≥ 2500 inhab.), %	68.30 (68.13, 68.47)	43.16 (42.61, 43.71)	< 0.001
Social deprivation index[c] (std)	− 0.10 (− 0.11, − 0.10)	0.94 (0.92, 0.95)	< 0.001

SES, socioeconomic status (factorial index calculated according to the factor loadings for 2008); *CI*, confidence interval; *std*, standard deviation. Data from the 2008, 2010, 2012, 2014, 2016, 2018, and 2020 waves of the National Household Income and Expenditure Survey, 2008–2020. [a]*P*-val for the difference between non-indigenous and indigenous households. [b]Refers to any government conditional/non-conditional program, in particular, the recently canceled conditional-cash-transfer program known as Prospera (formerly Progresa and Oportunidades). [c]Based on the 2000, 2010, and 2020 Population Censuses, as well as data from the 2005 and 2015 Intercensal Surveys, we first made linear predictions for the 2008 and 2012–2018 survey waves. We then estimated a factorial and standardized index based on the factor loadings for 2008

Table 2 Health expenditures in indigenous and non-indigenous households, Mexico, 2008–2020

	Non-indigenous households	Indigenous households	*P*-val[a]
No of households	284,461	31,368	
%	90.07	9.93	
	Calculated average of percentage (95% CI)		
Among the total households			
THE, p50 (IQR)	2556.38 (1702.53, 3992.24)	1738.01 (1133.60, 2671.25)	< 0.001
Monetary, %	73.44 (73.38, 73.51)	71.68 (71.48, 71.89)	< 0.001
Non-monetary, %	26.56 (26.49, 26.62)	28.32 (28.11, 28.52)	< 0.001
FE, p50 (IQR)[a]	1008.76 (671.03, 1489.42)	857.19 (560.49, 1279.34)	< 0.001
Outside the household, %	23.08 (22.98, 23.17)	17.10 (16.84, 17.35)	< 0.001
Inside the household, %	76.92 (76.83, 77.02)	82.90 (82.65, 83.16)	< 0.001
Monetary, %	81.86 (81.78, 81.95)	78.47 (78.20, 78.74)	< 0.001
Non-monetary, %	18.14 (18.05, 18.22)	21.53 (21.26, 21.80)	< 0.001
CTP, p50 (IQR)	1594.67 (936.72, 2850.70)	858.98 (495.64, 1551.30)	< 0.001
FE/THE, %	40.51 (40.46, 40.57)	50.28 (50.10, 50.46)	< 0.001
Reported HE > 0, %	65.47 (65.30, 65.65)	64.65 (64.12, 65.17)	< 0.01
If HE > 0			
HE, p50 (IQR)	53.49 (19.05, 149.44)	40.44 (13.19, 104.78)	< 0.001
Monetary, %	75.71 (75.53, 75.89)	69.84 (69.26, 70.42)	< 0.001
Non-monetary, %	24.29 (24.11, 24.47)	30.16 (29.58, 30.74)	< 0.001
HE/CTP, %	7.31 (7.25, 7.37)	8.81 (8.62, 9.00)	< 0.001

THE, total quarterly household expenditure. p50: median; *IQR*, interquartile range; *FE*, food and beverages quarterly household expenditure; *CTP*, household's capacity to pay; *HE*, health care quarterly household expenditure. Data from the 2008, 2010, 2012, 2014, 2016, 2018, and 2020 waves of the National Household Income and Expenditure Survey, 2008–2020. [a]*P*-val for the difference between non-indigenous and indigenous households

Table 3 Concentration index for catastrophic, impoverishing, and excessive health expenditures in indigenous and non-indigenous households, Mexico, 2008–2020

	2008–2020	2008	2010	2012	2014	2016	2018	2020	Δ% 2020–2008
Panel A. Catastrophic health expenditure									
Overall	− 0.15[a]	− 0.21[a]	− 0.20[a]	− 0.18[a]	− 0.16[a]	− 0.16[a]	− 0.14[a]	− 0.11[a]	− 47.20[a]
Non-indigenous	− 0.15[a]	− 0.21[a]	− 0.20[a]	− 0.19[a]	− 0.16[a]	− 0.16[a]	− 0.14[a]	− 0.11[a]	− 48.76[a]
Indigenous	− 0.07[a]	− 0.13[c]	− 0.17[b]	ns	ns	ns	− 0.09[c]	ns	ns
Panel B. Impoverishing health expenditure									
Overall	− 0.43[a]	− 0.59[a]	− 0.58[a]	− 0.47[a]	− 0.52[a]	− 0.42[a]	− 0.39[a]	− 0.41[a]	− 31.30[a]
Non-indigenous	− 0.44[a]	− 0.60[a]	− 0.58[a]	− 0.54[a]	− 0.52[a]	− 0.43[a]	− 0.38[a]	− 0.41[a]	− 32.20[a]
Indigenous	− 0.26[a]	− 0.41[a]	− 0.43[a]	ns	− 0.35[a]	− 0.19[a]	− 0.30[a]	− 0.23[a]	− 44.83[a]
Panel C. Excessive health expenditure									
Overall	− 0.20[a]	− 0.26[a]	− 0.27[a]	− 0.22[a]	− 0.25[a]	− 0.21[a]	− 0.19[a]	− 0.16[a]	− 36.14[a]
Non-indigenous	− 0.20[a]	− 0.26[a]	− 0.26[a]	− 0.24[a]	− 0.25[a]	− 0.21[a]	− 0.18[a]	− 0.16[a]	− 36.37[a]
Indigenous	− 0.12[a]	− 0.20[a]	− 0.23[a]	ns	− 0.20[a]	− 0.09[b]	− 0.14[a]	− 0.07[b]	− 64.99[a]

ns, not statistically significant. Data from the 2008, 2010, 2012, 2014, 2016, 2018, and 2020 waves of the National Household Income and Expenditure Survey, 2008-2020. [a–c]Estimates statistically different to zero at 1%, 5% and 10% levels respectively

Nonetheless, the greatest drop was observed for IHE and EHE in IHs (− 44.8% and − 64.9% vs. − 32.2% and − 36.4% in NIHs). The sensitivity analyses performed suggest the consistency of these results (Appendix 1).

According to our regression analysis for 2008–2020, IHs were more likely than NIHs to incur in CHE (5.0%, 95% CI: 4.7%, 5.4% vs. 4.4%, 95% CI: 4.3%, 4.5%), EHE (6.2%, 95% CI: 5.8%, 6.6% vs. 5.2%, 95% CI: 5.1%, 5.3%) (Fig. 1), and

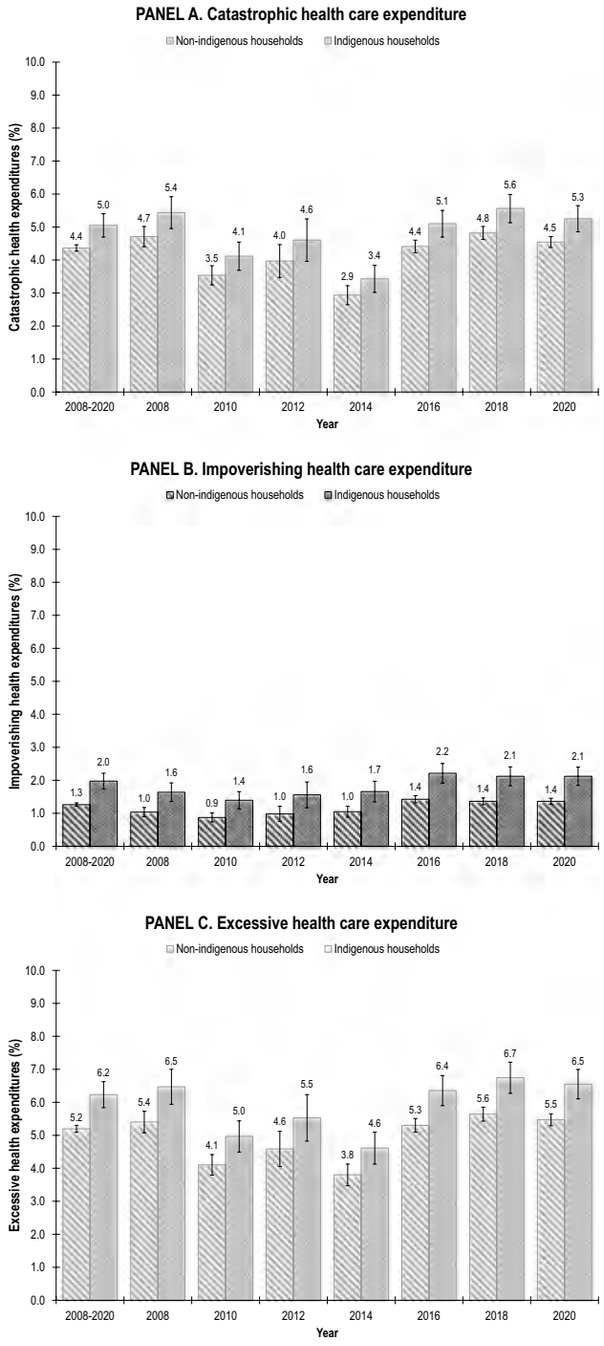


Fig. 1 Adjusted probability of catastrophic, impoverishing, and excessive health care expenditures in indigenous and non-indigenous households, Mexico, 2008–2020. Notes: Data from the 2008, 2010, 2012, 2014, 2016, 2018, and 2020 waves of the National Household Income and Expenditure Survey, 2008–2020

IHE (2.0%, 95% CI: 1.7%, 2.2% vs. 1.3%, 95% CI: 1.2%, 1.3%). However, their chances of incurring in CHE were similar at each point of the analyzed period: they declined for both types of households in 2008, dropping from 5.4% vs. 4.7% to similar levels in 2014: 3.4% in IHs vs. 2.9% in NIHs. They finally converged in 2020, again at levels similar for both types of household. The probability of incurring in EHE followed the same trend as CHE, reaching its lowest point in 2014 (4.6% for IHs vs. 3.8% for NIHs). It then grew and remained unchanged during 2016–2020 at levels of 6.7% and 5.6%, respectively. The likelihood of incurring in IHE remained unchanged from 2008 to 2014 (1.6% for IHs vs. 1.0% for NIHs) and then increased by 40%, standing at 2.2 and 1.4% from 2016 to 2020 for IHs and NIHs, respectively. The sensitivity analyses performed suggest the consistency of these results (Appendix 2).

Discussion

In this study of 315,829 Mexican households, we found that the poorest households in Mexico, including indigenous households (IHs), consistently show the highest risk of financial ruin for health reasons.

The vulnerability and social backwardness profile of IHs has typically been characterized as presenting financial, organizational, geographic, and cultural barriers to accessing health care services. The predominant approaches to explaining the persistently strained relationship between indigenous populations and health services have usually been rooted in cultural reductionism [39]. This perspective attributes the low use of conventional health services by indigenous communities to "cultural factors" without explaining the causal mechanisms [40]. These approaches are inclined to blame the victims for their own adverse living conditions [7, 41]. Little effort has been made to analyze certain forms of structural exclusion, such as racism [40, 42], embedded in the provision of health care services [43, 44] and in the design of segmented health systems, which tend to segregate vulnerable groups [12]. These culturalist approaches also fail to note the effects of discriminatory ideologies—racism, classism, and sexism—as structures that produce and reproduce inequality. They fail to explain systemically how discrimination becomes "embodied inequality" and manifests itself as health inequalities [42].

The finding that the poorest and indigenous households run the highest risk of health-related financial ruin reaffirms the need to prioritize health-financial-protection actions and address the various forms of systematic discrimination such as racism. A necessary first step would be to mobilize increasing amounts of health resources for rural and widely dispersed populations. Traditional strategies focused solely on expanding availability would be insufficient if they fail to consider the types of health providers used by the poor in Mexico and other LMICs. In many cases, these markets involve substantial participation by private sector microbusinesses, are highly fragmented, and lack effective regulatory

oversight [45]. The literature supports interventions aimed at influencing the demand for services and reducing the financial burden represented, for example, by indirect costs involved in traveling to places where health care services are available [46]. Other studies also underline the importance of strengthening cash-transfer mechanisms [47–50]. However, it is necessary to generate synergies between the most effective supply and demand interventions [51–55].

Two general trends in catastrophic (CHE) and excessive (EHE) health expenditures were identified in IHs and non-indigenous households (NIHs) with respect to CHE during the period analyzed: they fell steadily from 2008 to 2014, but then increased from 2014 to 2020, reaching 2008 levels. Impoverishing health expenditure (IHE) remained unchanged during the period 2008–2014 and then increased by 40% (for both types of households), reaching 1.4% in IHs and 2.1% in NIHs in 2020. This U-shaped pattern is associated with two general phases of social policies and financial protection in health: the first one of expansion and consolidation of a health reform intended to expand social protection in health through Seguro Popular (from 2008 to 2012–2014), and the second one of stagnation-retraction of this same health reform (2014–2020), which included the dismantling of Seguro Popular and its substitution with the INSABI, which was also dismantled in 2023.

Our complementary analyses also showed a sustained increase in the percentage of IHs benefiting from social programs from 2008 to 2012, with almost 66% of these households receiving the benefits of at least one program. However, during the 2012–2020 period, we saw a systematic decrease in the percentage of IHs receiving benefits from social programs. This decrease was particularly pronounced between 2018 and 2020, falling to 51.4%, the lowest level in the period of study. The abrupt downturn is explained by the cancelation of the Progresa-Oportunidades-Prospera program at the end of 2018, the main conditional cash-transfer program, originally implemented in the mid-1990s [56]. At the same time, the dismantling of Seguro Popular in 2019 is also correlated with a steep decline in the use of public services (29.1% according to the MoH) and an increase of 45.3% in the use of private health care services. Both trends affected IHs more severely compared to NIHs. This finding is in line with that of the 2018–2019 National Health and Nutrition Survey, which revealed that, among the 11.4% of the population that reported having had a health problem in the previous month, 87% had received care, but only 41% of them had been attended to in a public facility [57]. Between 2018 and 2020, the percentage of the population lacking access to health services increased from 16.2 (20.1 million people) to 28.2% (36.7 million people). Among the most impoverished population, the level of health care deprivation increased by 31.7 percentage points (from 25.6 to 57.3%) during the same period [58].

Our results also suggest the possibility that from 2008 to 2014, Seguro Popular succeeded in lowering CHE and EHE, while preventing an increase in IHE, in both types of households. In the second period of analysis, we observed a decrease in the proportion of the population affiliated with Seguro Popular—from 57 million in 2014 to 54 million in 2018 [17, 59]. CHE, IHE, and EHE also registered increased levels in IHs and NIHs. This result suggests that the stagnation in the expansion of this program and its subsequent disappearance had negative effects in financial protection, especially among the poorest segment of the population, including indigenous communities.

This study offers lessons for LMICs and other countries with a colonial background, racial, ethnic and class inequalities, and fragmented health systems such as Mexico. First, it suggests the need to establish financial protection in health mechanisms for the people most in need. One option could be a form of public health insurance such as Seguro Popular. Second, guided by the principle of equality as the basis of justice [60], health systems must also provide explicit benefits based on prioritization studies that identify the populations and interventions on which efforts should be focused. Without such a targeted approach, endeavors to provide universal coverage will be regressive since they will primarily benefit the most favored social sectors, while postponing care for those who face the greatest structural vulnerabilities [61]. These benefits must be accompanied by enforceability mechanisms that include measures to guarantee the exercise of rights, cultural appropriateness, and the dignified treatment of users from the most vulnerable social groups [62]. Third, it is necessary to define the criteria for accessing health care in the search for UHC, which should consist of citizenship. This measure would help remedy the fragmentation of health systems through the convergence of the financing mechanisms of social security agencies, agencies for the uninsured population, and benefit packages. Fourth, UHC policies should also include measures against discrimination and racism in all areas of the health care system. These range from clinical and administrative spaces to rules and regulations, where compliance with the dimensions of dignified treatment and patient-centered intercultural care must be ensured.

Our study must be interpreted bearing in mind the following limitations. First, although the analyzed survey is considered the gold standard for measuring expenditures in Mexican households, we do not discount possible memory biases in the self-reporting of health spending. Second, the criterion used to identify IHs had limitations. The most obvious was that it did not allow for the recognition of persons who self-identify as indigenous, even if they do not speak a native language. This means that IHs were underestimated in our results, such that the magnitude of CHE is likely to be higher. Third, although our estimated models considered an exhaustive set of characteristics that influenced the events of interest, this analysis could be subject to omitted-variable bias. Fourth, the cross-sectional-observational design of our study and the use

of secondary data limited its scope for identifying causal relationships. Finally, the 2020 measurements of overall as well as household health expenditures were affected by the COVID-19 pandemic for up to 6 months. Unfortunately, the public data from interviews with members of the analyzed households from August to November 2020 did not allow us to differentiate between the effects resulting from that crisis and those attributable to changes in health policies and the health system, and the elimination of social programs carried out by the new federal administration (2018–2024). This is especially pertinent if we consider the disproportionate impact of COVID-19 on Mexican indigenous communities [63] and the fact that the pandemic also led to an increase in the use of private health services. In future studies that will include the 2022 round of the National Household Income and Expenditures Survey, we intend to shed more light on this issue.

To conclude, in their search for UHC, LMICs should implement financial-protection mechanisms focused on the poor that also incorporate measures to specifically address structural inequalities. Salient among these are forms of discrimination such as racism, often manifested through informal practices and systematically suffered by vulnerable social groups including indigenous communities.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s40615-023-01770-8.

Acknowledgements We acknowledge the valuable assistance of Patricia E. Solís and Michael H. Sumner in translating this manuscript into English.

Data Sharing The data for the analysis were requested and obtained from the surveys public repository hosted at the National Institute for Statistics and Geography (available at https://www.inegi.org.mx/programas/enigh/).

Data Availability The dataset used and/or analyzed during the current study are available from the first author on request.

Declarations

Ethical Approval Ethical approval was not required by our institution for this type of study.

Competing Interests The authors declare no competing interests.

References

1. Wagstaff A, Eozenou P, Smitz M. Out-of-pocket expenditures on health: a global stocktake. World Bank Res Obs. 2020;35:123–57.
2. World Health Organization (WHO). The world health report: health systems financing: the path to universal coverage. Geneva PP - Geneva: World Health Organization; 2010.
3. Ruano AL, Rodríguez D, Rossi PG, Maceira D. Understanding inequities in health and health systems in Latin America and the Caribbean: a thematic series. Int J Equity Health. 2021;20:94.
4. Costa JC, Mujica OJ, Gatica-Domínguez G, del Pino S, Carvajal L, Sanhueza A, et al. Inequalities in the health, nutrition, and well-being of Afrodescendant women and children: a cross-sectional analysis of ten Latin American and Caribbean countries. Lancet Reg Heal – Am. 2022;15:1–17.
5. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Estadísticas a propósito del día internacional de los pueblos indígenas [Internet]. Comunicado de prensa N° 4300/22. Ciudad de Mexico, Mexico: INEGI; 2022. 1–7. https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2022/EAP_PueblosInd22.pdf. Accessed 1 June 2023.
6. Gall O. Mestizaje y racismo en México. Nueva Soc [Internet]. 2021; Marzo-Abri:1–16. https://nuso.org/articulo/mestizaje-y-racismo-en-mexico/. Accessed 10 Jul 2023.
7. Paradies Y. Colonisation, racism and indigenous health. J Popul Res [Internet]. 2016;33:83–96. https://doi.org/10.1007/s12546-016-9159-y.
8. Instituto Nacional de los Pueblos Indígenas (INPI). Población indígena en hogares según pueblo indígena por entidad federativa, 2020 [Internet]. Población autoadscrita indígena y afromexicana e indígena en hogares con base en el Censo Población y Vivienda 2020. Ciudad de Mexico, Mexico: INEGI 2022. 1-6. https://www.inpi.gob.mx/indicadores2020/. Accessed 5 Mar 2023.
9. Vejo TP. Raza y construcción nacional. México, 1810-1910. In: Artigas B, editor. Raza y política en Hisp. 1st ed. Ciudad de Mexico, Mexico: El Colegio De Mexico; 2018. p. 61–100.
10. Fábregas Puig AA. Historia mínima del indigenismo en América Latina. 1st ed. El Colegio De Mexico; 2021.
11. Pelcastre-Villafuerte BE, Meneses-Navarro S, Reyes-Morales H, Rivera-Dommarco JÁ. The health of indigenous peoples: challenges and perspectives. Salud Publica Mex. 2020;62:235–6.
12. Becerril-Montekio V, Meneses-Navarro S, Pelcastre-Villafuerte B, Serván-Mori E. The Unarticulated Mexican Public Health System: Why is it useful to distinguish between fragmentation and segmentation? article submitted to the J Public Heal. Policy. 2023, currently under review.
13. McIntyre D, Garshong B, Mtei G, Meheus F, Thiede M, Akazili J, et al. Beyond fragmentation and towards universal coverage: insights from Ghana, South Africa and the United Republic of Tanzania. Bull World Health Organ. 2008;86:871–6.
14. Vieira Machado C, Dias de Lima L. Health policies and systems in Latin America: regional identity and national singularities. Cad Saude Publica. 2017;33Suppl 2:e00068617.
15. World Health Organization (WHO). Global spending on health: weathering the storm. Geneva 27, Switzerland; 2020.
16. Knaul FM, Arreola-Ornelas H, Méndez-Carniado O. Financial protection in health: updates for Mexico to 2014. Salud Publica Mex. 2016;58:341–50.
17. Serván-Mori E, Gómez-Dantés O, Contreras-Loya D, Flamand L, Cerecero-García D, Arreola-Ornelas H, et al. Increase of catastrophic and impoverishing health expenditures in Mexico associated to policy changes and the COVID-19 pandemic. article submitted to the J Glob Heal. 2023, accepted and in process.
18. Micah AE, Cogswell IE, Cunningham B, Ezoe S, Harle AC, Maddison ER, et al. Tracking development assistance for health and for COVID-19: a review of development assistance, government, out-of-pocket, and other private spending on health for 204 countries and territories, 1990-2050. Lancet. 2021;398:1317–43.
19. INEGI, editor. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Panorama sociodemográfico de México. Censo de Población y Vivienda 2020 [Internet]. 1st ed. Ciudad de Mexico, Mexico: INEGi; 2021. https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=702825197711. Accessed 15 Nov 2022.
20. González Block MÁ, Reyes Morales H, Hurtado LC, Balandrán A, Méndez E. Mexico: health system review. Health Syst Transit. 2020;22:1–222.

21. Meneses Navarro S, Pelcastre-Villafuerte BE, Becerril-Montekio V, Serván-Mori E. Overcoming the health systems' segmentation to achieve universal health coverage in Mexico. Int J Health Plann Mgmt. 2022;37(6):3357–64. https://doi.org/10.1002/hpm.3538.
22. Frenk J, González-Pier E, Gómez-Dantés O, Lezana MA, Knaul FM. Comprehensive reform to improve health system performance in Mexico. Lancet. 2006;368:1524–34.
23. Secretaría de Gobernación (SEGOB). Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley General de Salud y de la Ley de los Institutos Nacionales de Salud [Internet]. Ciudad de México, México, México: Diario Oficial de la Federación (DOF); 2019 p. 1–17. https://www.dof.gob.mx/nota_detalle.php?codigo=5580430&fecha=29/11/2019#gsc.tab=0. Accessed 15 Jul 2023.
24. Gilardino RE, Valanzasca P, Rifkin SB. Has Latin America achieved universal health coverage yet? Lessons from four countries. Arch Public Heal. 2022;80:38.
25. Reich MR. Restructuring health reform. Mexican style. Heal Syst Reform. 2020;6:e1763114.
26. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Encuesta Nacional de Ingresos y Gastos de los Hogares 2020 (ENIGH). Nueva serie: Diseño muestral [Internet]. Ciudad de México, México; 2021. https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=889463901228. Accessed 20 Mar 2022.
27. Serván-Mori E, Orozco-Núñez E, Guerrero-López CM, Miranda JJ, Jan S, Downey L, et al. A gender-based and quasi-experimental study of the catastrophic and impoverishing health-care expenditures in Mexican households with elderly members, 2000-2020. Heal Syst Reform. 2023;9:1–15.
28. United Nations (UN). Department of Economic and Social Affairs-Statistics Division. Classification of individual consumption according to purpose (COICOP) 2018. New York; 2018. Report No.: 99
29. Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multicountry analysis. Lancet. 2003;362:111–7.
30. Essue BM, Laba T-L, Knaul F, Chu A, Van MH, Nguyen P, Jan TK, S. Economic burden of chronic ill health and injuries for households in low- and middle-income countries. In: Jamison DT, Gelband H, Horton S, Jha P, Laxminarayan R, Mock CN, et al., editors. Dis Control priorities Improv Heal reducing poverty [Internet]. 3rd ed. Washington DC 20433, USA: The World Bank; 2017. p. 121–43. Available from: https://dcp-3.org/sites/default/files/chapters/DCP3%20Volume%209_Ch%206.pdf. Accessed 31 May 2022.
31. Serván-Mori, E., Juárez-Ramírez, C., Meneses-Navarro, S. et al. Ethnic Disparities in Effective Coverage of Maternal Healthcare in Mexico, 2006–2018: a Decomposition Analysis. Sex Res Soc Policy 20, 561–574 (2023). https://doi.org/10.1007/s13178-021-00685-5.
32. Corntassel J. Who is indigenous? 'Peoplehood' and ethnonationalist approaches to rearticulating indigenous identity. Natl Ethn Polit. 2003;9:75–100.
33. Haughton J, Khandker SR. Handbook on poverty and inequality. 1st ed. Washington DC, USA: World Bank; 2009.
34. Poirier MJP, Grépin KA, Grignon M. Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: a critical interpretive synthesis. Soc Indic Res. 2020;148:1–46.
35. Consejo Nacional de Población (CONAPO). Índice de marginación por entidad federativa y municipio 2020. Nota técnico-metodológica [Internet]. Ciudad de México, México. 2021; https://www.gob.mx/cms/uploads/attachment/file/685354/Nota_te_cnica_IMEyM_2020.pdf. Accessed 31 Jan 2022.
36. Wagstaff A. The concentration index of a binary outcome revisited. Health Econ. 2011;20:1155–60.
37. O'Donnell O, O'Neill S, Van Ourti T, Walsh B. conindex: estimation of concentration indices. Stata J. 2016;16:112–38.
38. Van de Ven WPMM, Van Praag BMS. The demand for deductibles in private health insurance: a probit model with sample selection. J Econom. 1981;17:229–52.
39. Menéndez E. Salud intercultural: Propuestas, acciónes y fracasos. Cien Saude Colet. 2016;2:109–18.
40. Meneses-Navarro, S., Serván-Mori, E., Heredia-Pi, I. et al. Ethnic disparities in sexual and reproductive health in Mexico After 25 Years of Social Policies. Sex Res Soc Policy. 2022;19:975–90. https://doi.org/10.1007/s13178-022-00692-0.
41. Tanous O, Asi Y, Hammoudeh W, Mills D, Wispelwey B. Structural racism and the health of Palestinian citizens of Israel. Glob Public Health [Internet]. 2023;18:2214608. https://doi.org/10.1080/17441692.2023.2214608.
42. Krieger N. Methods for the scientific study of discrimination and health: an ecosocial spproach. Am J Public Health [Internet]. 2012;102:936–44. https://doi.org/10.2105/AJPH.2011.300544.
43. Castro Pérez R, Villanueva LM. El campo médico en México. Hacia un análisis de sus subcampos y sus luchas desde el estructuralismo genético de Bourdieu. Sociológica. 2019;34:73–113.
44. Menéndez E. Modelo hegemónico, modelo alternativo subordinado, modelo de autoatención. Caracteres estructurales. La Antropol médica en México. 1992;1:97–111.
45. Pelcastre-Villafuerte BE, Meneses-Navarro S, Sánchez-Domínguez M, Meléndez-Navarro D, Freyermuth-Enciso G. Condiciones de salud y uso de servicios en pueblos indígenas de México. Salud Publica Mex. 2020;62:810–9.
46. Alfonso YN, Bishai D, Bua J, Mutebi A, Mayora C, Ekirapa-Kiracho E. Cost-effectiveness analysis of a voucher scheme combined with obstetrical quality improvements: quasi experimental results from Uganda. Health Policy Plan. 2015;30:88–99.
47. Mussa EC, Agegnehu D, Nshakira-Rukundo E. Impact of conditional cash transfers on enrolment in community-based health insurance among female-headed households in south Gondar zone, Amhara region. Ethiopia. SSM - Popul Heal. 2022;17:1–10.
48. Feldman BS, Zaslavsky AM, Ezzati M, Peterson KE, Mitchell M. Contraceptive use, birth spacing, and autonomy: an analysis of the Oportunidades program in rural Mexico. Stud Fam Plann. 2009;40:51–62.
49. Banerjee AV, Duflo E, Glennerster R, Kothari D. Improving immunisation coverage in rural India: clustered randomised controlled evaluation of immunisation campaigns with and without incentives. Brithis Med J. 2010;340:1291.
50. Wang P, Connor AL, Guo E, Nambao M, Chanda-Kapata P, Lambo N, et al. Measuring the impact of non-monetary incentives on facility delivery in rural Zambia: a clustered randomised controlled trial. Trop Med Int Heal. 2016;21:515–24.
51. Lagarde M, Haines A, Palmer N. The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. Cochrane database Syst Rev. 2009;2009:1–44.
52. Hirai M, Morris J, Luoto J, Ouda R, Atieno N, Quick R. The impact of supply-side and demand-side interventions on use of antenatal and maternal services in western Kenya: a qualitative study. BMC Pregnancy Childbirth. 2020;20:453.
53. Serván-Mori E, Cerecero-García D, Heredia-Pi I, Pineda-Antúnez C, Sosa-Rubí S, Nigenda G. Improving the effective maternal-child health care coverage through synergies between supply and demand-side interventions: evidence from Mexico. J Glob Health. 2019;9:1–12.
54. Gopalan SS, Varatharajan D. Addressing maternal healthcare through demand side financial incentives: experience of Janani Suraksha Yojana program in India. BMC Health Serv Res. 2012;12:319.

55. Bowser D, Gupta J, Nandakumar A. The effect of demand- and supply-side health financing on infant, child, and maternal mortality in low- and middle-income countries. Heal Syst Reform. 2016;2:147–59.
56. Masino S, Niño-Zarazúa M. Improving financial inclusion through the delivery of cash transfer programmes: the case of Mexico's Progresa-Oportunidades-Prospera Programme. J Dev Stud. 2020;56:151–68.
57. Romero-Martínez M, Shamah-Levy T, Vielma-Orozco E, Heredia-Hernández O, Mojica-Cuevas J, Cuevas-Nasu L, et al. Encuesta Nacional de Salud y Nutrición 2018-19: Metodología y perspectivas. Salud Publica Mex. 2019;61:917–23.
58. Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). Nota técnica sobre la carencia por acceso a los servicios de salud, 2018-2020 [Internet]. Ciudad de México, México; 2021. https://www.coneval.org.mx/Medicion/MP/Documents/MMP_2018_2020/Notas_pobreza_2020/Nota_tecnica_sobre_la_carencia_por_acceso_a_los_servicios_de_salud_2018_2020.pdf. Accessed 15 Oct 2021.
59. Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). El Sistema de protección social en Salud: Resultados y diagnóstico de cierre [Internet]. Ciudad de Mexico, Mexico: CONEVAL; 2020;1–93. https://www.coneval.org.mx/evaluacion/iepsm/documents/analisis_spss_2020.pdf. Accessed 09 Apr 2020.
60. Rawls J. A Theory of Justice. Revised Edition. Cambridge, Mass.: Harvard University Press, 1999.
61. Meneses Navarro S, González Block MÁ, Quezada Sánchez AD, Freyermuth EG. Evolución de la equidad en el acceso a servicios hospitalarios según composición indígena municipal en Chiapas, México: 2001 a 2009. In: Page Pliego JT, editor. Enfermedades del rezago y emergentes desde las ciencias Soc y la salud pública. 1st ed. Mexico City, Mexico: Universidad Nacional Autónoma de México; 2014. p. 17–36.
62. Meneses-Navarro S, Pelcastre-Villafuerte BE, Bautista-Ruiz ÓA, Toledo-Cruz RJ, De la Rosa-Cruz SA, Alcalde-Rabanal J, et al. Innovación pedagógica para mejorar la calidad del trato en la atención de la salud de mujeres indígenas. Salud Publica Mex. 2020;63:51–9.
63. Salas-Ortiz A. Socioeconomic inequalities and ethnic discrimination in COVID-19 Outcomes: the case of Mexico. J. Racial and Ethnic Health Disparities (2023). https://doi.org/10.1007/s40615-023-01571-z.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Health Systems & Reform

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/khsr20

A Gender-Based and Quasi-Experimental Study of the Catastrophic and Impoverishing Health-Care Expenditures in Mexican Households with Elderly Members, 2000-2020

Edson Serván-Mori, Emanuel Orozco-Núñez, Carlos M. Guerrero-López, J. Jaime Miranda, Stephen Jan, Laura Downey, Emma Feeny, Ileana Heredia-Pi, Laura Flamand, Gustavo Nigenda, Robyn Norton & Rafael Lozano

To cite this article: Edson Serván-Mori, Emanuel Orozco-Núñez, Carlos M. Guerrero-López, J. Jaime Miranda, Stephen Jan, Laura Downey, Emma Feeny, Ileana Heredia-Pi, Laura Flamand, Gustavo Nigenda, Robyn Norton & Rafael Lozano (2023) A Gender-Based and Quasi-Experimental Study of the Catastrophic and Impoverishing Health-Care Expenditures in Mexican Households with Elderly Members, 2000-2020, Health Systems & Reform, 9:1, 2183552, DOI: 10.1080/23288604.2023.2183552

To link to this article: https://doi.org/10.1080/23288604.2023.2183552

© 2023 The Author(s). Published with license by Taylor & Francis Group, LLC.

Published online: 04 Apr 2023.

Submit your article to this journal

Article views: 3147

View related articles

View Crossmark data

Citing articles: 5 View citing articles

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=khsr20

HEALTH SYSTEMS & REFORM
2023, VOL. 9, NO. 1, 2183552
https://doi.org/10.1080/23288604.2023.2183552

Taylor & Francis
Taylor & Francis Group

RESEARCH ARTICLE

OPEN ACCESS Check for updates

A Gender-Based and Quasi-Experimental Study of the Catastrophic and Impoverishing Health-Care Expenditures in Mexican Households with Elderly Members, 2000-2020

Edson Serván-Mori[a], Emanuel Orozco-Núñez[a], Carlos M. Guerrero-López[a], J. Jaime Miranda[b,c,d], Stephen Jan[b,e,f], Laura Downey[b,e], Emma Feeny[e], Ileana Heredia-Pi[a], Laura Flamand[g], Gustavo Nigenda[h], Robyn Norton[b,e], and Rafael Lozano[i]

[a]Center for Health Systems Research, The National Institute of Public Health, Cuernavaca, Mexico; [b]The George Institute for Global Health, School of Public Health, Imperial College London, London, UK; [c]CRONICAS Center of Excellence in Chronic Diseases, Universidad Peruana Cayetano Heredia, Lima, Peru; [d]School of Medicine, Universidad Peruana Cayetano Heredia, Lima, Peru; [e]School of Public Health, The George Institute for Global Health, Imperial College London, London, UK; [f]Center for Health Economics and Policy Innovation, Business School, Imperial College London, London, UK; [g]Center for International Studies, The College of Mexico, Mexico City, Mexico; [h]The National School of Nursing and Obstetrics, National Autonomous University of Mexico, Mexico City, Mexico; [i]Health Metrics Science Department. Institute for Health Metrics and Evaluation, University of Washington, Seattle, Washington, USA

ABSTRACT

Latin America has experienced a rise in noncommunicable diseases (NCDs) which is having repercussions on the structuring of healthcare delivery and social protection for vulnerable populations. We examined catastrophic (CHE) and excessive (EHE, impoverishing and/or catastrophic) health care expenditures in Mexican households with and without elderly members (≥65 years), by gender of head of the households, during 2000–2020. We analyzed pooled cross-sectional data for 380,509 households from eleven rounds of the National Household Income and Expenditure Survey. Male- and female-headed households (MHHs and FHHs) were matched using propensity scores to control for gender bias in systematic differences regarding care-seeking (demand for healthcare) preferences. Adjusted probabilities of positive health expenditures, CHE and EHE were estimated using probit and two-stage probit models, respectively. Quintiles of EHE by state among FHHs with elderly members were also mapped. CHE and EHE were greater among FHHs than among MHHs (4.7% vs 3.9% and 5.5% vs 4.6%), and greater in FHHs with elderly members (5.8% vs 4.9% and 6.9% vs 5.8%). EHE in FHHs with elderly members varied geographically from 3.9% to 9.1%, being greater in less developed eastern, north-central and southeastern states. Compared with MHHs, FHHs face greater risks of CHE and EHE. This vulnerability is exacerbated in FHHs with elderly members, because of gender intersectional vulnerability. The present context, marked by a growing burden of NCDs and inequities amplified by COVID-19, makes key interlinkages across multiple Sustainable Development Goals (SDGs) apparent, and calls for urgent measures that strengthen social protection in health.

ARTICLE HISTORY
Received 21 October 2022
Revised 10 February 2023
Accepted 19 February 2023

KEYWORDS
Financial protection; gender; Mexico; NCDs; UHC

Introduction

Many health-system reforms of the last three decades in low- and middle-income countries (LMICs) with segmented health systems have striven to reduce the incidence of catastrophic and/or impoverishing health expenditures.[1] However, the sustained increase in such spending and the persistence of health inequities including those gender-related[2,3] threaten their progress toward achieving these objectives, critical to universal health coverage (UHC).[2]

One less-recognized dimension of UHC pertains to tackling gender disparities and its intersection with health and gender-equity goals outlined in the SDGs.[4] However, financing mechanisms do not explicitly consider gender and other markers of exclusion and discrimination, e.g., ethnic origin and sexual orientation, in the implementation of health policies and programs.[5] As a social determinant of health, gender accounts for differentials in power relations, access to health care and control over resources. Gender inequality disproportionately affects women vis-à-vis men, influencing health and well-being across three domains: (a) the social, economic assessment and commercial determinants of health; (b) health behaviors; and (c) health-system responses.[6] Studies have suggested that gender roles, socially constructed beliefs, and attitudes toward specific genders contribute to health inequalities.[7] This often manifests as variations in care-seeking behaviors (demand for health-care services) by

CONTACT Emanuel Orozco-Núñez emanuel.orozco@insp.mx Center for Health Systems Research, The National Institute of Public Health, Av. Universidad 655, Santa María Ahuacatitlán, Cuernavaca Morelos 62100, Mexico

© 2023 The Author(s). Published with license by Taylor & Francis Group, LLC.
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

gender, or as gender bias,[8,9] expressed through altruistic behavior on the part of women,[10] inequality aversion[11] and risk aversion related to the health problems of other household members,[12] a phenomenon rarely addressed in health-policy initiatives.[13]

Latin America, including Mexico, has experienced a substantial rise in noncommunicable diseases (NCDs) over recent decades,[14] which is having direct repercussions on the structuring of health-care delivery and social protection in the region, particularly for vulnerable populations. The most disadvantaged sectors of Mexican society have experienced a notable rise in the prevalence of and mortality resulting from the NCDs pandemic, one of the major contributors to health-care spending.[15,16] The diagnosis, treatment and management of NCDs frequently generate long-term-care costs that impoverish households and exacerbate inequities. This is critical in households with elderly members because comorbidity generally increases with age and exerts disproportionately negative effects on family finances.[17–19]

It is also known that population aging is accompanied not only by a higher prevalence of NCDs, but frequently also by the coexistence of two or more chronic conditions in the same individual (comorbidity).[17] The aging process in Mexico (as in other LMICs) is occurring in the midst of a fragile economy with high levels of poverty, limited access to health-care services and insufficient health resources.[20] The most prevalent chronic conditions in older adults are arterial hypertension (42.4%), hypercholesterolemia (25.5%), diabetes (25.1%), and hypertriglyceridemia (21.4%), while 55% of this population group presents comorbidity.[18] These conditions tend to negatively affect the quality of life of elderly people and generate a high economic burden for them and their households. They therefore constitute an important determinant of health-care expenditure that often results in financial catastrophe, particularly prevalent in vulnerable households.[19,21] Previous studies have also shown that in Mexico, FHHs are marked by greater social vulnerability than MHHs. The ensuing socioeconomic pattern is clear: FHHs suffer the most severe social disadvantages in Mexico.[22]

NCDs are both a cause and consequence of poverty,[23] and "the threat posed by NCDs is exacerbated by [...] gender inequalities,"[24] among others. The design of effective gender-sensitive policies in Mexico and other LMICs should be anchored in research that deepens our understanding of the health-related financial burden of NCDs from a gender perspective.[25]

Yet, studies on the financial protection of households based on gender remain scarce.[26,27] A better understanding of the gender-related vulnerabilities underlying inequitable health conditions and limited access to health services would serve to enhance system-wide efforts to improve the health-system response, optimizing the prevention, treatment and management of NCDs in Mexico and other LMICs.

Gender intersects with other drivers of inequity such as ethnicity, socioeconomic status, disability, age, geographical location, sexual orientation and sexual identity, all of which have a direct bearing on the 2030 Sustainable Development Agenda. For example, it is well known that education (SDG 4) exerts a major impact on the health outcomes of women and children, while decent work (SDG 8) affects the rates of occupation-related morbidity and mortality, for both men and women. Additionally, SDG 5 ("to achieve gender equality and empower all women and girls") interacts with SDG 3 ("to ensure healthy lives and promote well-being for all at all ages"). Gender and health thus intersect across multiple other SDGs in ways that can either hinder or boost health equity.[6]

Following WHO recommendations for analyzing microdata on household health expenditures from a gender perspective,[28] this study aimed to analyze the CHE and EHE in Mexican households with and without elderly members (≥65 years) by gender of head of the households, during the period 2000–2020. We hypothesized that FHHs experienced greater financial health risks than MHHs, and that this was exacerbated in households with elderly members.

Methods

Data and Sample

We conducted a pooled cross-sectional and quasi-experimental analysis based on the last 11 waves of the biennial National Income and Expenditure Household Survey (ENIGH), 2000–2020.[29] This probabilistic survey was representative at the national, state and rural-urban levels, and included the socioeconomic and demographic characteristics of 390,313 Mexican households. After excluding 2.5% of those that provided incomplete or implausible survey responses, our study population consisted of 380,690 households over the complete analyzed period.

We included the following characteristics:

(i) Head of household: age, schooling, employment and marital status, household type (unipersonal, nuclear, extended or composite), presence of members aged 0–5, ≥55 and ≥65 years, number of equivalent adults, health-

insurance coverage (none, Seguro Popular-SP /INSABI, Social Security, mixture or private), socioeconomic status (SES), according to a standardized factorial asset and housing material index,[30] where higher values indicated better housing conditions, and participation in a government conditional/non-conditional transfer program.

(ii) Place of residence: rural/urban (urban ≥2,500 inhabitants), and access to public services, housing conditions and income, according to a social-deprivation index,[31] where higher values indicated more socially developed municipalities. We grouped the 32 Mexican states into seven socioeconomic regions, with one representing the lowest and seven the highest level of development.[32]

Catastrophic and Impoverishing health-care Expenditures

We began by calculating total quarterly consumption for each household h (TE_h) by adding consumption on food and beverages (FE_h), transportation and communication, housing and services, personal care, education and health (HE_h), among others. HE_h represented expenditures on medicines and other health products, outpatient care, hospitalization and other services such as laboratory analyses and dental care.[33] In line with our previous work,[34] household health-care consumption (in constant 2018 USD) consisted of two components: "monetary" expenditure and "non-monetary" consumption, which included purchases or gifts received from other households, as well as institutional contributions such as transfers from the government or private organizations designed to help bear the health-care costs incurred at the household level.[34]

We analyzed three binary indicators of financial risk in health-care:

(i) Positive health-care expenditure was determined where $HE_h>0$.

(ii) Catastrophic health-care expenditure (CHE_h) was equal to 1 where $HE_h \geq 30\%$ of household capacity to pay (CTP_h) and otherwise equal to zero.[35] To calculate CTP_h, we first defined the poverty line (PL) as an average expenditure on food of between 45% and 55% of TE, adjusted for equivalence in consumption (equal to household size$^{\beta}$), where β was set at 0.56, as reported elsewhere.[36] Thus, $CTP_h = TE_h - FE_h$ if $PL>FE_h$, and $CTP_h = TE_h - PL$ if $PL \leq FE_h$.

(iii) Excessive health-care expenditure (EHEs) included households with CHEs and/or those with impoverishing health expenditures (equal to 1 if $TE_h \geq PL$ and $TE_h - HE_h < PL$, and equal to zero otherwise).[35]

Statistical Analysis

All analyses were performed using Stata v17 MP software. We first described the sociodemographic characteristics of households (averages and percentages with a 95% confidence interval-95%CI) as well as household health expenditures (medians with an interquartile range-IQR) according to the gender of the head of household in families with elderly members. We considered four time periods: 2000–2006, 2008–2012, 2014–2018, and 2020, and evaluated the temporal differences in each characteristic for each type of household (FHHs and MHHs). We then estimated the differences between them within each time period by constructing bivariate regression models as follows: linear for continuous variables, logistic for binary variables, quantile for amounts spent, and fractional for measures of proportion.

To estimate the HE>0, CHE and EHE probabilities in percentages for FHHs and MHHs with and without elderly members, we considered two sources of bias: (i) self-selection in the demand for health services (HE>0), attributable to gender bias pertaining to the head of household,[8–12,37,38] and (ii) the truncation of CHE and EHE when HE>0. To assess the first source of bias, we used pooled propensity-score matching.[39] For this purpose, we used logistic regression models to estimate the propensity scores (where the values of the outcome were 0 if MHH and 1 if FHH), and matched the study sample for all relevant characteristics listed above. Matching was performed using the 1–1 nearest-neighbor algorithm, including caliper = 0.01, non-replacement and common support. We examined balance in covariates using standardized differences in the characteristics of the households in the common support area.[40] Average percentage absolute biases of 20.5% before and 1.6% after matching indicated a balance between comparison groups. After computing the Mantel Haenszel test using gamma (1(0.05)2), we found that the matching estimations were insensitive to a hidden bias.[41] Sensitivity analyses were performed by contrasting the naïve model using kernel, local linear regression and radius matching algorithms (Appendices A–D).[40]

Among matched households, we used a one-stage probit model with robust standard errors and a two-stage probit model[42] to adjust the probabilities of HE>0,

CHE and EHE respectively. We also estimated the incremental risk of incurring positive HE, CHE and EHE associated with the presence of elderly members (the ratio of the differences in probability by gender of the head of the households). Lastly, we conducted post-hoc comparisons of quintiles in the overall (2000-2020) adjusted probability of EHE by state among FHHs with elderly members.

Results

The percentage of FHHs grew by 32.0%, from 21.9% to 28.9%, between the 2000–2006 period and the year 2020 (Table 1). These heads of household, mostly divorced, separated or widowed, belonged to older age brackets and had an elementary-school-level education or less. At the same time, a lower proportion than the heads of MHHs had attended college from 2000–2006, while by the end of the period, this figure had reversed. Heads of FHHs were less likely to participate in the labor market, compared with their male counterparts, who were mostly married or in union. FHHs, predominantly unipersonal or extended, were larger and more likely to include elderly family members compared to their male-headed counterparts (28.8% vs. 17.0% in 2000–2006 and 32.8% vs. 22.3% in 2020) (Table 1). In the period from 2000–2006, 47.0% of MHHs and 40.9% of FHHs enjoyed health insurance coverage. The figures rose to slightly above 92.0% in 2014–2018 and then dropped to 85.0% for MHHs and 75.3% for FHHs in 2020. While their SES was similar, more FHHs had participated in social programs by the end of this period, in spite of the fact that a greater number of MHHs had fallen below the PL. Although more FHHs than MHHs were located in urban areas, they were evenly distributed by level of municipal development and socioeconomic region.

Median quarterly TE trended downward for both types of households (Table 2): from USD $3,035 to USD $1,265 and from USD $2,745 to USD $1,168, for MHHs and FHHS, respectively, with almost 25% of expenditures consisting of non-monetary spending, on average. FE followed a similar pattern: approximately 75% were household-based and showed a smaller percentage of non-monetary spending compared to TE. CTP point estimates were also slightly higher among MHHs, whose heads were mostly married or in union and employed, living predominantly in nuclear or extended families. In households with HE>0, HEs were similar and decreased over time in both types of households, although the non-cash component of HE was higher among FHHs. HE/TE were similar but the HE/FE and HE/CTP point-estimate ratios, in particular, were higher for FHHs. From 2000-to-2020, spending on medicines and other health products increased from 56.5% to 73.6% among MHHs and from 58.0% to 74.9% among FHHs; these figures were consistently higher for FHHs with elderly members vs. comparable MHHs (Figure 1). Outpatient spending in households with elderly members, similar for MHHs and FHHs, declined over the period analyzed, dropping from 34.0% and 33.6% in 2000–2006 to 18.2% and 17.8% in 2020, respectively.

From 2000–2020, the adjusted probabilities of MHHs and FHHs experiencing HEs were 62.5% and 67.9%, respectively, $P < .001$ (Table 3), with the lowest figures observed between 2008–2012 (56.3% and 62.0%, respectively, $P < .001$). After factoring in the presence of elderly household members, the gap in the point prevalence of HEs>0 between FHHs and MHHs widened; this gap also increased over time, from 4.5 to 4.8 percentage points. Likewise, FFHs were more likely to incur CHEs than MHHs (4.7% vs. 3.9% during the entire period analyzed, $P < .001$), and this was even more probable in households with elderly members (5.8% vs. 4.9% in the aggregate period, $P < .001$). However, the likelihood to incur CHEs declined between 2000–2006 and 2008–2012 in both types of households: it was 5.9% and 4.7% in FHHs overall ($P < .001$) and 7.1% and 5.8% in those with elderly members ($P < .001$), respectively, vs. 5.0% and 3.9% in MHHs overall and 6.1% and 4.8% in those with elderly members ($P < .001$), respectively, in 2008–2012; the rates were stable for the remaining years (Table 3, Panel B).

The probability of incurring EHEs proved higher in FHHs than in MHHs (5.5% vs. 4.6%, $P < .001$), and even higher among FHHs with elderly members (6.9% vs. 5.8%, $P < .001$) during the 2000–2020 period. It declined over time, however, dropping from 6.7% in 2000–2006 to 5.4% in 2008–2012 in FHHs ($P < .001$), and from 8.2% to 6.7% in FHHs with elderly members ($P < .001$). The likelihood of experiencing EHEs also dropped among MHHs, falling from 5.8% in 2000–2006 to 4.4% in 2008–2012 ($P < .001$), and from 7.1% to 5.6% in MHHs with elderly members ($P < .001$), respectively, but rising slightly toward the end of the study period. During 2000–2020, the incremental risk for CHE and EHE associated with the presence of elderly members in FHHs equaled 14.5% and 13.1%, respectively, meaning that these households incurred greater expenses (Table 3, Panel C). During the study period (2000–2020) the adjusted probability of EHE in FHHs with elderly members varied geographically, with a gap of up to 133.3% (from 3.9% to 9.1%), separating the states with the highest from those with the lowest probabilities. EHEs were more prevalent in the less developed states in the east, north-central and southwest of the

Table 1. Main characteristics of households studied according to gender of head, Mexico, 2000-2020.

	2000-2006		2008-2012		2014-2018		2020	
	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed
No of households	50,358	14,138	48,664	16,152	119,745	43,434	62,683	25,516
%	78.08	21.92	75.08	24.92	73.39	26.61	71.08	28.92
	Calculated average or percentage (95% CI)							
Head of Household								
Age (in yrs.), avg.[§,¥]	46.1 (45.9, 46.2)	51.9 (51.6, 52.1)***	47.4 (47.2, 47.5)	52.5 (52.3, 52.8)***	48.0 (47.9, 48.1)	52.8 (52.6, 52.9)***	49.9 (49.7, 50.0)	54.2 (54.0, 54.4)***
Schooling, %								
None[§,¥]	11.0 (10.7, 11.2)	19.2 (18.5, 19.8)***	8.6 (8.3, 8.8)	14.7 (14.2, 15.3)***	6.3 (6.2, 6.5)	11.1 (10.8, 11.4)***	5.8 (5.6, 5.9)	9.7 (9.4, 10.1)***
Elementary[§,¥]	42.3 (41.9, 42.8)	45.2 (44.4, 46.1)***	38.1 (37.7, 38.6)	40.7 (40.0, 41.5)***	33.9 (33.6, 34.2)	36.0 (35.6, 36.5)***	32.2 (31.8, 32.5)	34.9 (34.3, 35.5)***
Junior high school[§,¥]	20.8 (20.4, 21.1)	15.8 (15.2, 16.4)***	22.6 (22.3, 23.0)	17.3 (16.7, 17.9)***	28.0 (27.8, 28.3)	24.2 (23.8, 24.6)***	28.5 (28.2, 28.9)	24.8 (24.3, 25.3)***
High school[§,¥]	10.9 (10.7, 11.2)	7.5 (7.1, 8.0)***	13.9 (13.6, 14.3)	11.9 (11.4, 12.4)***	14.5 (14.3, 14.7)	10.0 (9.7, 10.2)***	15.4 (15.1, 15.7)	10.9 (10.6, 11.3)***
College[§,¥]	15.0 (14.7, 15.3)	12.2 (11.7, 12.7)***	16.7 (16.4, 17.1)	15.3 (14.7, 15.8)***	17.3 (17.1, 17.5)	18.8 (18.4, 19.1)***	18.1 (17.8, 18.4)	19.7 (19.2, 20.2)***
Employed in the last month, %[Ψ,¥]	89.0 (88.7, 89.3)	57.5 (56.7, 58.3)***	83.9 (83.6, 84.2)	52.9 (52.1, 53.7)***	86.3 (86.1, 86.5)	58.6 (58.1, 59.0)***	82.1 (81.8, 82.4)	53.8 (53.2, 54.4)***
Marital status, %								
Married/free union[§,¥]	90.5 (90.2, 90.8)	17.0 (16.3, 17.6)***	88.6 (88.3, 88.9)	20.6 (20.0, 21.2)***	86.7 (86.5, 86.9)	24.6 (24.2, 25.0)***	85.2 (84.9, 85.5)	25.3 (24.7, 25.8)***
Divorced/separated/widowed[§,¥]	5.8 (5.6, 6.1)	67.1 (66.3, 67.9)***	7.1 (6.8, 7.3)	62.7 (61.9, 63.4)***	8.5 (8.3, 8.6)	61.4 (60.9, 61.8)***	9.8 (9.5, 10.0)	61.8 (61.2, 62.4)***
Single[§,¥]	3.7 (3.5, 3.8)	16.0 (15.4, 16.6)***	4.4 (4.2, 4.5)	16.7 (16.1, 17.3)***	4.8 (4.7, 4.9)	14.0 (13.7, 14.4)***	5.1 (4.9, 5.2)	12.9 (12.5, 13.4)***
Composition, %								
Unipersonal[Ψ,¥]	5.2 (5.0, 5.4)	17.5 (16.9, 18.1)***	6.6 (6.4, 6.8)	18.0 (17.4, 18.6)***	8.4 (8.3, 8.6)	18.6 (18.2, 18.9)***	9.4 (9.2, 9.6)	18.6 (18.1, 19.0)***
Nuclear[§,¥]	73.7 (73.3, 74.1)	45.6 (44.7, 46.4)***	71.0 (70.6, 71.4)	46.8 (46.1, 47.6)***	70.1 (69.8, 70.4)	47.6 (47.1, 48.1)***	68.4 (68.1, 68.8)	47.4 (46.8, 48.0)***
Extended[§]	20.5 (20.1, 20.8)	35.3 (34.5, 36.1)**	21.5 (21.1, 21.9)	33.7 (32.9, 34.4)***	20.6 (20.3, 20.8)	32.4 (32.0, 32.9)***	21.2 (20.8, 21.5)	32.7 (32.2, 33.3)***
Composite[φ,¥]	0.7 (0.6, 0.7)	1.6 (1.4, 1.8)***	0.9 (0.8, 1.0)	1.5 (1.3, 1.7)***	0.9 (0.9, 1.0)	1.4 (1.3, 1.5)***	1.0 (0.9, 1.1)	1.3 (1.2, 1.5)***
Members aged 0-5, %[§,¥]	38.3 (37.8, 38.7)	25.8 (25.1, 26.6)***	34.0 (33.6, 34.4)	23.1 (22.5, 23.8)***	31.0 (30.8, 31.3)	22.5 (22.1, 22.9)***	26.8 (26.4, 27.1)	19.9 (19.4, 20.4)***
Members aged ≥55, %[§,¥]	31.7 (31.3, 32.1)	47.0 (46.2, 47.8)***	34.7 (34.3, 35.1)	47.5 (46.7, 48.3)***	36.2 (36.0, 36.5)	49.0 (48.5, 49.5)***	40.7 (40.3, 41.1)	52.9 (52.3, 53.5)***
Members aged ≥65, %[§,¥]	17.0 (16.7, 17.4)	28.8 (28.0, 29.5)***	18.6 (18.2, 18.9)	29.5 (28.8, 30.2)***	19.6 (19.3, 19.8)	30.1 (29.7, 30.5)***	22.3 (22.0, 22.6)	32.8 (32.2, 33.4)***
No. of equivalent adults, avg.[§,¥]	2.9 (2.9, 2.9)	2.3 (2.3, 2.3)***	2.8 (2.8, 2.8)	2.3 (2.3, 2.3)***	2.7 (2.7, 2.7)	2.3 (2.3, 2.3)***	2.6 (2.6, 2.6)	2.3 (2.3, 2.3)***
Health insurance, %								
None[§,¥]	53.0 (52.6, 53.5)	59.1 (58.3, 59.9)***	19.4 (19.1, 19.8)	19.6 (19.0, 20.2)	7.7 (7.6, 7.9)	7.4 (7.2, 7.7)*	15.0 (14.7, 15.2)	14.7 (14.3, 15.2)
Seguro Popular/INSABI[b,§,¥]	3.9 (3.7, 4.1)	4.4 (4.1, 4.8)**	26.3 (25.9, 26.7)	23.6 (22.9, 24.2)***	34.1 (33.8, 34.3)	32.8 (32.3, 33.2)***	25.8 (25.4, 26.1)	23.8 (23.3, 24.3)***
Social Security [Ψ,¥]	38.9 (38.5, 39.3)	33.1 (32.3, 33.9)***	44.2 (43.8, 44.7)	46.3 (45.6, 47.1)***	36.0 (35.7, 36.2)	36.4 (35.9, 36.8)	43.4 (43.0, 43.8)	45.0 (44.4, 45.6)***
Mixture or private[§,¥]	4.2 (4.0, 4.3)	3.4 (3.1, 3.7)***	10.0 (9.7, 10.3)	10.5 (10.0, 10.9)	22.2 (22.0, 22.5)	23.4 (23.0, 23.8)***	15.9 (15.6, 16.2)	16.4 (16.0, 16.9)[+]
SES index[c] (std.), avg.[§,¥]	-0.42 (-0.43, -0.41)	-0.34 (-0.36, -0.32)***	-0.07 (-0.08, -0.06)	0.02 (0.01, 0.04)***	0.07 (0.07, 0.08)	0.12 (0.11, 0.13)***	0.16 (0.15, 0.17)	0.21 (0.20, 0.22)***
Below poverty line (PL) [¥]	12.5 (12.2, 12.8)	9.3 (8.8, 9.7)***	11.7 (11.5, 12.0)	8.8 (8.3, 9.2)***	11.6 (11.4, 11.8)	9.7 (9.4, 10.0)***	10.7 (10.4, 10.9)	8.9 (8.5, 9.2)***
Participating in a social program[d],%[§,¥]	21.4 (21.0, 21.7)	18.2 (17.6, 18.8)***	26.4 (26.0, 26.8)	25.3 (24.7, 26.0)*	31.4 (31.2, 31.7)	34.1 (33.6, 34.5)***	30.6 (30.2, 31.0)	35.2 (34.6, 35.7)***
Area of residence								
Urban, %[§,¥]	70.8 (70.4, 71.2)	78.9 (78.2, 79.6)***	73.6 (73.2, 74.0)	81.0 (80.4, 81.6)***	61.6 (61.4, 61.9)	69.9 (69.5, 70.4)***	60.0 (59.6, 60.3)	68.3 (67.7, 68.8)***
Social deprivation index[e] (std.), avg.[§,¥]	0.8 (0.8, 0.8)	0.8 (0.7, 0.8)**	0.2 (0.2, 0.2)	0.1 (0.04, 0.1)***	-0.1 (-0.2, -0.1)	-0.2 (-0.2, -0.1)	-0.4 (-0.4, -0.4)	-0.5 (-0.5, -0.4)***
Socioeconomic Region, %								
Lowest[§,¥]	9.8 (9.6, 10.1)	10.8 (10.3, 11.3)**	12.5 (12.2, 12.8)	12.0 (11.5, 12.5)[+]	7.9 (7.7, 8.0)	8.1 (7.9, 8.4)	8.0 (7.7, 8.2)	8.4 (8.1, 8.8)*
2[§,¥]	19.8 (19.5, 20.2)	21.3 (20.6, 22.0)***	12.9 (12.6, 13.2)	12.9 (12.4, 13.4)	16.6 (16.4, 16.8)	17.2 (16.8, 17.5)**	15.5 (15.2, 15.8)	15.9 (15.5, 16.4)[+]
3	14.5 (14.2, 14.8)	14.3 (13.7, 14.9)	13.4 (13.1, 13.7)	12.9 (12.4, 13.4)[+]	14.4 (14.2, 14.6)	14.0 (13.7, 14.4)*	14.3 (14.0, 14.6)	13.6 (13.2, 14.1)**
4[§,¥]	20.9 (20.5, 21.2)	19.0 (18.3, 19.6)***	30.0 (29.6, 30.4)	28.2 (27.5, 28.9)***	25.9 (25.7, 26.2)	26.6 (26.1, 27.0)**	26.4 (26.0, 26.7)	27.6 (27.1, 28.2)***
5[§,¥]	13.0 (12.7, 13.3)	13.9 (13.3, 14.5)**	13.1 (12.8, 13.4)	14.1 (13.5, 14.6)**	17.7 (17.5, 17.9)	17.8 (17.4, 18.1)	18.3 (18.0, 18.6)	17.6 (17.1, 18.0)*
6[§,¥]	14.2 (13.9, 14.5)	11.4 (10.9, 11.9)***	10.1 (9.8, 10.3)	9.3 (8.9, 9.8)**	15.0 (14.8, 15.2)	12.8 (12.5, 13.1)***	15.0 (14.7, 15.3)	13.3 (12.9, 13.7)***
Highest[§,¥]	7.7 (7.5, 8.0)	9.3 (8.8, 9.8)***	8.0 (7.8, 8.2)	10.7 (10.2, 11.1)***	2.5 (2.4, 2.6)	3.6 (3.4, 3.7)***	2.6 (2.5, 2.8)	3.5 (3.3, 3.7)***

CI: confidence interval; Avg.: average; SES: socioeconomic status; STD: Standard Deviation; PL: poverty line.
[a]Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000-2020.
[b]Beginning January 1, 2020, the Seguro Popular Program was dismantled and replaced by the Health Institute for Wellbeing (INSABI, by its initials in Spanish). This Institute was charged with ensuring the "free delivery of health services, medicines and other associated supplies" for people without Social Security coverage at all levels of care.[43]
[c]Factorial index calculated according to the 2000 factor loadings.
[d]Refers to any government conditional/non-conditional program, in particular, the recently canceled Conditional-Cash-Transfer Program known as Prospera (formerly Progresa or Oportunidades) (POP program).
[e]Based on the 2000, 2010 and 2020 Population Censuses, as well as data from the 2005 and 2015 Intercensal Surveys,[58] we first made linear predictions for the 2002-2008 and 2012-2018 survey waves. We then estimated a factorial and standardized index based on the factor loadings for 2000.
P-for-trend among FHHs: [§] < 0.001; [Ψ] < 0.01; [φ] < 0.05. *P*-for-trend among MHHs: [¥] < 0.001; [Ω] < 0.01; [Φ] < 0.05. *P*-val for the difference between FHHs and MHHs: *** < 0.001; ** < 0.01; * < 0.05; + < 0.10.

Table 2. Trends in household healthcare expenditure according to gender of head, Mexico, 2000-2020.

	2000-2006[a]		2008-2012[a]		2014-2018[a]		2020[a]	
	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed
No of households	50,358	14,138	48,664	16,152	119,745	43,434	62,683	25,516
%	78.08	21.92	75.08	24.92	73.39	26.61	71.08	28.92
	Calculated median (IQR) or percentage (95% CI)							
Among the total households								
TE, p50 (IQR)[b,§,¥]	3,035 (1,845, 5,070)	2,745 (1,666, 4,514)***	2,615 (1,643, 4,235)	2,437 (1,527, 3,923)***	1,500 (998, 2,331)	1,357 (901, 2,128)***	1,265 (869, 1,871)	1,168 (796, 1,746)***
Monetary, %[§,¥]	75.2 (75.0, 75.3)	69.5 (69.1, 69.8)***	75.4 (75.3, 75.6)	70.3 (70.0, 70.6)***	74.8 (74.7, 74.9)	69.3 (69.1, 69.5)***	74.0 (73.9, 74.2)	68.7 (68.5, 69.0)***
Non-monetary, %[§,¥]	24.8 (24.7, 25.0)	30.5 (30.2, 30.9)***	24.6 (24.4, 24.7)	29.7 (29.4, 30.0)***	25.2 (25.1, 25.3)	30.7 (30.5, 30.9)***	26.0 (25.8, 26.1)	31.3 (31.0, 31.5)***
FE, p50 (IQR)[b,§,¥]	1,047 (674, 1,574)	908 (578, 1,373)	963 (633, 1,435)	839 (546, 1,262)	620 (414, 913)	553 (363, 825)***	520 (351, 752)	468 (312, 684)***
Outside the household, %[§,¥]	20.7 (20.5, 20.9)	24.0 (23.5, 24.4)***	21.5 (21.3, 21.7)	24.1 (23.7, 24.5)***	24.0 (23.9, 24.2)	26.4 (26.1, 26.7)***	18.2 (18.0, 18.4)	20.0 (19.6, 20.3)***
Inside the household, %[§,¥]	79.3 (79.1, 79.5)	76.0 (75.6, 76.5)***	78.5 (78.3, 78.7)	75.9 (75.5, 76.3)***	76.0 (75.8, 76.1)	73.6 (73.3, 73.9)***	81.8 (81.6, 82.0)	80.0 (79.7, 80.4)***
Monetary, %[§,¥]	82.7 (82.5, 82.9)	78.3 (77.9, 78.8)***	83.8 (83.6, 84.0)	79.8 (79.4, 80.2)***	82.4 (82.3, 82.5)	78.2 (77.9, 78.4)***	82.3 (82.2, 82.5)	78.0 (77.7, 78.3)***
Non-monetary, %[§,¥]	17.3 (17.1, 17.5)	21.7 (21.2, 22.1)***	16.2 (16.0, 16.4)	20.2 (19.8, 20.6)***	17.6 (17.5, 17.7)	21.8 (21.6, 22.1)***	17.7 (17.5, 17.8)	22.0 (21.7, 22.3)***
CTP, p50 (IQR)[b,§,¥]	2,009 (1,056, 3,884)	1,856 (994, 3,476)	1,679 (915, 3,131)	1,604 (891, 2,918)	905 (525, 1,622)	829 (482, 1,492)	760 (461, 1,292)	711 (434, 1,218)
Reported HE>0, %[¥]	76.8 (76.4, 77.1)	76.0 (75.3, 76.7)[+]	62.0 (61.6, 62.4)	62.6 (61.9, 63.4)	62.7 (62.5, 63.0)	63.9 (63.4, 64.3)***	71.5 (71.2, 71.9)	73.7 (73.1, 74.2)***
If HE>0								
HE, p50 (IQR)[b,§,¥]	84.6 (29.9, 220.1)	87.6 (29.9, 226.5)[+]	56.0 (18.3, 155.0)	56.5 (18.8, 159.8)	30.3 (11.1, 81.4)	30.5 (11.4, 83.5)	25.8 (9.1, 72.9)	27.5 (9.5, 76.3)***
Monetary, %[§,¥]	69.6 (69.2, 70.0)	67.1 (66.3, 67.9)***	74.9 (74.5, 75.4)	72.5 (71.7, 73.3)***	72.3 (72.0, 72.6)	69.0 (68.4, 69.5)***	82.6 (82.3, 82.9)	79.5 (78.9, 80.0)***
Non-monetary, %[§,¥]	30.4 (30.0, 30.8)	32.9 (32.1, 33.7)***	25.1 (24.6, 25.5)	27.5 (26.7, 28.3)***	27.7 (27.4, 28.0)	31.0 (30.5, 31.6)***	17.4 (17.1, 17.7)	20.5 (20.0, 21.1)***
HE / TE, %[§,¥]	5.6 (5.5, 5.7)	6.2 (6.0, 6.3)***	4.7 (4.6, 4.8)	5.0 (4.8, 5.1)**	4.7 (4.7, 4.8)	5.1 (5.0, 5.2)***	4.9 (4.8, 5.0)	5.2 (5.1, 5.3)***
FE / TE, %[§,¥]	35.7 (35.6, 35.9)	34.4 (34.1, 34.7)***	37.2 (37.0, 37.3)	35.4 (35.1, 35.7)***	41.3 (41.2, 41.4)	40.7 (40.5, 40.9)***	41.8 (41.7, 42.0)	40.8 (40.6, 41.1)***
HE / FE, %[§,¥]	28.1 (26.3, 29.9)	32.6 (29.4, 35.7)*	21.4 (20.1, 22.7)	25.5 (22.3, 28.7)**	18.6 (18.0, 19.2)	20.9 (19.7, 22.0)***	19.6 (18.8, 20.4)	21.5 (20.2, 22.8)*
HE / CTP, %[φ,¥]	8.1 (8.0, 8.2)	8.7 (8.5, 9.0)***	6.9 (6.8, 7.0)	7.1 (6.9, 7.3)[+]	7.4 (7.3, 7.5)	7.8 (7.6, 7.9)***	7.6 (7.5, 7.7)	8.0 (7.8, 8.2)**

CI: confidence interval; TE: total quarterly household expenditure; p50: median; IQR: interquartile range; FE: quarterly food expenditure; CTP: quarterly capacity to pay; HE: quarterly health expenditure.
[a]Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000-2020.
[b]US$ dollars at constant 2018 prices.
P-for-trend among FHHs: [§] < 0.001; [Ψ] < 0.01; [φ] < 0.05. *P*-for-trend among MHHs: [¥] < 0.001; [Ω] < 0.01; [Φ] < 0.05. *P*-val for the difference between FHHs and MHHs: *** < 0.001; ** < 0.01; * < 0.05; + < 0.10.

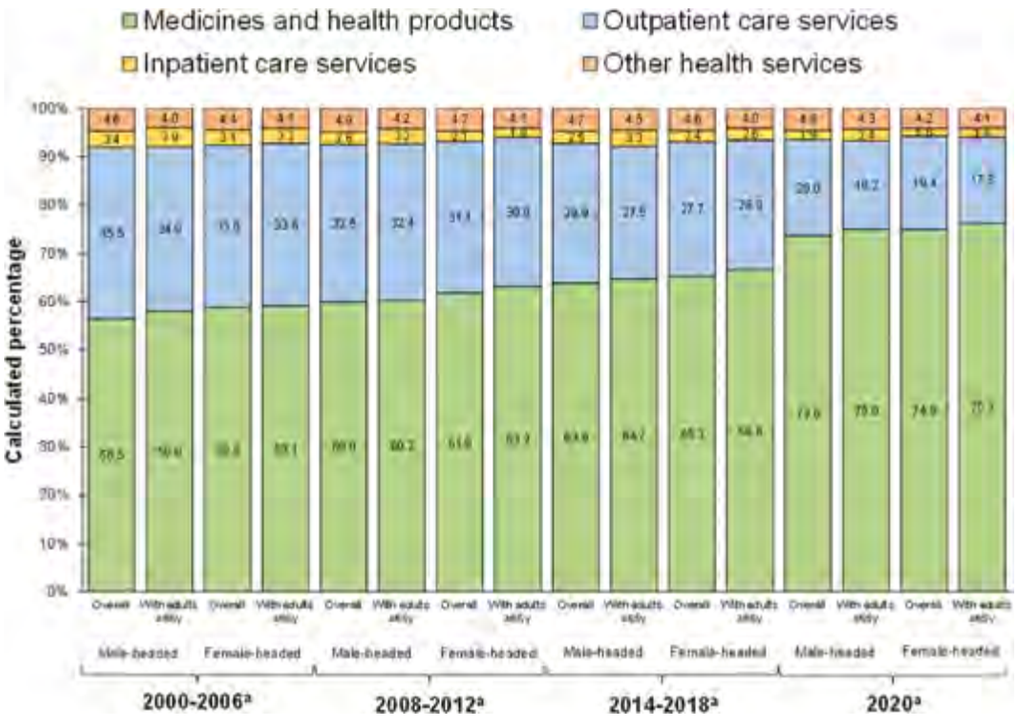


Figure 1. Trends in the distribution of health-care expenditure according to components and to gender of head in households with elderly members aged ≥65 years, Mexico, 2000–2020. [a]Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000–2020.

country, and lower in the more developed northern states (Figure 2).

Discussion

The evidence we present confirms our hypothesis that FHHs were at greater risk for health-related financial problems than MHHs in Mexico during the time period studied, possibly because of the interaction between gender and NCDs, with its direct implications for gender disparities and social inequality.[42] We provide robust evidence indicating that, from 2000 to 2020, FHHs in Mexico experienced greater health-related financial risks than MHHs, with an EHE percentage of 5.5% among FHHs compared to 4.6% for MHHs ($P < .001$). The incremental risk associated with the presence of elderly members in the household among FHHs was 13.1% greater than that for MHHs. EHE in FHHs with elderly members was not territorially random, being 133.3% higher in states with lower levels of social development.

Several gender-differentiated mechanisms shape the response to health needs, each with specific social impacts. The predominance of unpaid activities in FHHs reported in the literature stands out, with this type of work tending to increase with age and the presence of older family members. These additional pressures derive from the greater demand for health-care in these homes required to meet the needs of elderly household members. Our findings suggest that this phenomenon is associated with several vulnerability determinants.[45]

Although expenditures on medicines and other health products trended upward in both FHHs and MHHs with elderly members, from 2000 to 2020, these expenditures were higher in FHHs. Our findings are in line with other studies showing that pharmaceutical costs represent 34%-82% of health expenditures in households in LMICs, even in households with health insurance coverage.[46] Such levels of spending on medications highlight the need to review pharmaceutical coverage policies for essential drugs in Mexico. This evidence is consistent with previous findings indicating that even with the expansion of SP, the issue of access to medicines remains a pressing one, with SP proving largely unable to reduce out-of-pocket spending on medications.[47] This was particularly true with the presence of ≥2 NCDs in the household and the purchase of ≥3 prescribed medications; these conditions are more likely to be encountered in households with elderly members.[47] However, it is important to note that a discontinuity of 10 points upwards in the trend is seen after 2018 (Figure 1). The elimination of SP seems to have put even more pressure on families to spend money on medicines than before, while the current government

Table 3. Trends in adjusted probabilities of HE, CHE and EHE according to the gender of head of household and the presence of elderly aged ≥65 years, Mexico, 2000–2020.

	2000–2020[a]	2000–2006[a]	2008–2012[a]	2014–2018[a]	2020[a]
No of households	108,326	15,157	17,230	48,001	27,938
%	100	14.0	15.9	44.3	25.8
	Adjusted percentage (95% CI)				
Panel A. Health expenditure					
Overall					
Male-Headed	62.5 (62.1, 62.9)	71.9 (71.2, 72.7)	56.3 (55.4, 57.1)	57.9 (57.4, 58.4)	68.5 (67.8, 69.1)
Female-Headed	67.9 (67.5, 68.3)	76.7 (76.0, 77.4)	62.0 (61.2, 62.8)	63.6 (63.0, 64.1)	73.5 (72.9, 74.1)
Without elderly members (≥65y)					
Male-Headed	61.4 (60.9, 61.9)	71.0 (70.2, 71.8)	55.2 (54.3, 56.0)	56.8 (56.2, 57.4)	67.4 (66.8, 68.1)
Female-Headed	66.9 (66.5, 67.4)	75.8 (75.1, 76.6)	60.9 (60.1, 61.8)	62.5 (61.9, 63.1)	72.6 (71.9, 73.2)
With elderly members (≥65y)					
Male-Headed	65.1 (64.4, 65.9)	74.3 (73.3, 75.2)	59.0 (58.0, 60.1)	60.6 (59.8, 61.5)	70.9 (70.1, 71.7)
Female-Headed	70.4 (69.7, 71.1)	78.8 (77.9, 79.6)	64.6 (63.6, 65.7)	66.2 (65.4, 67.0)	75.7 (75.0, 76.5)
Incremental risk (%)	−5.9 (−6.5, −5.3)	−9.5 (−10.5, −8.5)	−3.7 (−4.1, −3.2)	−4.2 (−4.7, −3.7)	−8.1 (−9.0, −7.3)
Panel B. Catastrophic health expenditure					
Overall					
Male-Headed	3.9 (3.7, 4.2)	5.0 (4.6, 5.5)	3.9 (3.5, 4.3)	3.7 (3.4, 3.9)	3.8 (3.5, 4.1)
Female-Headed	4.7 (4.5, 4.9)	5.9 (5.4, 6.4)	4.7 (4.3, 5.2)	4.4 (4.1, 4.7)	4.6 (4.2, 4.9)
Without elderly members (≥65y)					
Male-Headed	3.6 (3.4, 3.8)	4.6 (4.2, 5.1)	3.6 (3.2, 4.0)	3.4 (3.1, 3.6)	3.5 (3.2, 3.8)
Female-Headed	4.3 (4.1, 4.6)	5.5 (4.9, 6.0)	4.3 (3.9, 4.8)	4.1 (3.8, 4.4)	4.2 (3.9, 4.5)
With elderly members (≥65y)					
Male-Headed	4.9 (4.4, 5.3)	6.1 (5.4, 6.9)	4.8 (4.2, 5.4)	4.5 (4.1, 5.0)	4.7 (4.2, 5.2)
Female-Headed	5.8 (5.3, 6.2)	7.1 (6.4, 7.9)	5.8 (5.1, 6.4)	5.4 (4.9, 5.9)	5.6 (5.0, 6.1)
Incremental risk (%)	14.5 (8.2, 20.8)	12.1 (5.8, 18.4)	15.0 (8.8, 21.3)	15.4 (9.0, 21.7)	13.9 (7.5, 20.4)
Panel C. Excessive health expenditure					
Overall					
Male-Headed	4.6 (4.4, 4.8)	5.8 (5.2, 6.3)	4.4 (4.0, 4.9)	4.3 (4.0, 4.6)	4.5 (4.2, 4.9)
Female-Headed	5.5 (5.3, 5.8)	6.7 (6.1, 7.3)	5.4 (4.9, 5.9)	5.2 (4.9, 5.6)	5.4 (5.0, 5.8)
Without elderly members (≥65y)					
Male-Headed	4.2 (3.9, 4.4)	5.3 (4.8, 5.8)	4.0 (3.6, 4.4)	3.9 (3.6, 4.2)	4.1 (3.8, 4.4)
Female-Headed	5.0 (4.8, 5.3)	6.2 (5.6, 6.7)	4.9 (4.4, 5.4)	4.8 (4.5, 5.1)	4.9 (4.5, 5.3)
With elderly members (≥65y)					
Male-Headed	5.8 (5.3, 6.3)	7.1 (6.4, 7.9)	5.6 (4.9, 6.2)	5.5 (4.9, 6.0)	5.7 (5.1, 6.2)
Female-Headed	6.9 (6.3, 7.4)	8.2 (7.4, 9.0)	6.7 (6.0, 7.4)	6.6 (6.0, 7.1)	6.7 (6.0, 7.3)
Incremental risk (%)	13.1 (7.0, 19.2)	9.5 (2.5, 16.5)	14.3 (8.4, 20.3)	14.5 (8.5, 20.4)	12.0 (5.5, 18.6)

CI: confidence interval; HE: quarterly health-care expenditure; CHE: catastrophic health-care expenditure; EHE: excessive health-care expenditure.
[a]Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000–2020.

struggles to set up an effective procurement mechanism after dismantling the previous one.[48]

Controlling for gender bias in care-seeking behavior allowed us to observe that structural conditions generate the described vulnerability. On the one hand, women often incur higher health expenditures, while at the same time having a lower income and lower total expenditures. Policies should consider the fact that women in FHHs have different priorities, needs, interests and resources than those in other households.[49] On the other hand, preferred ways of resolving health needs vary, as women tend to internalize the preferences of their family members and suffer from a lack of power or agency in family decision making. Higher levels of spending in FHHs may result from the fact that women are more inclined than men to seek services and to invest more of their own resources to obtain them.[38]

The U pattern observed in HE>0, CHE and EHE reflects a sustained decrease from 2000–2012, stagnation in 2014–2018, and a slight increase toward 2020. These changes are emblematic of two distinct periods as regards social policies and financial protection in health: the first was a time of expansion and consolidation, and the second, one of stagnation and contraction. In particular, for the first period, the positive effects of the SP on the financial protection of its affiliates have been documented,[50] as has its synergistic effects with the conditional cash transfer Progresa-Prospera-Oportunidades program.[51] Unfortunately, both programs, focused on the poorest households in Mexico, were canceled by the current administration in 2018.[50,52] This may have increased the risk of falling into or remaining in poverty, aggravating the lack of protection in social health of Mexican households and the fragmentation of the health system.[43,50,52,53] The design of effective health-system strategies specifically requires considering the role of social programs and policies in mitigating the negative impact of health expenditures. In Mexico, health-related financial risks dropped significantly during the implementation of



Figure 2. Quintiles of adjusted probability (2000-2020) of EHE by state among in FHHs with elderly members, Mexico. EHE: excessive health-care expenditure.

the SP from 2006 to 2012. This trend has shifted since 2013 as a result of budget cuts, lower public-health spending and the implementation of a new wave of health-system reforms.[52] In addition, the current administration has implemented social policies that have failed to meet policy goals aimed at ensuring gender equity and improving health indicators, despite increased finacial resources.[53,54] This outcome is relevant, as the greatest increase in health expenditures relates to the purchase of medicines and other health products. If the effects of the COVID-19 pandemic are included, it becomes apparent that these reforms had a recessionary effect in Mexico resulting in a lack of focus on NCDs. The increase in CHE and EHE expected in coming years, especially among vulnerable households, requires the implementation of effective financial and health social protection mechanisms that address the fundamental inequalities linked to gender from an intersectional perspective. Such initiatives must incorporate lessons learned and prioritize FHHs with elderly members or individuals suffering from ≥1 NCDs, as well as households in regions with high levels of social deprivation. In addition, policies to raise the income of FHHs are needed, whether this occurs through employment or increased subsidies.[55]

Although the survey analyzed constitutes the gold standard for measuring expenditures in Mexican households, its reliance on self-reporting entails the risk of memory bias, specifically regarding health, as relevant variables are frequently omitted. These include ethnicity, health needs and the consumption of specific medicines by household members; unfortunately, the survey from which we drew our analytical data did not systematically collect information pertaining to these variables. Despite employing a rigorous method that reduces potential gender bias in the demand preferences for health care resulting from observed factors,[56] the original sample size and its inferential power were limited. Furthermore, we do not rule out possible reverse causality between the gender of the head of household and positive spending on health. Correcting this bias would require an experimental design or the use of instrumental variables, approaches difficult to implement with the secondary data analyzed. Accordingly, our estimates should be considered conservative as regards the effect of gender on health-related financial risk.

Contrary to the methodology used by previous studies,[35,36] we adopted a comprehensive approach to measuring financial risk in health care, recognizing the relative importance of non-monetary sources and food consumption outside the home as part of total expenditures.[34] This could have reduced the potential underestimation of the financial burden on households caused by health problems and thus undermined comparability with other studies. In addition, the survey analyzed did not allow for defining a broader gender typology. Although recent surveys show that more than 99% of the Mexican population self-identifies as male or female,[57] we recognize the potential invisibility of other

genders; this aspect should be taken into account in future iterations of the survey.

Our findings support existing evidence concerning the key associations between gender and other social determinants. These connections bear on the possibility of achieving a number of SDGs, especially in the throes of a rapidly aging population, a growing burden of NCDs, and the expected exacerbation of health inequities as a result of COVID-19. All of these factors highlight the need to implement urgent measures that strengthen social protection in health incorporating a gender perspective.

The change in the nature of social policies in Mexico implemented by the current administration does not indicate a desire to redefine policy to help achieve gender equity in health, nor a commitment to allocate the needed resources. Public policies rooted in different perspectives such as anti-poverty and health programs should recognize the burden of unpaid work on women, often viewed as an inherent part of gender roles, and seek to correct the situation, while also considering the demographic composition of households.[58] Standardizing the incorporation of a gender perspective into the design and implementation of health policies would represent a significant advance toward the fulfillment of UHC. Mitigating power asymmetries between men and women is essential, as is adopting intersectional approaches. Decision makers should consider different levels of social vulnerability and incorporate lessons learned when designing, implementing or redirecting social policies and social protection systems.

Acknowledgments

We would like to express our special thanks for the insightful comments made by the members of the steering committee integrated by: Dra. Laura Flamand, Mtra. Michelle Ramírez, Dra. María de la Cruz Muradás, Mtra. Yahaira Ochoa, Dra. Mariana Irina González, Mtra. Julissa Chavira, Dr. Gustavo Nigenda and Dr. Imer Flores. We are also especially grateful to Blanca Laura Ortega Román and Liliana Ordaz Salazar for their role as general coordinator and research assistant of the project, and to Patricia E. Solis and Michael H. Sumner for their valuable assistance in translating this manuscript into English.

Contributors

ESM conceived the idea of the paper, led the formal analysis, and performed the data curation. EON supported the conceptual approach. ESM and EON wrote the first draft of the manuscript. CGL, JJM, SJ, LD, EF, IHP, LF, GN, RN and RL provided critical inputs on multiple iterations. ESM is the guarantor of the work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The final version of the manuscript was revised and approved by all authors.

Data Sharing

Data analyzed were obtained from the public repository of the National Income and Expenditure Household Survey, hosted at the National Institute for Statistics and Geography (INEGI) (available at https://www.inegi.org.mx/programas/enigh/).

Ethics Approval And Informed Consent

This study was approved by the Research, Biosafety and Ethics Committees of the National Institute of Public Health in Mexico (ID: CI-507-2022/CB22-173).

Memorial Quote

We dedicate this manuscript to our colleague, professor and friend, Sandra Sosa-Rubí, PhD, who passed away in March 2021; Sandra consistently inspired us in our analysis of equity and financial protection in health during her fruitful lifetime.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

This study was undertaken with funding from the Asociación Mexicana de Industrias de Investigación Farmacéutica A.C. (AMIIF). The funders had no say in the decisions related to study design, data analysis, interpretation, decision to publish, or preparation of the manuscript

ORCID

Emanuel Orozco-Núñez http://orcid.org/0000-0002-6550-7385

References

1. World Health Organization (WHO). Implementing health financing reform: lessons from countries in transition. In: Kutzin J, Cashin C, Jakab M, editors. Regional office for Europe, European observatory on health systems and policies 1st ed. World Health Organization. Regional Office for Europe; 2010. https://apps.who.int/iris/handle/10665/326420
2. World Health Organization (WHO). *global spending on health: weathering the storm*; 2020.
3. Comisión Económica para América Latina y el Caribe (CEPAL). *Las Reformas de Salud En América Latina y El Caribe: su Impacto En Los Principios de La Seguridad Social*; 2005.
4. United Nations Women (UN-Women). *Turning promises into action: gender equality in the 2030 agenda for sustainable development*; 2018.
5. Sen G, Govender V, El-Gamal S. *Universal health coverage, gender equality and social protection: a health*

systems approach; 2020. https://www.unwomen.org/en/digital-library/publications/2020/12/discussion-paper-universal-health-coverage-gender-equality-and-social-protection
6. Manandhar M, Hawkes S, Buse K, Nosrati E, Magar V. Gender, health and the 2030 agenda for sustainable development. Bull World Health Organ. 2018;96 (9):644–53. doi:10.2471/BLT.18.211607.
7. Jacobs B, Ir P, Bigdeli M, Annear PL, Van Damme W. Addressing access barriers to health services: an analytical framework for selecting appropriate interventions in low-income Asian countries. Health Policy Plan. 2012;27(4):288–300. doi:10.1093/heapol/czr038.
8. Schünemann J, Strulik H, Trimborn T. The gender gap in mortality: how much is explained by behavior? J Health Econ. 2017;54(July):79–90. doi:10.1016/j.jhealeco.2017.04.002.
9. Chiappori PA, Gandhi A, Salanie B, Salanie F. Identifying preferences under risk from discrete choices. Am Econ Rev. 2009;99(2):356–62. doi:10.1257/aer.99.2.356.
10. Said F, Mahmud M, D'Adda G, Chaudhry A. It is not power, but how you use it: experimental evidence on altruism from households in Pakistan. Appl Econ Lett. 2020;27(5):426–31. doi:10.1080/13504851.2019.1624912.
11. He H, Villeval MC. Are group members less inequality averse than individual decision makers? J Econ Behav Organ. 2017;138(June):111–24. doi:10.1016/j.jebo.2017.04.004.
12. Croson R, Gneezy U. Gender differences in preferences. J Econ Lit. 2009;47(2):448–74. doi:10.1257/jel.47.2.448.
13. Ahmed SM, Adams AM, Chowdhury M, Bhuiya A. Gender, socioeconomic development and health-seeking behaviour in Bangladesh. Soc Sci Med. 2000;51 (3):361–71. doi:10.1016/S0277-9536(99)00461-X.
14. NCD Risk Factor Colaboration (NCD-RisC) Americas Working Group. Trends in cardiometabolic risk factors in the Americas between 1980 and 2014: a pooled analysis of population-based surveys. Lancet Glob Heal. 2020;8(1):e123–e133. doi:10.1016/S2214-109X(19)30484-X.
15. Alegre-Díaz J, Herrington W, López-Cervantes M, Gnatiuc L, Ramirez R, Hill M, Baigent C, McCarthy MI, Lewington S, Collins R, et al. Diabetes and cause-specific mortality in Mexico City. N Engl J Med. 2016;375(20):1961–71. doi:10.1056/NEJMoa1605368.
16. Frenk J, Frejka T, Bobadilla JL, Stern , C, Lozano , R, Sepúlveda , J, Jos, M, et al. The epidemiologic transition in Latin America. Boletín la of Sanit Panam. 1991;111 (6):485–96.
17. Jing Z, Li J, Fu PP, Wang Y, Yuan Y, Zhao D, Hao W, Yu C, Zhou C. Catastrophic health expenditure among single empty-nest elderly with multimorbidity in rural Shandong, China: the effect of co-occurrence of frailty. Int J Equity Health. 2021;20(1):23. doi:10.1186/s12939-020-01362-6.
18. Salinas-Rodríguez A, De la Cruz-Góngora V, Manrique-Espinoza B. Health conditions, geriatric syndromes andnutritional status of older adults in Mexico. Salud Publica Mex. 2020;62(6):777–85. doi:10.21149/11840.
19. Rivera-Almaraz A, Manrique-Espinoza B, Chatterji S, Naidoo N, Kowal P, Salinas-Rodríguez A. Longitudinal associations of multimorbidity, disability and out-of-pocket health expenditures in households with older adults in Mexico: the study on global AGEing and adult health (SAGE). Disabil Health J. 2019;12 (4):665–72. doi:10.1016/j.dhjo.2019.03.004.
20. Salinas-Rodríguez A, Manrique-Espinoza B, Torres Mussot I, Montañez-Hernández JC. Out-of-pocket healthcare expenditures in dependent older adults: results from an economic evaluation study in Mexico. Front Public Heal. 2020;8(329):1–10. doi:10.3389/fpubh.2020.00329.
21. Wang Z, Li X, Chen M. Catastrophic health expenditures and its inequality in elderly households with chronic disease patients in China. Int J Equity Health. 2015;14(8):1–11. doi:10.1186/s12939-015-0134-6.
22. Abeldano A, Garrido J. Gender inequalities: GIS Approaches to gender analysis. In: Ozdenerol E, editor. Spatial concentration of social vulnerability and gender inequalities in Mexico 1st ed. CRC Press; 2021. p. 116–36. doi:10.1201/9780429196584.
23. Nugent R, Bertram MY, Jan S, Niessen LW, Sassi F, Jamison DT, Pier EG, Beaglehole R. Investing in non-communicable disease prevention and management to advance the sustainable development goals. Lancet. 2018;391(10134):2029–35. doi:10.1016/S0140-6736(18)30667-6.
24. Horton R. Offline: time to radically rethink non-communicable diseases. Lancet. 2019;393(10184):1922. doi:10.1016/S0140-6736(19)31038-4.
25. Gheorghe A, Griffiths U, Murphy A, Legido-Quigley H, Lamptey P, Perel P. The economic burden of cardiovascular disease and hypertension in low- and middle-income countries: a systematic review. BMC Public Health. 2018;18(1):975. doi:10.1186/s12889-018-5806-x.
26. Ganju A, Goulart AC, Ray A, Majumdar A, Jeffers BW, Llamosa G, Cañizares H, Ramos-Cañizares IJ, Fadhil I, Subramaniam K, et al. Systemic solutions for addressing non-communicable diseases in low- and middle-income countries. J Multidiscip Healthc. 2020;13(July):693–707. doi:10.2147/JMDH.S252300.
27. Murphy A, Palafox B, Walli-Attaei M, Powell-Jackson T, Rangarajan S, Alhabib KF, Avezum AJ, Calik KBT, Chifamba J, Choudhury T, et al. The household economic burden of non-communicable diseases in 18 countries. BMJ Glob Heal. 2020;5(2):e002040. doi:10.1136/bmjgh-2019-002040.
28. Organización Mundial de la Salud (OMS). *La Protección Financiera de La Salud En La Región de Las Américas. Métodos Para Medir El Gasto Catastrófico y Empobrecedo*. In: Métodos para los cálculos con microdatos 1st ed. Organización Panamericana de Salud (OPS); 2021. p. 19–22. doi:10.37774/9789275323823.
29. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Programas de información. Subsistema de Información Demográfica y Social.

Published; 2022. [accessed 2022 May 6]. https://www.inegi.org.mx/programas
30. Poirier MJP, Grépin KA, Grignon M. Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: a critical interpretive synthesis. Soc Indic Res. 2020;148(1):1–46. doi:10.1007/s11205-019-02187-9.
31. Consejo Nacional de Población (CONAPO). *Índice de marginación por Entidad Federativa y Municipio 2020. Nota Técnico-Metodológica*; 2021. https://www.gob.mx/cms/uploads/attachment/file/685354/Nota_te_cnica_IMEyM_2020.pdf
32. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Regiones socioeconómicas de México. Clasificación de Entidades Federativas. Published; 2004. [accessed 2020 Jun 16]. https://sc.inegi.org.mx/niveles/
33. United Nations (UN). Department of Economic and Social Affairs-Statistics Division. *Classification of Individual Consumption According to Purpose (COICOP) 2018*; 2018.
34. Serván-Mori E, Wirtz VJ. Monetary and nonmonetary household consumption of health services and the role of insurance benefits: an analysis of the Mexico's National Household Income and Expenditure Survey. Int J Health Plann Manage. 2018;33(4):847–59. doi:10.1002/hpm.2536.
35. Knaul FM, Arreola-Ornelas H, Méndez-Carniado O, Bryson-Cahn C, Barofsky J, Maguire R, Miranda M, Sesma S. Evidence is good for your health system: policy reform to remedy catastrophic and impoverishing health spending in Mexico. Lancet. 2006;368 (9549):1828–41. doi:10.1016/S0140-6736(06)69565-2.
36. Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multicountry analysis. Lancet. 2003;362 (9378):111–17. doi:10.1016/S0140-6736(03)13861-5.
37. Dittrich M, Leipold K. Gender differences in time preferences. Econ Lett. 2014;122(3):413–15. doi:10.1016/j.econlet.2014.01.002.
38. Onah MN, Horton S. Male-female differences in households' resource allocation and decision to seek healthcare in south-eastern Nigeria: results from a mixed methods study. Soc Sci Med. 2018;204(May):84–91. doi:10.1016/j.socscimed.2018.03.033.
39. Rosenbaum P, Rubin D. The central role of the propensity score in observational studies for causal effects. Biometrika. 1983;70:41–55.
40. Caliendo M, Kopeinig S. Some practical guidance for the implementation of propensity score matching. J Econ Surv. 2008;22(1):31–72. doi:10.1111/j.1467-6419.2007.00527.x.
41. Becker SO, Caliendo M. Sensitivity analysis for average treatment effects. Stata J. 2007;7(1):71–83. doi:10.1177/1536867X0700700104.
42. Cameron KA, Song J, Manheim LM, Dunlop DD. Gender disparities in health and healthcare use among older adults. J Women's Heal. 2010;19(9):1643–50. doi:10.1089/jwh.2009.1701.
43. Meneses-Navarro S, Pelcastre-Villafuerte B, Becerril-Montekio V, Serván-Mori E. Overcoming the health systems' segmentation to achieve universal health coverage in Mexico. Int J Health Plann Manage. 2022;37 (6):3357–64. doi:10.1002/hpm.3538.
44. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Subsistema de información demográfica y social. Censos y conteos de población y vivienda. [accessed 2018 Jun 22]. https://www.inegi.org.mx/programas/ccpv/2020/
45. He L, Zhou S. Household financial vulnerability to income and medical expenditure shocks: measurement and determinants. Int J Environ Res Public Health. 2022;19(4480):1–17. doi:10.3390/ijerph19084480.
46. Myint CY, Pavlova M, Groot W. Catastrophic health care expenditure in Myanmar: policy implications in leading progress towards universal health coverage. Int J Equity Health. 2019;18(1):118. doi:10.1186/s12939-019-1018-y.
47. Serván-Mori E, Heredia-Pi I, Montañez-Hernandez J, Avila-Burgos L, Wirtz VJ. Access to medicines by Seguro Popular beneficiaries: pending tasks towards universal health coverage. PLoS One. 2015;10(9):1–13. doi:10.1371/journal.pone.0136823.
48. Gómez-Dantés O, Dreser A, Wirtz VJ, Reich MR. Challenges of guaranteeing access to medicines in Mexico: lessons from recent changes in pharmaceuticals procurement. Heal Syst Reform. 2022;8 (1):2084221. doi:10.1080/23288604.2022.2084221.
49. Verdonk P, Benschop YWM, de Haes HCJM, Lagro-Janssen TLM. From gender bias to gender awareness in medical education. Adv Heal Sci Educ. 2009;14 (1):135–52. doi:10.1007/s10459-008-9100-z.
50. Knaul FM, Arreola-Ornelas H, Touchton M, McDonald, T, Blofield, M, Ávila-Burgos, L, Gómez-Dantes, O, Kuri , P, Mendez , O, Nargund, RS, et al. Setbacks in the quest for universal health coverage in Mexico: polarized politics, policy upheaval, and pandemic disruption. *Under Rev Lancet*. Published online 2022.
51. Serván-Mori E, Cerecero-García D, Heredia-Pi I, Pineda-Antúnez C, Sosa-Rubí S, Nigenda G. Improving the effective maternal-child health care coverage through synergies between supply and demand-side interventions: evidence from Mexico. J Glob Health. 2019;9 (2):1–12. doi:10.7189/jogh.09.020433.
52. Serván-Mori E, Gómez-Dantés O, Contreras-Loya D, Flamand , L, Cerecero-García , D, Arreola-Ornelas, H, Knaul , FM, et al. Changes in health care coverage, and catastrophic and impoverishing health expenditures in Mexico associated to the dissolution of Seguro popular. Under Rev Lancet Glob Heal. 2022. Published online. doi:10.2139/ssrn.4252674.
53. Reich MR. Restructuring health reform, Mexican style. Heal Syst Reform. 2020;6(1):e1763114. doi:10.1080/23288604.2020.1763114.
54. Garay C, Palmer-Rubin B, Poertner M. Organizational and partisan brokerage of social benefits: social policy linkages in Mexico. World Dev. 2020;136 (105103):1–12. doi:10.1016/j.worlddev.2020.105103.
55. Ibukun C, Komolafe E. Household catastrophic health expenditure: evidence from Nigeria. Microeconomics Macroecon. 2018;6(1):1–8. doi:10.5923/j.m2economics.20180601.01.

56. Diaz JJ, Handa S. An assessment of propensity score matching as a nonexperimental impact estimator: evidence from Mexico's PROGRESA Program. J Hum Resour. 2006;41(2):319–45. doi:10.3368/jhr.XLI.2.319.
57. Instituto Nacional de Estadística, Geografía e Informática (INEGI). Comunicado de prensa N° 340/22. Encuesta Nacional sobre Diversidad Sexual y de Género (ENDISEG) 2021. Published online 2021. p. 1–10. https://www.inegi.org.mx/investigacion/endiseg/2022/
58. Monroy-Gómez-Franco L. ¿Quién puede trabajar desde casa? Evidencia desde México. Estud Económicos. 2021;36(1):89–113. doi:10.24201/ee.v36i1.413.

Appendices

Appendix A. Logistic regression model of the association between gender of head of household and each covariate[a]

	Adjusted odds ratio	Robust 95% CI
Head of Household		
Age (in yrs.)	0.99	(0.99, 0.99)
Schooling		
None	1.81	(1.73, 1.90)
Elementary	1.26	(1.22, 1.30)
Secondary	1.11	(1.07, 1.14)
High school	0.82	(0.79, 0.85)
College	Ref.	
Marital status		
Married/free union	0.05	(0.04, 0.05)
Divorced/separated/widowed	2.18	(2.11, 2.25)
Single	Ref.	
Composition		
Unipersonal	0.55	(0.50, 0.60)
Nuclear	2.00	(1.83, 2.19)
Extended	2.08	(1.90, 2.27)
Composite	Ref.	
Any member aged 0–5	1.17	(1.14, 1.20)
Any member aged ≥55	1.16	(1.12, 1.21)
Any member aged ≥65	0.94	(0.91, 0.97)
No of equivalent adults	0.88	(0.87, 0.89)
Health insurance		
None	0.79	(0.76, 0.82)
Seguro Popular/INSABI[b]	1.02	(0.99, 1.06)
Social Security	0.85	(0.82, 0.88)
Mixture or private	Ref.	
SES index[c] (std)	1.27	(1.26, 1.29)
Beneficiary of any social program[d]	1.21	(1.17, 1.24)
Area of residence		
Urban	1.19	(1.16, 1.22)
Socioeconomic Region		
Lowest	1.13	(1.07, 1.19)
2	1.03	(0.98, 1.08)
3	0.96	(0.92, 1.01)
4	0.95	(0.90, 0.99)
5	0.86	(0.82, 0.90)
6	0.77	(0.73, 0.80)
Highest	Ref.	
Period		
2000–2006	0.81	(0.78, 0.83)
2008–2012	0.83	(0.81, 0.86)
2014–2018	0.89	(0.87, 0.92)
2020	Ref.	
Intercept	2.34	(2.08, 2.64)
Number of households	380,690	
Pseudo R^2	0.361	
Area under ROC curve	0.861	

CI: confidence interval; SES: socioeconomic status.

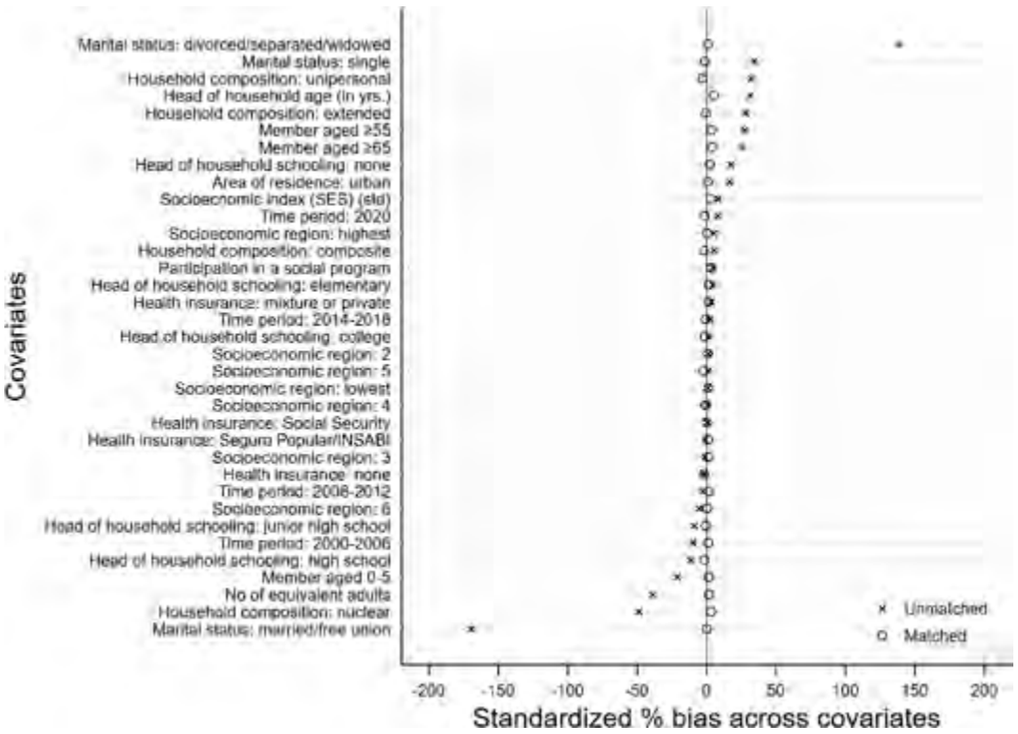
[a]Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000–2020.

[b]The Seguro Popular Program, a health-insurance scheme analogous to Social Security, has been recognized as the most important health-policy initiative implemented by Mexico in the 21st century.[53] Beginning January 1, 2020, this Program was dismantled and replaced by the Health Institute for Wellbeing (INSABI, by its initials in Spanish). The latter has been charged with ensuring the "free delivery of health services, medicines and other associated supplies" for people without Social Security coverage at all levels of care.[43] After three years of starting operations (2019–2022) INSABI was relegated to a seccondary role to garantee the provision of services, medicines and associated supplies.

[c]Factorial index calculated according to the factor loadings for 2000.

[d]Refers to any government conditional/non-conditional program, in particular, the recently canceled conditional-cash-transfer program known as Prospera (formerly Progresa and Oportunidades) (POP program).

Appendix B. Balance of covariates following propensity score matching



Note: Matching was performed using the 1:1 nearest-neighbor algorithm including caliper = 0.01, non-replacement, and common support. Average percentage absolute biases of 20.5% before and 1.5% after matching indicated a balance between comparison groups.

Appendix C. Sensitivity analysis: Mantel-Haenszel bounds for variable positive health-care expenditure

Gamma	Q_mh+	Q_mh-	p_mh+	p_mh-
1.000	19.581	19.581	0.000	0.000
1.050	15.745	23.420	0.000	0.000
1.100	12.091	27.085	0.000	0.000
1.150	8.601	30.591	0.000	0.000
1.200	5.261	33.952	0.000	0.000
1.250	2.058	37.181	0.020	0.000
1.300	1.007	40.287	0.157	0.000
1.350	3.968	43.281	0.000	0.000
1.400	6.822	46.171	0.000	0.000
1.450	9.576	48.964	0.000	0.000
1.500	12.238	51.666	0.000	0.000
1.550	14.813	54.285	0.000	0.000
1.600	17.308	56.825	0.000	0.000
1.650	19.728	59.291	0.000	0.000
1.700	22.077	61.688	0.000	0.000
1.750	24.359	64.019	0.000	0.000
1.800	26.579	66.290	0.000	0.000
1.850	28.739	68.501	0.000	0.000
1.900	30.843	70.659	0.000	0.000
1.950	32.895	72.763	0.000	0.000
2.000	34.896	74.819	0.000	0.000

Gamma: odds of differential assignment due to unobserved factors.
Q_mh+: Mantel-Haenszel statistic (assumption: overestimation of treatment effect).
Q_mh-: Mantel-Haenszel statistic (assumption: underestimation of treatment effect).
p_mh+: significance level (assumption: overestimation of treatment effect).
p_mh-: significance level (assumption: underestimation of treatment effect).
The Mantel-Haenszel (MH) statistic measured the influence of potential hidden bias on our estimations. This test calculated Rosenbaum bounds for average treatment effects on the treated in the presence of unobserved heterogeneity (hidden bias) between treatment and control cases, and provided bound estimates of significance levels at given levels of hidden bias under the assumption of either systematic over- or underestimation of treatment effects. Our results suggest that matching estimations were insensitive to a hidden bias.

Appendix D. Effect of gender of head of household on positive health-care expenditure, according to matching algorithms

		Average treatment on the treated (ATT)			
	Unmatched (naïve model)	1:1 nearest neighbor	Local linear regression	Kernel	Radius
Gender of household head: Female	0.711	0.675	0.679	0.679	0.679
Gender of household head: Male	0.668	0.619	0.630	0.628	0.629
Difference ± SE	0.043 ± 0.002	0.061 ± 0.003	0.049 ± 0.004	0.051 ± 0.003	0.050 ± 0.003

Matching included caliper = 0.01, non-replacement and common support.

Electronic supplementary material:
The online version of this article contains supplementary material.

journal of global health

© 2023 The Author(s)

Cite as: Garcia-Diaz R, Sosa-Rubí SG, Lozano Rafael, Serván-Mori Edson. Equity in out-of-pocket health expenditure: Evidence from a health insurance program reform in Mexico. J Glob Health 2023;13:04134.

PAPERS

Equity in out-of-pocket health expenditure: Evidence from a health insurance program reform in Mexico

Rocío Garcia-Diaz[1], Sandra G Sosa-Rubí[2], Rafael Lozano[3,4], Edson Serván-Mori[2]

[1]Tecnologico de Monterrey, School of Social Science and Government, Monterrey, N.L., México
[2]Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Morelos, Mexico
[3]Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA
[4]School of Medicine, National Autonomous University of Mexico, Mexico City, Mexico

Background The segmentation and fragmentation of health systems in low- and middle-income countries (LMICs) deepens health inequities and shifts the economic burden of health care to families via out-of-pocket spending (OOPHE). This problem has been addressed by introducing public health insurance programs for poor people; however, there is a lack of knowledge about how equitable these programs are. We aimed to analyse the long-term effects of the *Seguro Popular* (*SP*) voluntary health insurance program, recently phased out and replaced by the Health Institute for Welfare (*Instituto de Salud para el Bienestar* (*INSABI*)), on OOPHE equity in the poor Mexican population.

Methods We conducted a pooled cross-sectional analysis using eleven waves of the National Household Income and Expenditure Survey (2002-2020). We identified the effect of *SP* by selecting households without social security (with *SP* or without health insurance (n = 169 766)) and matched them by propensity score to reduce bias in the decision to enrol in *SP*. We estimated horizontal and vertical equity metrics and assessed their evolution across subpopulations.

Results The program's entry years (2003-2010) show a positive redistributive effect associated with a focalised stage of the program, while oversaturation could have diluted these effects during 2010-2014, with adverse results in terms of vertical equity and re-ranking among insured families. *SP* is more horizontally inequitable than for those uninsured. Within *SP*, the redistributive effect could improve up to 13% if all families with similar expenditures were spending equal OOPHE and horizontal equity was eliminated. Regarding vertical equity, *SP* outperforms the insured population with middle-range coverage some years after the implementation, but this progress disappears.

Conclusions To achieve universal health coverage, health authorities need to create and execute financial protection mechanisms that effectively address structural inequalities. This involves implementing a more comprehensive risk-pooling mechanism that makes social insurance sustainable in the long-run by increasing the social-economic influx of resources. It is essential to monitor oversaturation and financial sustainability to achieve optimal results. The replacement of the *SP* with *INSABI* highlights the complexity of maintaining a social insurance program where the ideology of different governments can influence the program structure, regulation, financing, and even its existence.

Correspondence to:
Edson Serván-Mori, PhD
Center for Health Systems Research,
The National Institute of Public Health
Cuernavaca, Morelos 62100
Mexico
eservan@insp.mx

Equity in health financing is a key concern of health systems worldwide, particularly segmented and fragmented ones [1,2]. Health systems must guarantee equitable access to effective and timely health services. However, accessing health services can lead to individuals, mainly those from vulnerable populations, using significant portions of their disposable income to pay privately and compromising their welfare [3,4].

García-Díaz R, Sosa-Rubí SG, Lozano R, Serván-Mori E. Equity in out-of-pocket health expenditure: Evidence from a health insurance program reform in Mexico. J Glob Health. 2023;13:04134. https://doi.org/10.7189/jogh.13.04134

Some studies have analysed equity in all income sources to finance health care reforms in developing and developed countries [5-8]. From all these income sources, out-of-pocket health care expenditure (OOPHE) is recognized as the most unjust, inequitable, and inefficient way to finance health care [9]. Its financial burden is heavier in low- and middle-income countries (LMICs) [10], making its reduction a policy objective in implementing social insurance reforms to remedy regressivity and reduce health care costs for poorer households [11]. The absence of risk pooling mechanisms that limit the consumption of health care by the poor is a critical issue of the segmented and fragmented health system in developing countries [12,13].

Financial risk protection is a key element of universal health coverage (UHC) and the Sustainable Development Goal (SDG) 3.8.2 indicators [14,15]. Social and public insurance schemes, frequently featuring risk-pooling mechanisms, have been proposed by several LMICs as a financing tool to reduce the share of OOPHE [11].

Based on public health evidence, the Mexican Congress approved a reform in 2003 to provide social protection in health to those lacking social security through the System for Social Protection in Health and its financial arm, *Seguro Popular* (*SP*) [16], a public health insurance scheme targeting the poorest uninsured groups. Enrolment in the *SP* was not dependent on health status or pre-existing illness and required no co-payment based on the type of health care received [17,18]. Previous studies have suggested that this program, cancelled in December 2018, has had several positive effects: it contributed to reduced catastrophic and/or impoverishing health spending by its beneficiaries [18], reported greater use and effectiveness of health services [19,20], and exhibited synergistic benefits with other programs such as the conditional cash transfer program (*Progresa-Oportunidades-Prospera* (*POP*)), also cancelled in 2018, in reducing gaps in access to and utilisation of essential health services [21]. Studies have even suggested that it had positive effects on mortality [22,23]. However, a recent literature review highlighted a gap in knowledge regarding the program's equity effects [24].

We hypothesised that the deterioration in financial protection in the health system for the most vulnerable population in Mexico has led to increased horizontal inequity in health, as measured by unequal OOPHE [25]. Specifically, we expect that OOPHE is unequal in households with a similar ability to pay and that it varies by household socioeconomic status and health financing situation. Thus, improving equity aspects of the health programs could lead to a reduction in redistribution of OOPHE across different households.

For this, we follow the approach suggested by Duclos et al. [26] to inequality decomposition into horizontal inequity, vertical inequity, and re-ranking. The analysis is based on a social welfare function aggregating individual utilities across populations using rank-dependent ethical weights. This provides ethical flexibility to implement sensitivity checks on equity effects in terms of OOPHE that result from *SP* across time and in comparisons with uninsured households and has the advantage of tackling issues of identification of equal households in the expenditure distribution using nonparametric estimation [27,28].

Our study is closest to that of Cavagnero and Bilger [29], who analysed the health financing program reform in Argentina 2001/2002 for all income sources in the health system. Their methodology allows us to assess different aspects of OOPHE for *SP* beneficiaries and households with no insurance. However, there are some differences in the analysis. Instead of covering all sources of health care expenditures, we focus solely on OOPHE associated with a household's health insurance status. We conduct a long-term equity (horizontal and vertical) analysis of the *SP* program and uninsured populations at different time points, allowing us to examine how equity measures change over time and in relation to *SP* enrolment, highlighting periods of possible oversaturation of the program.

METHODS

Settings

We conducted a pooled cross-sectional analysis based on eleven waves of the National Income and Expenditure Household Survey (ENIGH) (2000-2020) [30], a probabilistic, cross-sectional survey implemented biannually since 1992 and administered and managed by the National Institute for Statistics and Geography (*Instituto Nacional de Estadística, Geografía e Informática* (*INEGI*)). It includes a standardised set of income and expense questions and is the most complete source of data of health spending in Mexico.

During 2000-2020, *INEGI*-trained personnel administered face-to-face surveys to 390 313 households, among which we selected households without social security, including those without health insurance (n = 77 496) and those affiliated exclusively to *SP* (n = 97 608). After excluding 3% of households with incomplete data or implausible values in the variables of interest for this study, we obtained an analysis sample of 169 766 households.

Measures

We began by calculating the total quarterly consumption for each household by adding expenditures on food and beverages, transportation and communication, housing and services, personal care, education, and OOPHE, among others. We defined OOPHE according to the Classification of Individual Consumption by Purpose (COICOP) 2018 [31], including expenditures for medicines and other health products, outpatient care, inpatient care services, and other services (e.g. laboratory analyses and dental services). We also calculated household capacity to pay according to the poverty line defined by Xu's approach [32]. Expenditure figures are those incurred during the quarter prior to the survey and are expressed in international purchasing power parity dollars (PPP) constant of 2013. Following previous studies, we complemented the OOPHE with expenditure outside the home and both the monetary and non-monetary components of household spending [33].

We classified households according to the two types of members' medical insurance (*SP* and no insurance affiliation) and created a binary variable accordingly (affiliation to *SP* = one, no health insurance = 0) [17].

We also included the following covariates:

1) Household: age, schooling, employment and marital status of household heads, composition (unipersonal, nuclear, extended or composite), presence of members aged 0-5, ≥55, and ≥65 years, number of equivalent adults, and a factorial index of assets and housing materials as measures of socioeconomic status [34], calculated based on the factor loadings for 2000, where higher values indicated better housing conditions, the participation in a government conditional/non-conditional transfer program.
2) Place of residence: rural/urban (urban ≥2500 inhabitants), access to public services, housing conditions and income according to a social-deprivation index [35] (where higher values indicated more socially developed municipalities), municipality coverage of *SP* (% among population without social security), municipality density (×1000 inhabitants without social security) of primary care clinics, inpatient hospital beds (or those in service installed in the hospitalisation area), physicians and dentists, physicians-in-training, and nurses. We obtained the total number of people affiliated with *SP* at the municipal level from the administrative data of *SP* (2003-2019) [36] and the 2020 Mexican Census. We retrieved the total number of people without social security from projections of the National Population Council 1990-2012 [37], the 2015 Intercensal Survey, and the 2020 Mexican Census [38]. We predicted the population without social security at the municipal level for 2013, 2014, 2016-2019 using a linear regression model with robust standard errors for each state. We obtained data on health resources from the Ministry of Health's Health Care Equipment, Human Resources, and Infrastructure Information Subsystem [39]. Finally, we grouped the 32 Mexican states into seven socioeconomic regions, with one representing the lowest and seven the highest level of development [40].

Definition of equity point estimates

Using the quarterly consumption distribution (X), we obtained the net expenditure distribution (N) when discounting OOPHE. Therefore, the relative change in inequality that results from the effects of OOPHE is:

$$\text{Equation 1)}\quad \Delta I = I_X - I_N$$

The redistributive change in inequality due to OOPHE identifies the elements of financial protection a social insurance program may have. A positive ΔI means that OOPHE in richer households is higher than in poorer households, causing a reduction in net expenditure distribution, while a negative one suggests OOPHE increases inequality due to higher OOPHE in poorer households. When ΔI identical to zero, either the distribution of OOPHE is equally proportional to the gross expenditure distribution, or families are not spending in health. The redistributive change in inequality due to OOPHE can be decomposed as:

$$\text{Equation 2)}\quad \Delta I = I_X - I_N = \underbrace{\left(I_X - I_N^E\right)}_{V} - \underbrace{\left(I_N^P - I_N^E\right)}_{H>0} - \underbrace{\left(I_N - I_N^P\right)}_{R>0}$$

The decomposition results in a series of inequality and concentration indexes (Appendix 1 in the **Online Supplementary Document**). First, vertical equity (V) is the decrease in inequality caused by a health system that treats equals equally. To compute it, artificial groups of expenditure equals must be constructed and purged from within group inequality to obtain I_N^E. V is then captured in the difference between $I_X - I_N^E$, which is the progressivity of the OOPHE when horizontal inequity is removed. The second component is horizontal inequity, which measures the increase of inequality due to an unequal net expenditure treatment of households that were initially equal. That is, the difference $I_N^E - I_N^P$ is a consequence of inequality within

groups of households equals in terms of expenditure I_N^P. The last component is the re-ranking effect, which identifies households that have changed rankings order in the expenditure distribution due to OOPHE.

Analysis

We analysed data using Stata, version 17 MP (StataCorp LLC, College Station, Texas, USA). We first described the households' sociodemographic characteristics and their health expenditures by type of insurance (*SP* and no-*SP*). We then constructed unadjusted linear (for continuous variables) and logistic regression models (for binary variables) to assess independence between groups.

Two aspects were key in analysing the effect of *SP* on OOPHE and its associated equity aspects – accounting for the potential bias of the decision to buy the insurance and identifying equal households in the gross expenditure distribution to assess horizontal inequity in equation 1. In the case of selection bias to buy insurance, we hypothesised that households that were regularly incurring or expecting health expenditures soon were more likely to buy or enrol in a program than those who were not. To assess this source of bias, we used pooled propensity-score matching [41]. We used multiple logistic regression models to estimate the propensity scores (Appendix 2 in the **Online Supplementary Document**) and matched the study sample for all selected covariates [17,42-45]. We use the 1-1 nearest-neighbor algorithm, including caliper = 0.01, non-replacement, and common support. We examined balance in covariates and found balance between comparison groups (Appendix 3 in the **Online Supplementary Document**) [46]. We also found that the matching estimations were insensitive to a hidden bias after computing Mantel Haenszel test (Appendix 4 in the **Online Supplementary Document**) [47,48].

We performed horizontal and vertical equity analyses among 65 990 matched households. To measure horizontal equity, we used non-parametric estimation to estimate a conditional net expenditure density, allowing us to derive the horizontal inequity measure in Equation 2. We obtained the normative measurement using the inequality indices of gross expenditures, net expenditures, and concentration coefficients of net expenditures according to the ranking of pre-OOPHE expenditures and simulated net expenditures. The analysis is a two-step process, with the first stage being a statistical exercise and the second being the normative measurement. **Figure 1** presents the resulst of the statistical analysis on a pooled sample of ENIGH surveys conducted between 2000 and 2020, showing equivalent expenditure, net equivalent expenditure, and expected equivalent expenditures (the white dots).

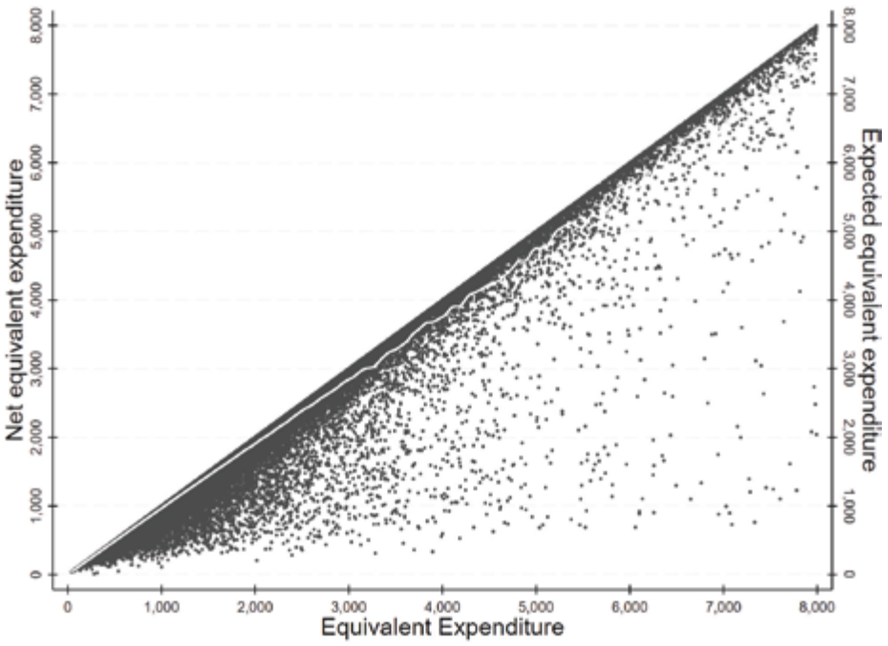


Figure 1. Out-of-pocket health expenditure in Mexico, 2002. Author's calculations using ENIGH for year 2002. The out-of-pocket health expenditure corresponds to all private health expenditures paid by households in a year.

RESULTS

Descriptive analysis

Households affiliated with *SP* compared to those who have not had slightly older heads of household, with less schooling, greater participation in the labor market, and a higher proportion of men, married, or living in common-law unions (**Table 1**). A higher proportion of these households were nuclear or extended (89.4% vs 81.3%), had children aged 0-5 years (34.8% vs 27.8%), and adults aged ≥65 years (22.8% vs 21.3%). These households also had equivalent number of adults (2.6 vs 2.4), lower socioeconomic level, much higher participation in social programs (50.1% vs 22.6%), residing mostly in rural settings (56.5% vs 35.0%), greater social deprivation, and located in less developed states. Propensity score matching statistically balanced both types of households on all observable covariates (**Table 1**).

Among matched households, differences in quarterly spending and in the financial burden of health care stand out (**Table 2**). Compared to non-*SP* households, those affiliated with *SP* reported lower total quarterly median expenditure ($PPP1972.3 vs $PPP2083.3; $P<0.001$) and on food ($PPP865.4 vs $PPP893.2; $P<0.001$), greater reliance on the non-cash component of spending, lower spending on food outside the household, as well as a lower capacity to pay ($PPP1157.3 vs $PPP1276.2; $P<0.001$) and a higher probability of spending on health (65.6% vs 60.8%; $P<0.001$). Among households that incurred health spending

Table 1. Overall characteristics of analysed households according to *Seguro Popular* and/or *INSABI* affiliation before and after matching process, Mexico 2000-2020, presented as calculated average of percentage (95% confidence interval) unless otherwise specified*

	Before matching		After matching	
	***Seguro Popular*†**	**Without health insurance**	***Seguro Popular*†**	**Without health insurance**
Number of households, n (%)	96 496 (56.84)	73 270 (43.16)	32 951 (50.00)	32 951 (50.00)
Head of household				
Average age in years	48.88 (48.77, 48.98)††	48.47 (48.35, 48.59)	48.15 (47.98, 48.33)	48.02 (47.84, 48.19)
Female	25.68 (25.41, 25.96)	25.25 (24.93, 25.56)	26.51 (26.03, 26.98)	26.35 (25.87, 26.82)
Schooling				
None	13.52 (13.30, 13.74)‡‡	13.97 (13.72, 14.22)	11.73 (11.39, 12.08)	11.85 (11.50, 12.20)
Elementary	47.20 (46.89, 47.52)††	42.96 (42.60, 43.32)	41.46 (40.93, 41.99)	41.23 (40.70, 41.76)
Secondary	26.82 (26.54, 27.10)††	20.41 (20.12, 20.70)	25.38 (24.91, 25.85)	25.06 (24.60, 25.53)
High school	8.16 (7.99, 8.33)††	10.44 (10.22, 10.66)	11.96 (11.61, 12.31)	12.06 (11.71, 12.41)
College or over	4.29 (4.17, 4.42)††	12.22 (11.98, 12.45)	9.47 (9.15, 9.78)	9.79 (9.47, 10.11)
Employed in the last month	80.82 (80.57, 81.07)††	78.56 (78.26, 78.86)	79.66 (79.22, 80.09)	80.13 (79.70, 80.56)
Marital status				
Married/free union	73.65 (73.37, 73.93)††	65.41 (65.07, 65.76)	65.94 (65.43, 66.45)	65.38 (64.87, 65.89)
Divorced/separated/widowed	20.93 (20.68, 21.19)††	24.37 (24.06, 24.68)	24.69 (24.23, 25.16)	24.72 (24.25, 25.18)
Single	5.42 (5.28, 5.56)††	10.22 (10.00, 10.44)	9.37 (9.05, 9.68)§§	9.91 (9.58, 10.23)
Household				
Composition				
Unipersonal	9.82 (9.63, 10.01)††	17.90 (17.63, 18.18)	17.54 (17.13, 17.95)	18.22 (17.80, 18.64)
Nuclear	67.07 (66.77, 67.36)††	63.89 (63.54, 64.24)	65.24 (64.72, 65.75)	64.68 (64.17, 65.20)
Extended	22.40 (22.13, 22.66)††	17.40 (17.12, 17.67)	16.43 (16.03, 16.83)	16.32 (15.92, 16.71)
Composite	0.72 (0.66, 0.77)§§	0.81 (0.75, 0.88)	0.79 (0.69, 0.88)	0.78 (0.68, 0.87)
Any member aged 0-5	34.75 (34.45, 35.05)††	27.83 (27.51, 28.16)	27.32 (26.84, 27.80)	27.00 (26.52, 27.48)
Any member aged ≥55	38.47 (38.16, 38.78)§§	37.85 (37.50, 38.20)	36.42 (35.90, 36.94)	36.25 (35.73, 36.77)
Any member aged ≥65	22.78 (22.52, 23.05)††	21.29 (21.00, 21.59)	19.69 (19.26, 20.12)	19.40 (18.97, 19.82)
Number of equivalent adults, average	2.64 (2.64, 2.65)††	2.41 (2.40, 2.42)	2.37 (2.36, 2.38)	2.36 (2.35, 2.38)
SES index, mean (SD)‡	-0.02 (-0.03, -0.01)††	0.03 (0.02, 0.04)	0.16 (0.15, 0.17)	0.16 (0.14, 0.17)
Beneficiary of any social program§	50.10 (49.78, 50.41)††	22.59 (22.28, 22.89)	25.49 (25.02, 25.96)	25.64 (25.17, 26.11)
Area of residence				
Urban	43.52 (43.21, 43.84)††	64.99 (64.65, 65.34)	58.82 (58.29, 59.35)	59.18 (58.65, 59.71)
Social deprivation index, mean (SD)‖	-0.08 (-0.08, -0.07)††	0.10 (0.09, 0.11)	-0.20 (-0.21, -0.19)	-0.19 (-0.20, -0.18)
Coverage of *Seguro Popular*¶	77.43 (77.30, 77.56)††	39.21 (38.95, 39.46)	68.42 (68.18, 68.67)††	67.72 (67.45, 67.99)
Density of primary care clinics**	0.68 (0.68, 0.68)††	0.62 (0.62, 0.62)	0.67 (0.67, 0.68)	0.67 (0.66, 0.67)
Density of inpatient hospital beds**	0.55 (0.55, 0.56)††	0.71 (0.71, 0.72)	0.66 (0.65, 0.67)	0.66 (0.65, 0.67)
Density of physicians and dentists**	1.21 (1.21, 1.22)	1.20 (1.20, 1.21)	1.29 (1.28, 1.31)	1.29 (1.28, 1.30)
Density of physicians-in-training**	0.38 (0.38, 0.39)††	0.44 (0.44, 0.45)	0.44 (0.43, 0.44)	0.44 (0.43, 0.44)
Density of nurses**	2.29 (2.28, 2.31)††	2.19 (2.17, 2.20)	2.51 (2.48, 2.54)	2.50 (2.47, 2.52)

Table 1. continued

	Before matching		After matching	
	Seguro Popular†	Without health insurance	*Seguro Popular*†	Without health insurance
Socioeconomic region				
Lowest	14.93 (14.71, 15.16)††	12.99 (12.74, 13.23)	13.25 (12.88, 13.61)	13.63 (13.26, 14.00)
2	21.70 (21.44, 21.96)††	18.40 (18.12, 18.68)	17.49 (17.08, 17.90)	17.32 (16.91, 17.73)
3	17.12 (16.88, 17.36)††	14.68 (14.43, 14.94)	16.02 (15.63, 16.42)	15.72 (15.33, 16.12)
4	25.14 (24.87, 25.41)††	22.82 (22.51, 23.12)	24.94 (24.47, 25.41)	24.91 (24.45, 25.38)
5	11.69 (11.49, 11.89)††	13.25 (13.00, 13.50)	14.67 (14.29, 15.06)	14.60 (14.22, 14.98)
6	7.72 (7.55, 7.89)††	11.54 (11.31, 11.78)	10.36 (10.03, 10.69)	10.38 (10.05, 10.71)
Highest	1.70 (1.62, 1.78)††	6.32 (6.14, 6.50)	3.27 (3.08, 3.46)	3.43 (3.23, 3.63)

CI – confidence interval, SES – socioeconomic status, SD – standard deviation
*Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000-2020.
†Beginning 1 January 2020, *Seguro Popular* was dismantled and replaced by *INSABI*, which was charged with ensuring the "free delivery of health services, medicines and other associated supplies" for people without Social Security coverage at all levels of care [49].
‡Factorial index calculated according to the 2000 factor loadings.
§Refers to any government conditional/non-conditional program, particularly he recently cancelled Conditional-Cash-Transfer Program known as *Prospera* (formerly *Progresa or Oportunidades*) (*POP*).
‖Based on the 2000, 2010 and 2020 Population Censuses, as well as data from the 2005 and 2015 Intercensal Surveys [35]. We first made linear predictions for the 2002-2008 and 2012-2018 survey waves. We then estimated a factorial and standardized index based on the factor loadings for 2000.
¶Among population without social security.
**×1000 inhabitants without social security.
††$P<0.001$.
‡‡$P<0.01$.
§§$P<0.05$

Table 2. Out-of-pocket health expenditure in households according to *Seguro Popular* affiliation after matching process, Mexico 2000 -2020, presented as percentages (95% confidence interval) unless otherwise specified*

Number of households (%)	*Seguro Popular*†	Without health insurance
	32 951 (50.00)	32 951 (50.00)
Total households		
Total household expenditure, median (IQR)†	1972.29 (1330.33, 2926.12)‡	2083.25 (1349.11, 3335.01)
Monetary	70.10 (69.88, 70.32)‡	71.51 (71.29, 71.73)
Non-monetary	29.90 (29.68, 30.12)‡	28.49 (28.27, 28.71)
Food expenditure, median (IQR)†	865.38 (578.79, 1264.05)‡	893.22 (584.99, 1347.73)
Outside the household	21.67 (21.38, 21.95)‡	24.09 (23.78, 24.39)
Inside the household	78.33 (78.05, 78.62)‡	75.91 (75.61, 76.22)
Monetary	77.55 (77.27, 77.83)‡	78.29 (78.01, 78.58)
Non-monetary	22.45 (22.17, 22.73)‡	21.71 (21.42, 21.99)
Food expenditure/total household expenditure, % (95% CI)	45.28 (45.11, 45.44)‡	43.96 (43.79, 44.14)
Capacity to pay, median (IQR)†	1157.27 (700.19, 1952.47)‡	1276.24 (714.63, 2349.71)
Reported OOPHE>0	65.58 (65.06, 66.09)‡	60.81 (60.28, 61.33)
If OOPHE>0		
OOPHE, median (IQR)†	42.97 (15.32, 114.52)	42.89 (13.92, 118.08)
Monetary	75.12 (74.58, 75.65)‡	86.25 (85.81, 86.69)
Non-monetary	24.88 (24.35, 25.42)‡	13.75 (13.31, 14.19)
Medicines and health products	67.70 (67.24, 68.16)‡	69.05 (68.59, 69.52)
Outpatient care services	25.16 (24.76, 25.56)	24.91 (24.49, 25.33)
Inpatient care services	2.18 (2.00, 2.35)	2.12 (1.95, 2.30)
Other health services	4.97 (4.75, 5.19)‡	3.91 (3.72, 4.11)
OOPHE/total household expenditure	5.04 (4.92, 5.16)‡	4.56 (4.44, 4.67)
OOPHE/food expenditure	19.36 (17.82, 20.89)	18.06 (16.94, 19.19)
OOPHE/capacity to pay	7.85 (7.68, 8.01)‡	7.01 (6.84, 7.17)

SES – socioeconomic status, IQR – interquartile range, OOPHE – out-of-pocket health expenditure
*Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2020 waves of the National Household Income and Expenditure Survey, 2000-2020.
†Beginning 1 January 2020, *Seguro Popular* was dismantled and replaced by *INSABI*, which was charged with ensuring the "free delivery of health services, medicines and other associated supplies" for people without Social Security coverage at all levels of care [49].
‡$P<0.001$.

during the quarter prior to being surveyed, the quarterly OOPEH was similar in *SP* and non-*SP* households ($PPP43); however the weight of the non-monetary component in OOPEH was almost 2-fold among households affiliated with *SP* (24.9% vs 13.7%; $P<0.001$), while the distribution of OOPEH by component was similar (68% on medicines, 25% on ambulatory care, 2% on hospitalisations, and the rest on other health services or goods). The OOPEH/Total household expenditure and OOPEH/Capacity to pay ratios were also higher among households with *SP* (5.0% vs 4.6%; $P<0.001$ and 7.8% vs 7.0%; $P<0.001$ respectively), while the OOPEH/Food expenditure ratio was similar (20%).

Equity analysis

Table 3 shows the result of Equation 2 decomposition for all the population and different subpopulations according to their health insurance status in all years in the analysis. Each panel shows changes in inequality ΔI, followed by the equity estimates on vertical inequity (V), horizontal inequity (H), and re-ranking (R) in all years. The upper panel is the subpopulation without insurance and the lower panel is the subpopulation with *SP*. For all populations, when statistically significant, OOPEH has increased inequality in expenditures. We observed that the years after the implementation of *SP* had more significant increase in changes in inequality when compared to households without insurance (0.0237 for *SP* vs 0.009 for non-insured households in 2006 and 0.005 for *SP* vs 0.003 for non-insured households in 2020).

The last three rows in each panel of **Table 3** present the decomposition of these changes in inequality across different insurance statuses. V is normally referred to in the literature as the main determinant of a change in inequality. We expect vertical inequity to dominate the changes in inequality as it happens in **Table 3**, V in relation to both H and R. V measures the progressivity of OPPHE in the expenditure distribution after controlling for OOPHE that treat equals equally. It highlights the possibility that OOPHE may be income based; that is, those households with higher incomes pay more in terms of OOPHE. *SP* is more pro-poor across all years, except from 2010 to 2014. Pro-poor outcomes may be a consequence of the fact that initially, *SP* was targeted to the lowest two deciles in the income distribution [50]. These positive outcomes when compared to uninsured households regarding vertical equity are reversed some years after implementation and when the number of beneficiaries substantially increased during 2009-2011. The accumulated affiliation of the program increased substantially in that period, from 31.1% in 2009 to 51.8% in 2011 and remained in that range until 2019 [51]. We can see those results in 2010, 2012, and 2014, where vertical equity in the non-insured population is higher than for *SP* households. Poorer households with *SP* will pay more for the health services and care they need. The positive vertical equity improved from 2016 onwards.

Horizontal inequity is how OOPHE is redistributed among those households with equal living standards in terms of expenditure levels. In all years, horizontal inequity is higher in *SP* households compared to the non-*SP* ones, highlighting the program's challenges in targeting resources across similar households. The health expenditures of individuals with almost identical household incomes vary considerably, which results from insufficient health coverage across illnesses and frequent shortages of medicines.

Reranking is the change in inequality after horizontal inequity is removed. In some cases, wealthier households are overtaken by poorer ones after OOPHE. It changes the ranking of families after OOPHE is covered. Reranking in the uninsured subpopulation was the same in all years ($R=0.002$) and mainly remained the same after the implementation of *SP*. Meanwhile, *SP* beneficiaries faced higher reranking than those uninsured in 2006 ($R=0.008$) and 2008 ($R=0.003$). From 2010 to 2014, the reranking was the same or lower, with the best year in 2012 ($R=0.0008$). In the last stage of the program (2016 to 2020), the reranking was again higher for the *SP* subpopulation. The program's protection in terms of income ranks in the income distribution was limited. We can identify the best period in terms of lower reranking due to OOPHE that happened four years after its implementation. The change in rankings due to OOPHE is related to the lasting effect related to the impoverishing effect in some households in the program since their situations concerning other families with similar resources are profoundly affected after paying OOPHE. **Figure 2** shows all point estimates in three panels showing the equity components for all insurance statuses. In the upper-left panel, we present the horizontal inequity across all years, from 2000 to 2020; in the upper-right, the vertical equity component; and in the lower panel, the reranking effect.

DISCUSSION

In this long-term study, we found that, as *SP* enrolled more beneficiaries, the redistributive effect of the program diminished, having less or no difference compared to uninsured subpopulations. Its early years show a positive and statistically significant redistributive effect associated with a focalised stage. Our findings align

Table 3. Horizontal inequity, vertical equity and reranking of out-of-pocket health expenditure in 2000-2020*

	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020
Without health insurance											
ΔI	0.001 (0.001)	0.001 (0.001)	-0.0002 (0.001)	0.009 (0.004)§	0.002 (0.001)	0.004 (0.003)	0.008 (0.004)‡	0.005 (0.005)	-0.0004 (0.002)	-0.0007 (0.0009)	0.003 (0.002)‡
V	0.004 (0.001)§	0.004 (0.002)§	0.003 (0.001)§	0.013 (0.004)§	0.005 (0.001)‖	0.007 (0.003)‡	0.012 (0.005)§	0.006 (0.005)	0.001 (0.002)	0.001 (0.0008)	0.006 (0.002)‖
H	0.0008 (0.0001)‖	0.0006 (0.0001)‖	0.0009 (0.0001	0.0009 (0.0002)‖	0.0005 (0.0001)‖	0.0004 (0.00009)‖	0.0002 (0.0001)	-0.0003 (0.0001)§	0.0005 (0.00009)‖	0.0005 (0.0001)‖	0.0007 (0.0001)‖
R	0.002 (0.0003)‖	0.002 (0.0003)‖	0.002 (0.0003)‖	0.002 (0.0008)‖	0.001 (0.0002)‖	0.001 (0.0004)‖	0.003 (0.001)§	0.001 (0.0004)‖	0.001 (0.0003)‖	0.001 (0.0002)‖	0.002 (0.0004)‖
Sample size	5432	9507	11 094	2481	3649	3649	934	1658	5011	5155	10 460
I_X	0.557005	0.535393	0.521107	0.474485	0.43640	0.445932	0.492187	0.490332	0.496877	0.458449	0.408730
I_N	0.555264	0.53465	0.519919	0.470889	0.43473	0.442750	0.488335	0.487078	0.495226	0.458271	0.402780
***Seguro Popular*†**											
ΔI	-	-	-	0.047 (0.016)‖	0.0237 (0.010)‡	0.003 (0.003)	0.006 (0.004)	0.005 (0.003)	0.003 (0.002)	0.006 (0.002)§	0.005 (0.002)§
V	-	-	-	0.056 (0.016)‖	0.028 (0.010)‖	0.006 (0.003)‡	0.007 (0.004)	0.006 (0.003)‡	0.007 (0.002)‖	0.010 (0.002)‖	0.009 (0.002)‖
H	-	-	-	0.001 (0.0002)‖	0.0009 (0.0002)‖	0.0005 (0.0001)‖	0.0003 (0.0001)§	0.0004 (0.0001)‖	0.0006 (0.0001)‖	0.0008 (0.0001)‖	0.0007 (0.00009)‖
R	-	-	-	0.008 (0.001)‖	0.003 (0.0007)‖	0.002 (0.0005)‖	0.0008 (0.0007)	0.001 (0.0003)‖	0.002 (0.0007)‖	0.003 (0.0005)‖	0.003 (0.0004)‖
Sample size	0	0	0	2286	3563	3623	986	1661	4978	5261	10639
I_X				0.390342	0.392930	0.395214	0.402497	0.402733	0.403366	0.408111	0.377873
I_N				0.364297	0.377335	0.390954	0.400155	0.399982	0.401220	0.405022	0.372723
Overall											
ΔI	0.003 (0.002)	0.002 (0.001)	0.001 (0.001)	0.005 (0.002)‡	0.001 (0.002)	0.002 (0.001)	0.002 (0.002)	0.007 (0.001)‖	-0.0006 (0.001)	0.001 (0.0006)§	0.002 (0.0009)‖
V	0.005 (0.002)§	0.005 (0.001)‖	0.005 (0.001)‖	0.009 (0.002)‖	0.003 (0.002)‡	0.004 (0.001)‖	0.005 (0.002)‡	0.010 (0.001)‖	0.002 (0.001)§	0.004 (0.0007)‖	0.006 (0.001)‖
H	0.0007 (0.0001)‖	0.0005 (0.0001)‖	0.001 (0.0001)‖	0.001 (0.00009)‖	0.0006 (0.00007)‖	0.0005 (0.00008)‖	0.0005 (0.0001)‖	0.0008 (0.00008)‖	0.0006 (0.00008)‖	0.0007 (0.00005)‖	0.0007 (0.00007)‖
R	0.002 (0.0003)‖	0.002 (0.0004)‖	0.002 (0.0003)‖	0.002 (0.0004)‖	0.001 (0.0002)‖	0.001 (0.0002)‖	0.002 (0.0005)‖	0.002 (0.0002)‖	0.002 (0.0002)‖	0.002 (0.0001)‖	0.002 (0.0002)‖
Sample size	5432	9507	11 094	11 622	12 344	12 358	4542	8513	28637	30371	35 354
I_X				0.523067	0.475373	0.474204	0.476502	0.442455	0.464380	0.453724	0.435075
I_N				0.519372	0.472864	0.472611	0.474920	0.439769	0.463225	0.452864	0.431441

*Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, and 2020 waves of the National Household Income and Expenditure Survey, 2000-2020.
†Beginning with 1 January 2020, *Seguro Popular* was dismantled and replaced by *INSABI*, which was charged with ensuring the "free delivery of health services, medicines and other associated supplies" for people without Social Security coverage at all levels of care [49]. So, the year 2020 refers to *SP* and/or *INSABI*. Bootstrap standard errors are reported in parentheses.
‡$P<0.10$.
§$P<0.05$.
‖$P<0.01$.

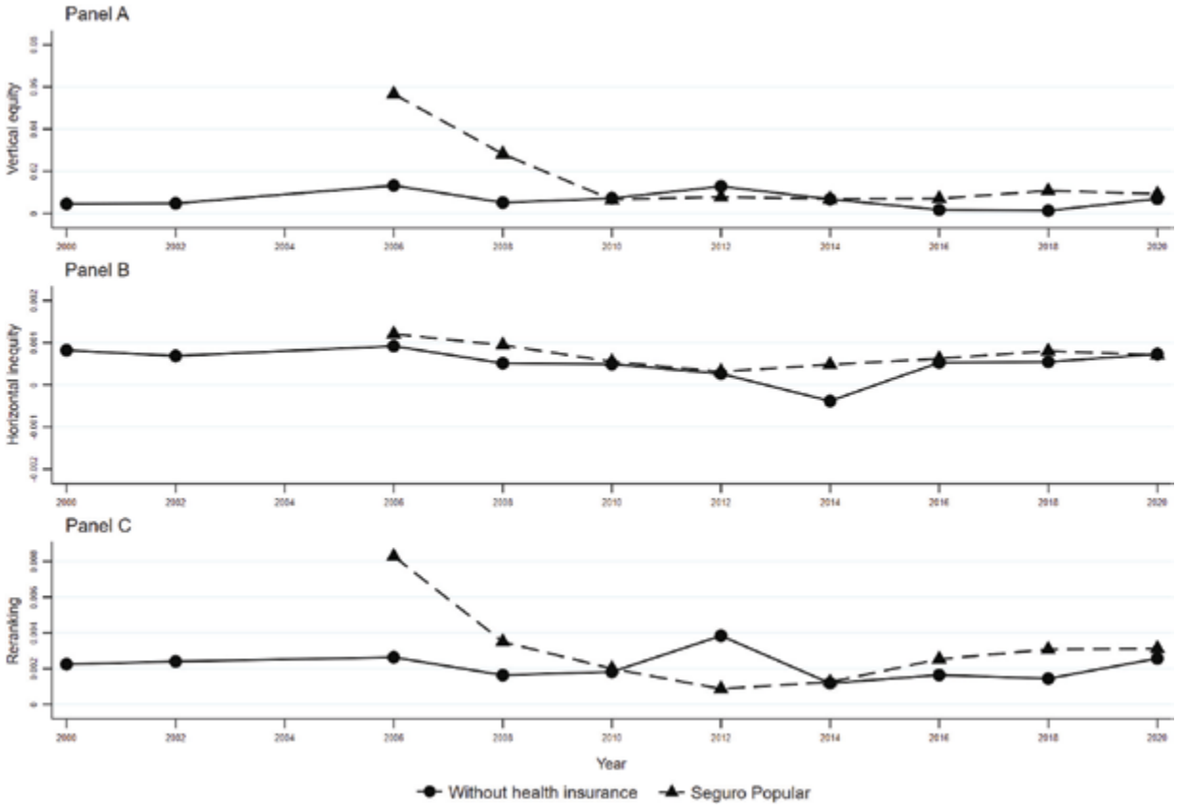


Figure 2. Vertical, horizontal, and reranking equity indicators. **Panel A.** Vertical equity. **Panel B.** Horizontal inequity. **Panel C.** Reranking. Data from the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, and 2020 waves of the National Household Income and Expenditure Survey, 2000-2020. The welfare indicator to construct equity indicators is per capita equivalent total expenditure. The equivalence scale we use is the Organization for Economic Cooperation and Development's equivalent scale [52].

with an analysis using a distributional poverty impact approach. This analysis, conducted in 2006, indicated that the *SP* policy had a more favourable distributional poverty impact for poor households compared to other policy-reducing policies [42]. Between 2010 and 2014, the program did not offer improved financial protection in terms of its redistributive effects than uninsured households, possibly due to oversaturation. This is in line with earlier suggestions it needed to be reassessed and gradually reformed as it aged, and it became increasingly difficult to maintain its benefits observed during 2003-2012 and take the next step toward universal and effective health coverage [18].

Regarding vertical equity, the program was progressive in all years we analysed, with important variations in magnitude, as its early years demonstrated better outcomes for insured compared to uninsured families. However, horizontal inequity was always higher than in uninsured subpopulations, which may indicate *SP* had difficulties in targeting similar health services and resources across its beneficiaries. This forced some households to change their rankings in well-being, measured as per capita equivalent expenditure. Households with access to health services may have access to treatments without full coverage and end up paying a part or all of their costs privately. Our results suggest a social-economic influx of resources or a more comprehensive risk pooling mechanism that makes social insurance sustainable in the long run must be implemented.

There are some differences across insurance types. Government insurance emerges more progressively some years after the implementation, paired with middle-range coverage. In Mexico and other LMICs, government social insurance types are focused only on informal workers or poor, uninsured segments of the population and financed mainly through direct taxes. This certainly limits its progressiveness compared to other countries with social schemes which also include high-income groups [53]. We observed that, in terms of the vertical equity component, the sustained effect, characterised by a significant increase in the number of affiliates, led to the disappearance of progressive effects for insured families compared to uninsured ones.

Horizontal equity in *SP* households is always higher than in uninsured families. Access and coverage were essential determinants for the equity outcomes in our analysis. Both are related to the sustained input of resources to keep an expansion of the programs in terms of coverage paired with the take-up of benefits using access to health care and reduction of OOPHE. The reason people end up spending can be related to insurance coverage and household health characteristics. In a previous analysis [43], we found that older adults or household living in larger cities are better protected against OOPHE health care payments than their uninsured counterparts. Nonetheless, we observed no effect in rural and smaller cities, a result linked to constrained access to limited resources in these regions. There is evidence that some illnesses, such as renal issues, are more likely to induce private payments [54]. This phenomenon is linked to variations in the availability of medicines and coverage across diseases based on insurance alternatives. Hence, there is a need to address changing populations and epidemiological profiles, especially in older subpopulations, as suggested by Parker et al. [55]. However, medicine shortages in some health programmes are widespread, and people must pay either partially or fully for their medicines. A low-cost, limited health service provider is sometimes an effective alternative. For instance, patient's use of doctor's offices in private pharmacies in Mexico caused a 5% decline in public outpatient health utilisation [56]. This substitution of public for private health care in outpatient services is not offset by changes in inpatient care, which suggests that the quality of health care in terms of complications leading to hospitalisations is not changing.

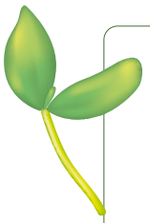
In the case of *SP*, the redistributive effect could improve by up to 13% if all families with similar incomes were spending equal OOPHE and horizontal inequity eliminated. An improvement like this could happen if health services included better-designed financial protection on medicines and related health services (such as laboratory testing) when using *SP* health service institutions. However, it is difficult to determine if those inter-household differences can always be considered horizontal equity since we know different households would have different spending patterns. Ultimately, the measure simply highlights the differences for the policymakers to decide how this can be reduced to improve the redistributive effect in the health system performance.

This study has some limitations. First, we did not consider all income sources that would capture the complete financing redistribution by income sources. We also used cross-sectional rather than longitudinal data, which would have allowed us to follow up on life cycle events related to OOPHE among beneficiaries. For instance, evidence suggests that, as individuals get older, they tend to stick to their insurance scheme, especially when household members are diagnosed with chronic illnesses [54,55]. Furthermore, the database we used had no information on the need for health services, and we departed from the average type of households in different categories. Our data offers no information on comorbidities and OOPHE related to certain illnesses. Additionally, we could not examine the total cost of medical expenses when analysing OOPHE. In some cases, individuals may opt for forgoing treatment, increasing long-term deterioration in health, and earning capacity in the future. Third, we still faced recall issues due to the survey structure of ENIGH, as questions regarding OOPHE have a recall period of three months. Fourth, the duration and implementation of *SP* must be considered in interpreting our findings. The program was introduced in 2003 and its rollout participation was gradual across states through local government participation and *POP* program [57-59]. Therefore, our 2004 sample is not nationally representative of *SP*. The program was present in every Mexican state in 2006, was declared universal in 2012 [58], and was replaced by *INSABI* in 2019 [49]. INSABI does not have the structure of a social insurance program where individuals enrol and even make private contributions to their insurance, but instead guarantees health access without individuals enrolling in a program and without making private contributions to their insurance [18]. Lastly, we cannot distinguish between the two programs in the year 2020 in our sample, so we identified them as *SP/INSABI*. Nevertheless, we recently found that the dismantling of *SP* in Mexico led to a reduction in health care coverage levels and substantial increases in the proportion of poor households experiencing catastrophic health expenditure and excessive health costs across nearly all Mexican states [25]. These shifts in coverage and financial burdens are key factors in explaining the observed outcomes related to vertical equity and re-ranking in the years in our study.

CONCLUSIONS

In a context where a health crisis such as COVID-19 and a risky and profound reorganisation of the Mexican health system converge, the recent cancellation of the *INSABI* program highlights the complexity involved in continuing a financial health protection program and the potential effects that untimely health

policies, without taking advantage of previously accumulated knowledge and a solid replacement, could have on the structure of a program, its regulation, its financing and even its existence. In Mexico and other LMICs, achieving a universal health care system requires guaranteeing access to comprehensive and quality services guided by principles of citizenship, without any discrimination whatsoever and regardless of employment status.



Data availability statement: We obtained data from the public repository of the National Income and Expenditure Household Survey, hosted at the National Institute for Statistics and Geography (INEGI) (https://www.inegi.org.mx/programas/enigh/).

Funding: No external funding was received for this study.

Authorship contributions: RGD conceived the idea of the paper. RGD, SSR, and ESM designed the study, led the formal analysis, and performed the data curation. RGD wrote the first draft of the manuscript. ESM and RL provided critical inputs on multiple iterations. RGD is the guarantor of the work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The final version of the manuscript was revised and approved by all authors.

Disclosure of interest: The authors completed the ICMJE Disclosure of Interest Form (available upon request from the corresponding author) and disclose no relevant interests.

Additional material
Online Supplementary Document

REFERENCES

1 World Health Organization. Kutzin J, Cashin, Jakab M, eds. Implementing Health Financing Reform: Lessons from Countries in Transition. Geneva: World Health Organization; 2010.
2 Siqueira M, Coube M, Millett C, Rocha R, Hone T. The impacts of health systems financing fragmentation in low- and middle-income countries: A systematic review protocol. Syst Rev. 2021;10:164. Medline:34078460 doi:10.1186/s13643-021-01714-5
3 Boerma T, Eozenou P, Evans D, Evans T, Kieny MP, Wagstaff A. Monitoring progress towards universal health coverage at country and global levels. PLoS Med. 2014;11:e1001731. Medline:25243899 doi:10.1371/journal.pmed.1001731
4 Wagstaff A, Flores G, Hsu J, Smitz MF, Chepynoga K, Buisman LR, et al. Progress on catastrophic health spending in 133 countries: A retrospective observational study. Lancet Glob Health. 2018;6:e169-79. Medline:29248367 doi:10.1016/S2214-109X(17)30429-1
5 Wagstaff A. The economic consequences of health shocks: Evidence from Vietnam. J Health Econ. 2007;26:82-100. Medline:16905205 doi:10.1016/j.jhealeco.2006.07.001
6 Wagstaff A. Health systems in East Asia: what can developing countries learn from Japan and the Asian Tigers? Health Econ. 2007;16:441-56. Medline:17066428 doi:10.1002/hec.1180
7 Bilger M. Progressivity, horizontal inequality and reranking caused by health system financing: A decomposition analysis for Switzerland. J Health Econ. 2008;27:1582-93. Medline:18774190 doi:10.1016/j.jhealeco.2008.07.009
8 Mtei G, Makawia S, Ally M, Kuwawenaruwa A, Meheus F, Borghi J. Who pays and who benefits from health care? An assessment of equity in health care financing and benefit distribution in Tanzania. Health Policy Plan. 2012;27 suppl_1:i23-34. Medline:22388497 doi:10.1093/heapol/czs018
9 Rostampour M, Nosratnejad S. A systematic review of equity in healthcare financing in low- and middle-income countries. Value Health Reg Issues. 2020;21:133-40. Medline:31786404 doi:10.1016/j.vhri.2019.10.001
10 Global Burden of Disease Health Financing Collaborator Network. Past, present, and future of global health financing: a review of development assistance, government, out-of-pocket, and other private spending on health for 195 countries, 1995-2050. Lancet. 2019;393:2233-60. Medline:31030984 doi:10.1016/S0140-6736(19)30841-4
11 Jalali FS, Bikineh P, Delavari S. Strategies for reducing out of pocket payments in the health system: A scoping review. Cost Eff Resour Alloc. 2021;19:47. Medline:34348717 doi:10.1186/s12962-021-00301-8
12 Roy K, Howard DH. Equity in out-of-pocket payments for hospital care: Evidence from India. Health Policy. 2007;80:297-307. Medline:16678296 doi:10.1016/j.healthpol.2006.03.012
13 Becceril-Montekio V, Meneses-Navarro S, Pelcastre-Villafuerte BE, Serván-Mori E. The Unarticulated Mexican Public Health System: Why is it useful to distinguish between fragmentation and segmentation. Forthcoming 2023.
14 Mathauer I, Saksena P, Kutzin J. Pooling arrangements in health financing systems: A proposed classification. Int J Equity Health. 2019;18:198. Medline:31864355 doi:10.1186/s12939-019-1088-x
15 World Health Organization. Financial protection. 2022. Available: https://www.who.int/health-topics/financial-protection#tab=tab_1. Accessed: 15 July 2022.
16 Frenk J, González-Pier E, Gómez-Dantés O, Lezana MA, Knaul FM. Comprehensive reform to improve health system performance in Mexico. Lancet. 2006;368:1524-34. Medline:17071286 doi:10.1016/S0140-6736(06)69564-0
17 Wirtz VJ, Santa-Ana-Tellez Y, Servan-Mori E, Avila-Burgos L. Heterogeneous effects of health insurance on out-of-pocket expenditure on medicines in Mexico. Value Health. 2012;15:593-603. Medline:22867767 doi:10.1016/j.jval.2012.01.006

REFERENCES

18 Knaul FM, Arreola-Ornelas H, Touchton M, McDonald T, Blofield M, Avila Burgos L, et al. Setbacks in the quest for universal health coverage in Mexico: Polarized politics, policy upheaval, and pandemic disruption. Lancet. 2023;402:731-46. Medline:37562419 doi:10.1016/S0140-6736(23)00777-8

19 Sosa-Rubí SG, Galárraga O, Harris JE. Heterogeneous impact of the "Seguro Popular" program on the utilization of obstetrical services in Mexico, 2001-2006: A multinomial probit model with a discrete endogenous variable. J Health Econ. 2009;28:20-34. Medline:18824268 doi:10.1016/j.jhealeco.2008.08.002

20 Serván-Mori E, Contreras-Loya D, Gomez-Dantés O, Nigenda G, Sosa-Rubí SG, Lozano R. Use of performance metrics for the measurement of universal coverage for maternal care in Mexico. Health Policy Plan. 2017;32:625-33. Medline:28453712 doi:10.1093/heapol/czw161

21 Serván-Mori E, Cerecero-García D, Heredia-Pi I, Pineda-Antúnez C, Sosa-Rubí S, Nigenda G. Improving the effective maternal-child health care coverage through synergies between supply and demand-side interventions: Evidence from Mexico. J Glob Health. 2019;9:020433. Medline:32257178 doi:10.7189/jogh.09.020433

22 Celhay P, Martinez S, Muñoz M, Perez M, Perez-Cuevas R. Long-term effects of public health insurance on the health of children in Mexico: A retrospective study. Lancet Glob Health. 2019;7:e1448-57. Medline:31405780 doi:10.1016/S2214-109X(19)30326-2

23 Conti G, Ginja R. Who Benefits from Free Health Insurance?: Evidence from Mexico. J Hum Resour. 2023;58:146-82. doi:10.3368/jhr.58.3.1117-9157R2

24 Colchero MA, Gómez R, Bautista-Arredondo S. A systematic review of the literature on the impact of the Seguro Popular. Health Res Policy Syst. 2022;20:42. Medline:35436938 doi:10.1186/s12961-022-00839-w

25 Serván-Mori E, Gómez-Dantés O, Contreras D, Flamand L, Cerecero-García D, Arreola-Ornelas H, et al. Increase of catastrophic and impoverishing health expenditures in Mexico associated to policy changes and the COVID-19 pandemic. J Glob Health. 2023;13:06044. Medline:37883200 doi:10.7189/jogh.13.06044

26 Duclos JY, Jalbert V, Araar A. Classical horizontal inequity and reranking: An integrating approach. In: Amiel Y, Bishop JA, editors. Fiscal Policy, Inequality and Welfare (Research on Economic Inequality. Vol. 10.). UK: Emerald Group Publishing Limited; 2003. p. 65-100.

27 Duclos JY, Lambert PJ. A normative and statistical approach to measuring classical horizontal inequity. Can J Econ. 2000;33:87-113. doi:10.1111/0008-4085.00006

28 Rodríguez JG, Salas R, Perrote I. Partial horizontal inequity orderings: A non-parametric approach. Oxf Bull Econ Stat. 2005;67:347-68. doi:10.1111/j.1468-0084.2005.00123.x

29 Cavagnero E, Bilger M. Equity during an economic crisis: Financing of the Argentine health system. J Health Econ. 2010;29:479-88. Medline:20452070 doi:10.1016/j.jhealeco.2010.03.008

30 Instituto Nacional de Estadística, Geografía e Informática (INEGI). Programas de información. Subsistema de Información Demográfica y Social. 2022. Available: https://www.inegi.org.mx/programas. Accessed: 6 May 2022.

31 United Nations, Department of Economic and Social Affairs, Statistics Division. Classification of Individual Consumption According to Purpose (COICOP) 2018. New York: United Nations; 2018.

32 Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJL. Household catastrophic health expenditure: A multicountry analysis. Lancet. 2003;362:111-7. Medline:12867110 doi:10.1016/S0140-6736(03)13861-5

33 Serván-Mori E, Orozco-Núñez E, Guerrero-López CM, Miranda JJ, Jan S, Downey L, et al. A gender-based and quasi-experimental study of the catastrophic and impoverishing health-care expenditures in Mexican households with elderly members, 2000-2020. Health Syst Reform. 2023;9:2183552. Medline:37014089 doi:10.1080/23288604.2023.2183552

34 Poirier MJP, Grépin KA, Grignon M. Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: A critical interpretive synthesis. Soc Indic Res. 2020;148:1-46. doi:10.1007/s11205-019-02187-9

35 Secretaría de Gobernatión, Consejo Nacional de Población. Índice de Marginación Por Entidad Federativa y Municipio 2020. Nota Técnico-Metodológica. Mexico: Consejo Nacional de Población; 2021.

36 Comisión Nacional de Protección Social en Salud. Beneficiarios de Protección Social en Salud de Seguro Popular. Mexico: Seguro Popular; 2022.

37 Secretaría de Salud. Dirección General de Información en Salud (DGIS). Población total a mitad de año con seguridad social por edad quinquenal. Mexico: Secretaría de Salud; 2017.

38 Instituto Nacional de Estadística, Geografía e Informática (INEGI). Censos y Conteos de Población y Vivienda. Subsistema de Información Demográfica y Social Demográfica y Social: Censos y conteos. 2022. Available: https://www.inegi.org.mx/programas/. Accessed: 1 November 2023.

39 Secretaría de Salud. Subsistema de Información de Equipamiento, Recursos Humanos e Infraestructura para la Salud (SINERHIAS). Sistemas de Información en Salud. 2022. Available: http://www.dgis.salud.gob.mx/contenidos/basesdedatos/da_recursos_gobmx.html. Accessed: 18 September 2022.

40 Instituto Nacional de Estadística, Geografía e Informática (INEGI). Regiones socioeconómicas de México. Clasificación de Entidades Federativas. 2004. Available: https://sc.inegi.org.mx/niveles/. Accessed: 16 June 2020.

41 Rosenbaum P, Rubin D. The central role of the propensity score in observational studies for causal effects. Biometrika. 1983;70:41-55. doi:10.1093/biomet/70.1.41

42 García-Díaz R, Sosa-Rubí SG. Analysis of the distributional impact of out-of-pocket health payments: Evidence from a public health insurance program for the poor in Mexico. J Health Econ. 2011;30:707-18. Medline:21724281 doi:10.1016/j.jhealeco.2011.04.003

43 García-Díaz R, Sosa-Rubí SG, Serván-Mori E, Nigenda G. Welfare effects of health insurance in Mexico: The case of Seguro Popular de Salud. PLoS One. 2018;13:e0199876. Medline:29965976 doi:10.1371/journal.pone.0199876

44 Ávila-Burgos L, Serván-Mori E, Wirtz VJ, Sosa-Rubí SG, Salinas-Rodríguez A. Efectos del Seguro Popular sobre el gasto en salud en hogares mexicanos a diez años de su implementación. Salud Publica Mex. 2013;55 Supl. 2:S91-9. Medline:24626719 doi:10.21149/spm.v55s2.5103

45 Leyva-Flores R, Servan-Mori E, Infante-Xibille C, Pelcastre-Villafuerte BE, Gonzalez T. Primary health care utilization by the Mexican indigenous population: The role of the Seguro Popular in socially inequitable contexts. PLoS One. 2014;9:1-6. Medline:25099399 doi:10.1371/journal.pone.0102781

46 Caliendo M, Kopeinig S. Some practical guidance for the implementation of propensity score matching. J Econ Surv. 2008;22:31-72. doi:10.1111/j.1467-6419.2007.00527.x

47 Rosenbaum P, Rubin D. Assessing sensitivity to an unobserved binary covariate in an observational study with binary outcome. J R Stat Soc [Ser A]. 1983;45:212-8. doi:10.1111/j.2517-6161.1983.tb01242.x

48 Becker SO, Caliendo M. Sensitivity analysis for average treatment effects. Stata J. 2007;7:71-83. doi:10.1177/1536867X0700700104

49 Meneses Navarro S, Pelcastre-Villafuerte B, Becerril-Montekio V, Serván-Mori E. Overcoming the health systems' segmentation to achieve universal health coverage in Mexico. Int J Health Plann Manage. 2022;37:3357-64. Medline:35789039 doi:10.1002/hpm.3538

50 Aterido R, Hallward-Driemeier M, Pages C. Does Expanding Health Insurance Beyond Formal-Sector Workers Encourage Informality? Measuring the Impact of Mexico's Seguro Popular. World Bank Policy Research Working Paper No. 5785. 2011.

51 Comisión Nacional de Protección Social en Salud. Informe de Resultados Del Sistema de Protección Social En Salud: Enero – Diciembre 2019. Mexico: Comisión Nacional de Protección Social en Salud; 2019.

52 Haughton J, Khandker SR. Handbook on Poverty and Inequality, 1st edition. Washington DC: World Bank; 2009.

53 Wagstaff A, van Doorslaer E. Equity in health care finance and delivery. In: Culyer AJ, Newhouse JP, editors. Handbook of Health Economics. Netherlands: Elsevier; 2000. p. 1803-1862.

54 Garcia-Diaz R. Effective access to health care in Mexico. BMC Health Serv Res. 2022;22:1027. Medline:35962375 doi:10.1186/s12913-022-08417-0

55 Parker SW, Saenz J, Wong R. Health Insurance and the Aging: Evidence From the "Seguro Popular" Program in Mexico. Demography. 2018;55:361-86. Medline:29357097 doi:10.1007/s13524-017-0645-4

56 Rubli A. Low-Cost, Limited-Service Private Healthcare Providers: Evidence from Mexico. 2017. Available: https://paa.confex.com/paa/2017/mediafile/ExtendedAbstract/Paper12904/adrian_pado_draft_feb17.pdf. Accessed: 16 November 2023.

57 Knaul FM, Arreola-Ornelas H, Méndez-Carniado O, Bryson-Cahn C, Barofsky J, Maguire R, et al. Evidence is good for your health system: policy reform to remedy catastrophic and impoverishing health spending in Mexico. Lancet. 2006;368:1828-41. Medline:17113432 doi:10.1016/S0140-6736(06)69565-2

58 Knaul FM, González-Pier E, Gómez-Dantés O, García-Junco D, Arreola-Ornelas H, Barraza-Lloréns M. The quest for universal health coverage: Achieving social protection for all in Mexico. Lancet. 2012;380:1259-1279. Medline:22901864 doi:10.1016/S0140-6736(12)61068-X

59 Secretaría de Salud. Sistema de Protección Social En Salud: Elementos Conceptuales, Financieros y Operativos. Segunda. Mexico:Fondo De Cultura Economica; 2006.

PLOS ONE

RESEARCH ARTICLE

Financing Maternal Health and Family Planning: Are We on the Right Track? Evidence from the Reproductive Health Subaccounts in Mexico, 2003–2012

Leticia Avila-Burgos[1☯], Lucero Cahuana-Hurtado[1☯*], Julio Montañez-Hernandez[1☯], Edson Servan-Mori[1☯], Belkis Aracena-Genao[2‡], Aurora del Río-Zolezzi[3‡]

1 Center for Health Systems Research, National Institute of Public Health, Morelos, Mexico, **2** Research Center for Evaluation and Surveys, National Institute of Public Health, Morelos, Mexico, **3** National Center for Gender Equity and Reproductive Health, Ministry of Health, Mexico City, Mexico

☯ These authors contributed equally to this work.
‡ These authors also contributed to this work.
* lucero.cahuana@insp.mx

CrossMark
click for updates

OPEN ACCESS

Citation: Avila-Burgos L, Cahuana-Hurtado L, Montañez-Hernandez J, Servan-Mori E, Aracena-Genao B, del Río-Zolezzi A (2016) Financing Maternal Health and Family Planning: Are We on the Right Track? Evidence from the Reproductive Health Subaccounts in Mexico, 2003–2012. PLoS ONE 11 (1): e0147923. doi:10.1371/journal.pone.0147923

Editor: Gerardo Chowell, Georgia State University, UNITED STATES

Received: April 7, 2015

Accepted: January 11, 2016

Published: January 26, 2016

Copyright: © 2016 Avila-Burgos et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All relevant data necessary to replicate the study findings are within the paper and its Supporting Information files.

Funding: Funding for this study was provided by the National Center for Gender Equity and Reproductive Health of the Mexican Ministry of Health. The funder had no direct role in the study design or analysis, the decision to publish this work, or the preparation and drafting of this manuscript.

Abstract

Objective

To analyze whether the changes observed in the level and distribution of resources for maternal health and family planning (MHFP) programs from 2003 to 2012 were consistent with the financial goals of the **related** policies.

Materials and Methods

A longitudinal descriptive analysis of the Mexican Reproductive Health Subaccounts 2003–2012 was performed by financing scheme and health function. Financing schemes included social security, government schemes, household out-of-pocket (OOP) payments, and private insurance plans. Functions were preventive care, including family planning, antenatal and puerperium health services, normal and cesarean deliveries, and treatment of complications. Changes in the financial imbalance indicators covered by MHFP policy were tracked: (a) public and OOP expenditures as percentages of total MHFP spending; (b) public expenditure per woman of reproductive age (WoRA, 15–49 years) by financing scheme; (c) public expenditure on treating complications as a percentage of preventive care; and (d) public expenditure on WoRA at state level. Statistical analyses of trends and distributions were performed.

Results

Public expenditure on government schemes grew by approximately 300%, and the financial imbalance between populations covered by social security and government schemes decreased. The financial burden on households declined, particularly among households without social security. Expenditure on preventive care grew by 16%, narrowing the

Ávila-Burgos L, Cahuana-Hurtado L, Montañez-Hernández J, Serván-Mori E, Aracena-Genao B, del Río-Zolezzi A. Financing maternal health and family planning: are we on the right track? Evidence from the reproductive health subaccounts in Mexico, 2003-2012. PLoS ONE. 2016;11(1):e0147923. https://doi.org/10.1371/journal.pone.0147923

Competing Interests: ADZ has the following competing interest: ADZ is an officer of the National Center of Gender Equality and Reproductive Health of the Mexican Ministry of Health.

financing gap between treatment of complications and preventive care. Finally, public expenditure per WoRA for government schemes nearly doubled at the state level, although considerable disparities persist.

Conclusions

Changes in the level and distribution of MHFP funding from 2003 to 2012 were consistent with the relevant policy goals. However, improving efficiency requires further analysis to ascertain the impact of investments on health outcomes. This, in turn, will require better financial data systems as a precondition for improving the monitoring and accountability functions in Mexico.

Introduction

In recent decades, countries around the world have identified improving maternal health as a policy objective given its critical relevance in the reduction of social inequalities [1,2]. Mexico is no exception: at the beginning of the 21st century, its maternal mortality ratio reached 74.1 deaths per 100,000 live births, with an unacceptable inverse correlation between the distribution of this indicator and economic development across all 32 states [3,4]. Like those in many other countries, Mexico's policy makers therefore began to formulate more effective MHFP policies.

In line with its commitment to achieving the Millennium Development Goals (MDGs), the Mexican government undertook to cut its 1990 maternal mortality ratio by three-quarters by 2015 [2,4]. In 2001, it launched the *Arranque Parejo en la Vida* (Fair Start in Life) program. One of the major challenges encountered by this program in improving access to skilled childbirth care and strengthening family planning in those rural areas with the highest maternal mortality rates [4,5] was the need to coordinate the efforts of the numerous health institutions that make up the fragmented, employment-based and decentralized Mexican healthcare system.

Prior to the healthcare system reform in 2003, only formal-sector workers and government employees could access social security services. Because of supply and budget restraints, those without social security had limited access to government services and were forced to purchase healthcare from private providers [6–8]. Out-of-pocket (OOP) payments accounted for half of total health expenditure, and nearly 3% of Mexican households reported catastrophic health spending [6,9]. Before the reform, the population with social security received twice as much money as the population without, and distribution of per capita spending among State Health Services (known as *SESAs* from the initials in Spanish) varied as much as fivefold. [10,11]

To reduce these gaps and ensure financial protection for the poorest households, the government launched the System of Social Protection in Health (SSPH) [8,12], as a mechanism for reducing OOP spending by increasing public expenditure [8,12,13]. Its core component, the *Seguro Popular* (*SP*), is a voluntary public healthcare insurance scheme, primarily for those lacking social security (Fig 1). The *SP* introduced changes in the allocation of new resources to *SESAs* on the basis of capitation payments [8,11,12], thus tying expenditure to potential demand (affiliated population), and weakening the traditional dependence on budget allocation.

MHFP policies were aligned with these wider healthcare reforms in pursuit of the MDGs. Mechanisms were established to remove financial barriers and offer women increased access to healthcare, particularly for pregnancy, childbirth and family planning [4,5]. One such

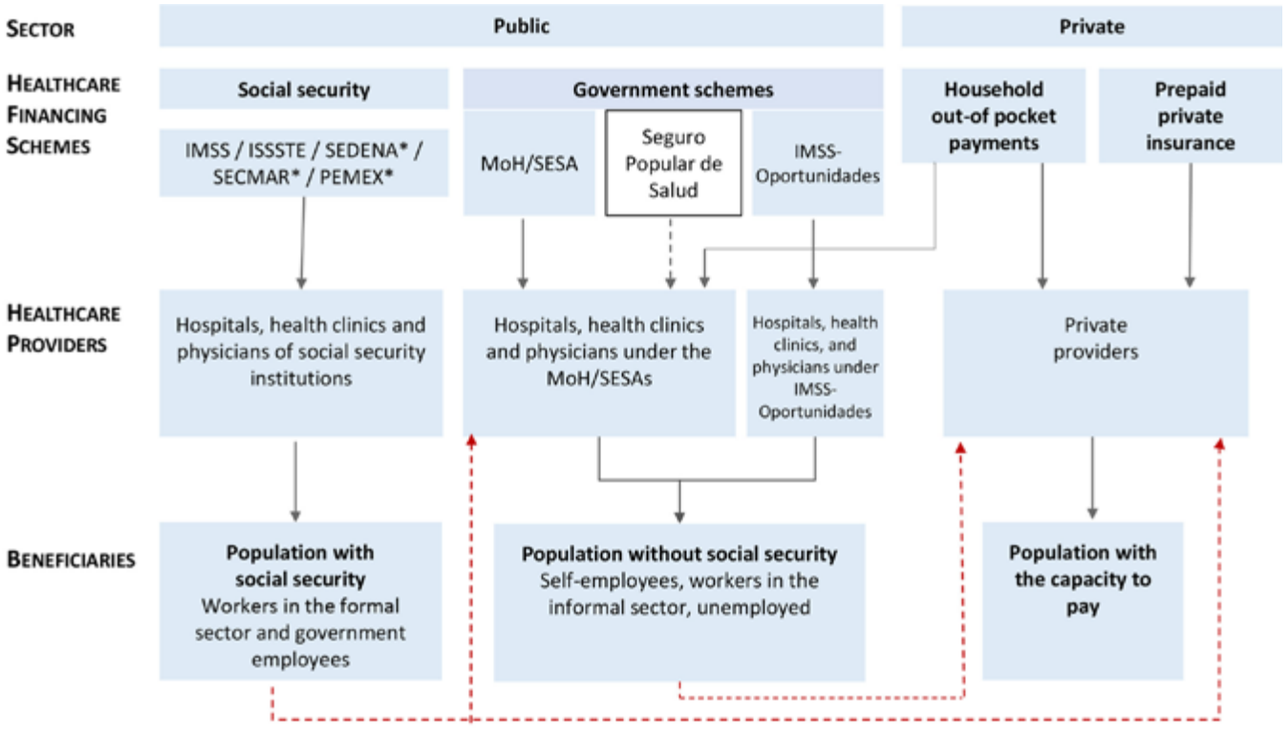


Fig 1. The Mexican Health System. The Mexican health system is fragmented and labor-based. It includes a public and a private sector. The public sector consists of two sub-sectors: (a) social security, which comprises the Mexican Institute for Social Security (IMSS); the Institute for Social Security and Services for Civil Servants (ISSSTE); and social security institutions for the army, the marines and the national oil company workers (SEDENA, SECMAR and PEMEX). Social security coverage went from 38.3% in 2000 to 38.9% in 2012; and (b) government schemes (restricted by user fee), which include the Ministry of Health, the State Health Services, the Seguro Popular (since 2004); and the IMSS-Oportunidades program. Until 2003, access to providers was limited, leaving beneficiary population without the capacity to pay out of this public health sub-system. The Seguro Popular, designed to remove this barrier, has opened the access to health services for 38.5% of the Mexican population. (c) the private sector, which comprises household out-of-pocket payments and prepaid private insurance. Private providers offer services to those with the capacity to pay, including the population with and without social security.

doi:10.1371/journal.pone.0147923.g001

mechanism was the *Embarazo Saludable* (Healthy Pregnancy) strategy, introduced in 2008, which allowed pregnant women without social security to enroll in *Seguro Popular* [5]. The Comprehensive Strategy for Reducing Maternal Mortality [5], launched in 2009, catalyzed the participation of public health institutions in the delivery of emergency obstetric care to anyone in need.

Monitoring all these changes was fundamental to informing policy development and tracking financial progress towards policy commitments. Distribution of health expenditure data solely by general categories, however, did not allow for financial analysis of specific health areas such as maternal health and family planning. A set of Reproductive Health Subaccounts (RHS) was therefore constructed in line with the Health Accounts System, and has been in place since 2004 [14,15]. After a full decade of continual estimates, these subaccounts offer a detailed description of national and state-level expenditure on reproductive health by financial scheme, function (activity/program) and beneficiary, thus providing national and state-level perspectives on reproductive health funding. The aim of this study was to analyze whether the

changes observed in the level and distribution of resources for MHFP were consistent with the financial objectives of the policies implemented in Mexico from 2003 to 2012.

Reproductive Health Subaccounts framework

The RHS in Mexico were designed in line with the Organization for Economic Co-operation and Development's System of Health Accounts framework [16] and the World Health Organization's Guide to Producing Reproductive Health Subaccounts [17]. They are thus methodologically compatible with the System of National Accounts adopted by the United Nations [18].

Consumption is the main axis for financial tracking. For MHFP, consumption refers to all transactions concerning the provision and final utilization of MHFP healthcare goods and services within health systems [19]. Its analysis considers healthcare functions, namely antenatal, childbirth (vaginal or cesarean) and postpartum services; treatment of complications during pregnancy and childbirth, such as miscarriages; and family planning health activities [16].

The second analytical dimension is *health providers*. These are the organizations and actors dealing in healthcare goods and services, such as hospitals offering inpatient and outpatient care, as well as ambulatory healthcare suppliers. Under the RHS, countries allocate money to their health systems through an array of financial arrangements known as *health financing schemes* [16,17]. These constitute the third analytical dimension.

Fig 1 illustrates the basic healthcare financing arrangements in Mexico: (a) social security, including the Mexican Social Security Institute (*IMSS*, from its initials in Spanish), and the Institute of Social Security and Services for Civil Servants (*ISSSTE*); (b) government schemes, including spending by the Ministry of Health (MoH), *SESAs*, *IMSS-Prospera* and SSPH; (c) OOP payments; and (d) private insurance. These financing arrangements target specific populations or beneficiaries, representing the fourth analytical dimension of the RHS. MHFP beneficiaries include all women of reproductive age (WoRA), those aged 15–49 years [17,20].

Materials and Methods

Sources of information

Data from the RHS 2003–2012 series were analyzed using RHS matrices designed to break down actual spending by public/private and national/sub-national schemes dealing with reproductive health functions.

Public spending estimates considered RHS national and state-level data on Mexican health accounts, budgetary information, and services provided by health-related public institutions (e.g., the MoH, *SESAs*, social security organizations and the SSPH) [21]. To identify the volume of MHFP health services provided between 2003 and 2012, information was analyzed for a total of 44.4 million hospital discharges, 176.2 million hospital inpatient days, and 774.9 million general and specialty visits.

Private spending estimates drew upon RHS data available only at the national level for private insurance expenditure reported by the Mexican Association of Insurance Institutions [22], and OOP expenditure for health purposes published biannually by the National Survey on Household Incomes and Expenses [23]. In alternate years where surveys were not conducted, OOP spending was estimated on the basis of data from the previous year, adjusted for inflation [24]. For OOP expenditure, the RHS distinguish between households with and without social security protection by examining whether or not WoRA or the heads of households reported affiliation to a social security scheme. Further details on the methodology for calculating public and private spending can be found in Avila et al [15, 25].

The number of beneficiaries by financing scheme was determined by applying the coverage percentages calculated by the MoH [26] to official population projections [27].

Measurement and data analysis

A longitudinal descriptive analysis was performed on the levels and trends in MHFP expenditure in Mexico from 2003 to 2012. Expenditure was first deflated using the accumulated inflation figures published by the National Institute of Statistics (*INEGI* in Spanish) [24]. It was then converted into 2012 international dollars using a purchasing power parity rate of 7.99 Mexican pesos per international dollar [28].

To track whether changes in MHFP expenditure were aligned with maternal health policy objectives, the following financial indicators were employed [5,6,16,17,29]:

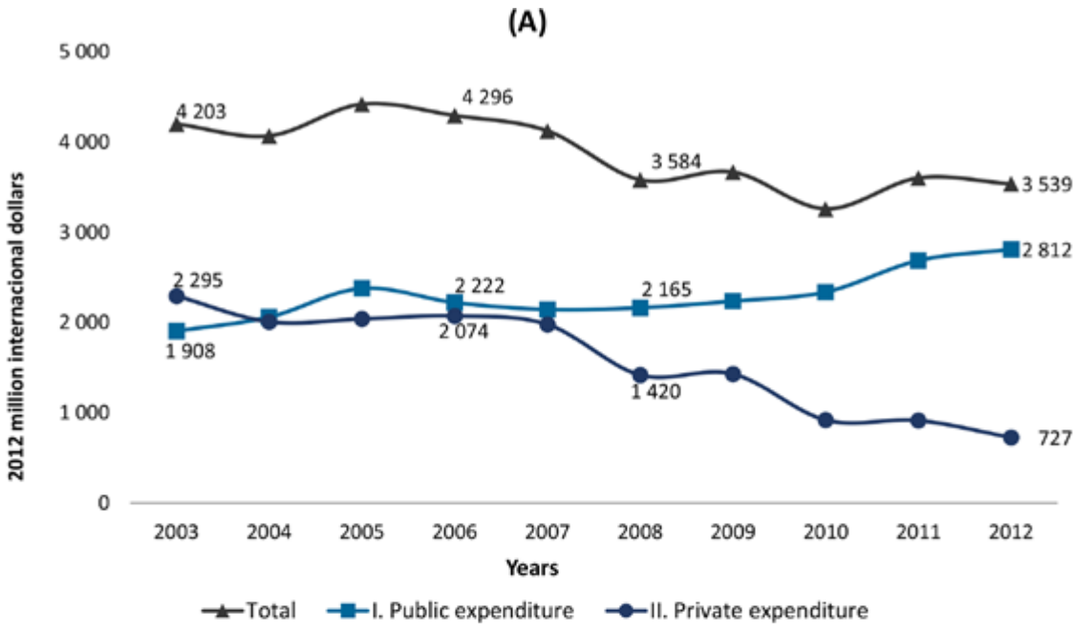
1. Public and OOP spending, as percentages of total MHFP expenditure. Increased public expenditure coupled with reduced OOP spending over time was taken to reflect a reduction of financial barriers in accessing MHFP services.
2. Average public expenditure per WoRA. By using this indicator to compare health financing schemes, it was possible to assess whether the financial imbalance between populations with and without social security had decreased.
3. Public expenditure on complications as a percentage of expenditure on preventive care. This indicator relates to the goal of providing women with greater access to health services for pregnancy, childbirth and family planning. Reductions in this indicator reflect greater increases in public expenditure on preventive care than on the treatment of complications. Preventive care included antenatal and postpartum care, as well as family planning services provided by ambulatory providers.
4. OOP expenditure on specific MHFP health functions: (a) childbirth (vaginal or cesarean), (b) complications of pregnancy or childbirth, (c) antenatal care, and (d) family planning. The disaggregation of these indicators by households with and without social security allowed determination of whether OOP spending had fallen more in households without social security.
5. Measurement of the alignment of MHFP expenditure with potential service demand. Spearman correlations were calculated between the logarithms of public expenditure at state level and the number of WoRA by health financing scheme for the years 2003 and 2012.
6. Public MHFP expenditure per WoRA was calculated at the state level. Median values were compared using K-sample tests, and reductions in financial imbalances were examined over time by calculating maximum/minimum ratios.

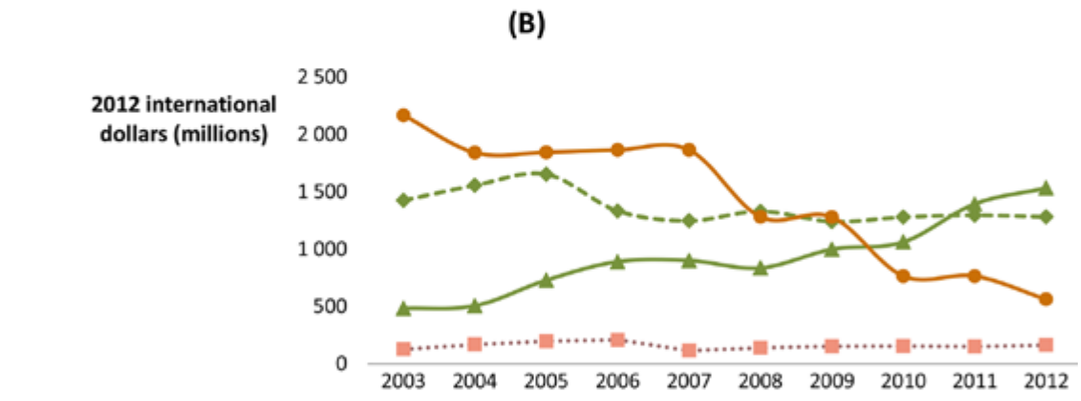
All analyses were performed using Stata 13.1 software [30]. This project was approved by the Research, Ethics and Biosecurity Committees of the National Institute of Public Health.

Results

Public expenditure on MHFP varied over the 10-year period analyzed, ending in 2012 with a total increase of 47% versus 2003. By contrast, private spending decreased from 2005; by 2012, it had fallen to approximately one-third of the 2003 level. As a percentage of total MHFP expenditure, public spending increased from 45.4% in 2003 to 79.0% in 2012 (Fig 2A).

From 2003 to 2012, public expenditure rose because of a dramatic increase in spending on government schemes. By contrast, during the same period, private expenditure declined as a corollary of lower OOP spending.





	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I. Public expenditure										
Social security	1 425	1 556	1 652	1 332	1 246	1 329	1 239	1 278	1 294	1 280
Goverment schemes	483	506	729	890	900	835	999	1 062	1 394	1 532
II. Private expenditure										
Out-of-pocket (OOP) expenditure	2 167	1 842	1 845	1 865	1 865	1 280	1 279	765	765	563
Private insurance	128	168	197	209	115	140	153	156	151	164
OOP expenditure as a percentage of total expenditure	51.5	45.7	41.9	43.8	45.3	35.9	35.4	24.0	21.8	16.3

1 international dollar=7.99 pesos (base year: 2012)
Purchasing power parity

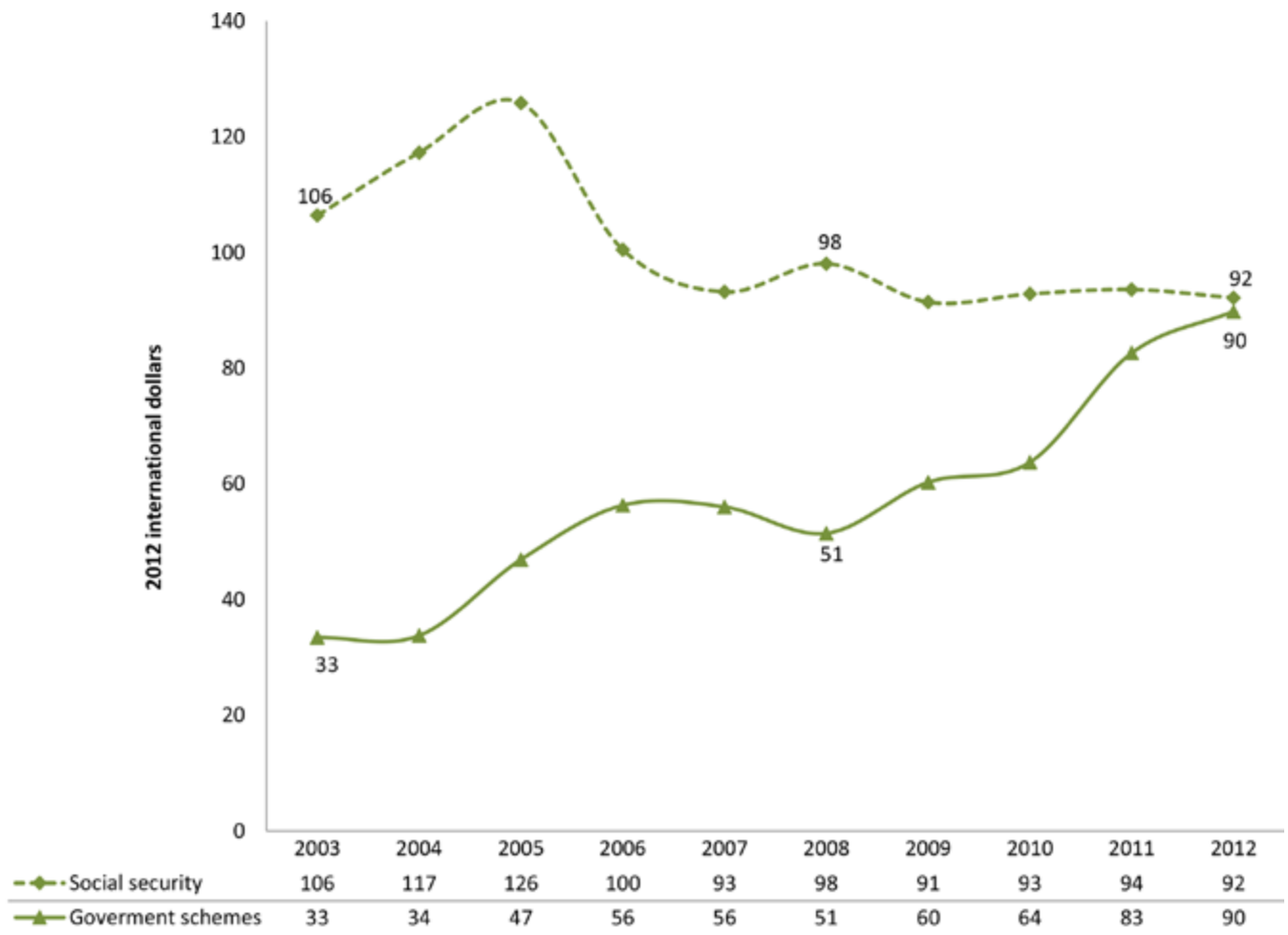
Fig 2. MHFP expenditure by financing scheme, 2003–2012. (A) Total, public and private MHFP expenditure. (B) MHFP expenditure by financing scheme. Public expenditure rose over the period analyzed because of a dramatic growth in government scheme spending. By contrast, private expenditure fell as a corollary of the drop in OOP spending.

doi:10.1371/journal.pone.0147923.g002

Overall government expenditure rose markedly (by roughly 317%) for this period. Allocations increased for the social security population until 2005, and then fell by approximately 20% over the following year, remaining fairly constant for the remainder of the period analyzed. The sharpest drop occurred in OOP expenditure, which fell from 50.2% of total MHFP expenditure in 2003 to just under 16% in 2012, a drop of 74% (Fig 2B).

Between 2003 and 2012, national expenditure on social security per WoRA decreased by 13%, but increased almost threefold on the other government schemes. As a result, the ratio of the difference in expenditure between social security and other government schemes dropped from 3.18 in 2003 to only 1.03 in 2012 (Fig 3).

During the period analyzed, public expenditure on treatment of complications increased, with 2012 levels 37% higher than in 2003 (Fig 4). Public expenditure on preventive care rose between 2003 and 2006, dropped again to a low point in 2008–2009, concluding in 2012 with an increase of 62% over 2003 figures. As a result, public expenditure on complications dropped from 178.5% of expenditure on preventive care in 2003 to 150.7% in 2012 (Fig 4).

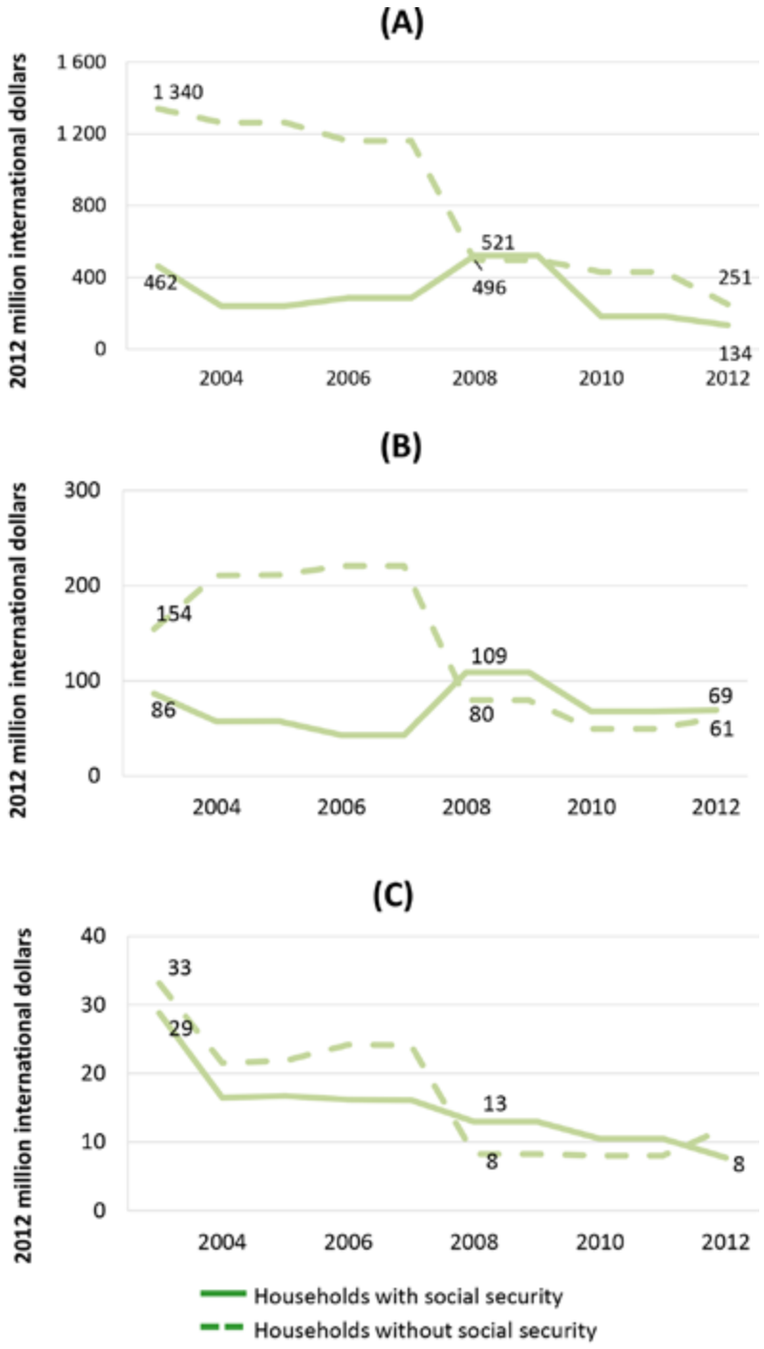


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Social security	106	117	126	100	93	98	91	93	94	92
Goverment schemes	33	34	47	56	56	51	60	64	83	90

PPP 2012: 1 international dollar=7.99 pesos (base year :2012)
Purchasing power parity

Fig 3. Public expenditure on MHFP by financing scheme per WoRA, 2003–2012.

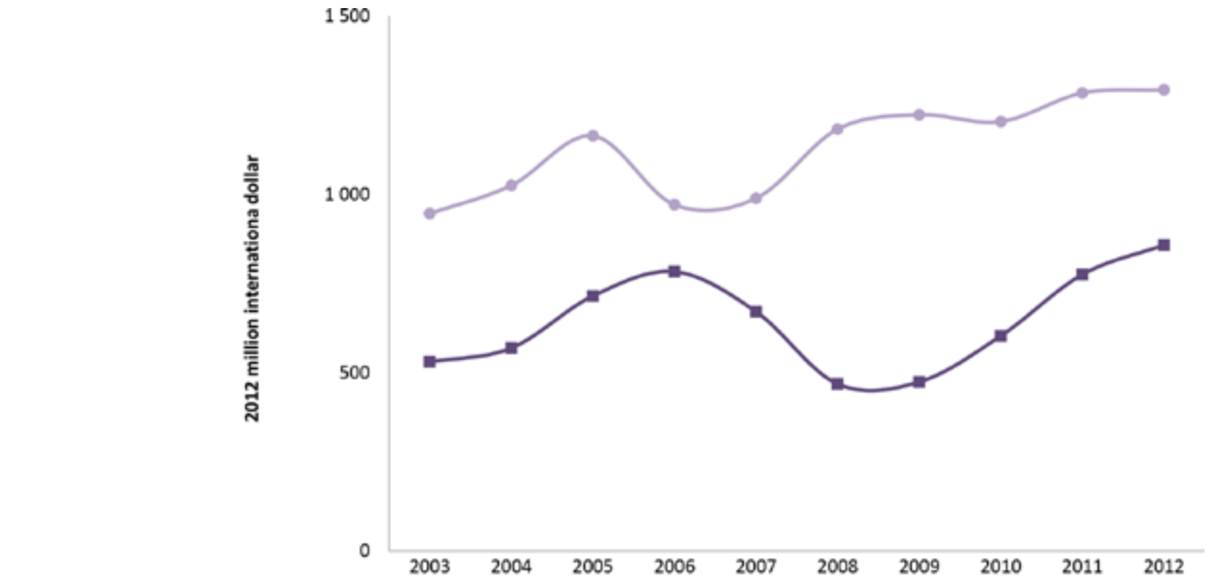
doi:10.1371/journal.pone.0147923.g003



1 international dollar=7.99 pesos (base year: 2012)
Purchasing power parity

Fig 4. Public MHFP expenditure by health function, 2003–2012.

doi:10.1371/journal.pone.0147923.g004



Public expenditure	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Preventive care*	530	569	715	783	671	468	474	603	775	858
Complications from pregnancy or childbirth+	946	1 025	1 164	971	989	1 183	1 223	1 204	1 284	1 293
Public expenditure on complications as a percentage of expenditure on preventive care actions	178.5	180.1	162.8	124.0	147.4	252.5	258.0	199.7	165.7	150.7

* Preventive care includes antenatal, postpartum and family planning health services offered at health care centers.
+ Includes hospital outpatient and impatient care for complications of pregnancy, childbirth and miscarriages
PPP 2012 1 international dollar= 7.99. Purchasing power parity (base year: 2012)

Fig 5. Out-of-pocket expenditure on selected health functions, 2003–2012. (A) Childbirth (vaginal or cesarean) as well as pregnancy and childbirth related complication. (B) Antenatal care. (C) Family planning. Across functions, the decrease of OOP expenditure in households without social security was greater than that in other households.

doi:10.1371/journal.pone.0147923.g005

Fig 5 shows OOP expenditure on selected health functions by households with and without social security. For households without social security, 2003–2012 saw a steady decrease in OOP spending on childbirth and complications, representing an 81% reduction over 2003 expenditure. OOP expenditure in these households also decreased by 61% for antenatal care, and 64% for family planning services. Expenditure by households with social security on childbirth and complications, and antenatal care continued to fall steadily until 2007. It then began to rise, peaking in 2008, and then reducing again, concluding in 2012 with reductions of 71% and 20%, respectively, over 2003. OOP expenditure on family planning dropped progressively throughout the period analyzed, reaching a total decrease of 73% by 2012.

Across health functions, except family planning, OOP expenditure for households without social security dropped more substantially than for households with social security.

In 2003, expenditure by government schemes on MHFP at the state level showed a moderate association with the potential demand (Spearman's rho = 0.65; p = 0.00) (Panel 6a). Throughout

the 10 years analyzed, this association increased (Spearman's rho = 0.75; p = 0.00), with average expenditure on government schemes rising significantly at the state level (χ^2 = 9.9; p = 0.00).

The financial gap among states narrowed for government schemes, with a maximum/minimum ratio of 103.8/4.1 (25.3) in 2003 versus 288.4/24.3 (11.86) in 2012 (S1 Appendix). There were, however, significantly larger disparities between spending levels in different states for the population without social security (Fig 6A and 6B). In the social security-funded population, the relationship between expenditure and potential demand remained stable (Fig 6C and 6D).

The government schemes tightened the alignment between expenditure and potential demand during the period from 2003 to 2012. However, a high degree of variability persists among states.

Discussion

This past decade, Mexico has witnessed a significant transformation in the level and distribution of MHFP expenditure. These changes flowed directly from the policies implemented between 2003 and 2015, designed to address the fifth MDG and improve access to MHFP services alongside major health system reforms. Policies were focused mainly on women without access to social security, and designed to provide financial protection for the poorest households. Our results show that the changes in expenditure were consistent with the financial objectives of the MHFP policies, although not all of these objectives have been met.

Overall, from 2008 onward, public spending on the population without social security increased continually, with a consequent drop in OOP expenditures. These changes proved even more pronounced than those reported for total health expenditure in Mexico [21], due to the existence of synergistic effects following the introduction of the SSPH and the *Embarazo Saludable* strategy. Our findings concur with those of other studies suggesting that the SSPH has boosted both the enrollment of pregnant women in the *SP* and the use of publicly-funded MHFP services [31,32].

The results of this study also demonstrate that, between 2003 and 2012, social security expenditure on MHFP activities decreased by 10%, despite a 38% growth in the total budget for the social security scheme [21]. This can be explained by the 9% reduction that occurred during the period analyzed in the number of hospital inpatient days related to childbirth (vaginal and cesarean), and to the treatment of complications during pregnancy and childbirth [33]. Future studies will be required to determine the effects of these changes on the quality of the services delivered.

The combination of more spending by government schemes and less by social security clearly accounts for the increased financial parity between the two. However, spending levels vary widely among SESAs. This is partly due to the persistence of traditional budgeting practices accounting for 64% of total health expenditure. This may end up countering the effects of the newly introduced SSPH allocation mechanisms, which have enabled government schemes to improve their alignment of fresh resources with potential demand. Purchasing decisions concerning goods and services also vary a great deal among the public financing schemes. While these decisions are taken at the federal level for social security, they are made at the state level for government schemes. In the case of *SP*, problems in accountability between state and federal government have been reported [34–36]. Future studies should analyze whether changes in financial allocation criteria improve resource administration and efficiency.

The results also show that households without social security experienced greater reductions in OOP expenditure than their counterparts. This is particularly true for childbirth services. It can therefore be assumed that expanded coverage of such services at the institutional level contributes to the financial protection of these households. Various studies have pointed out the

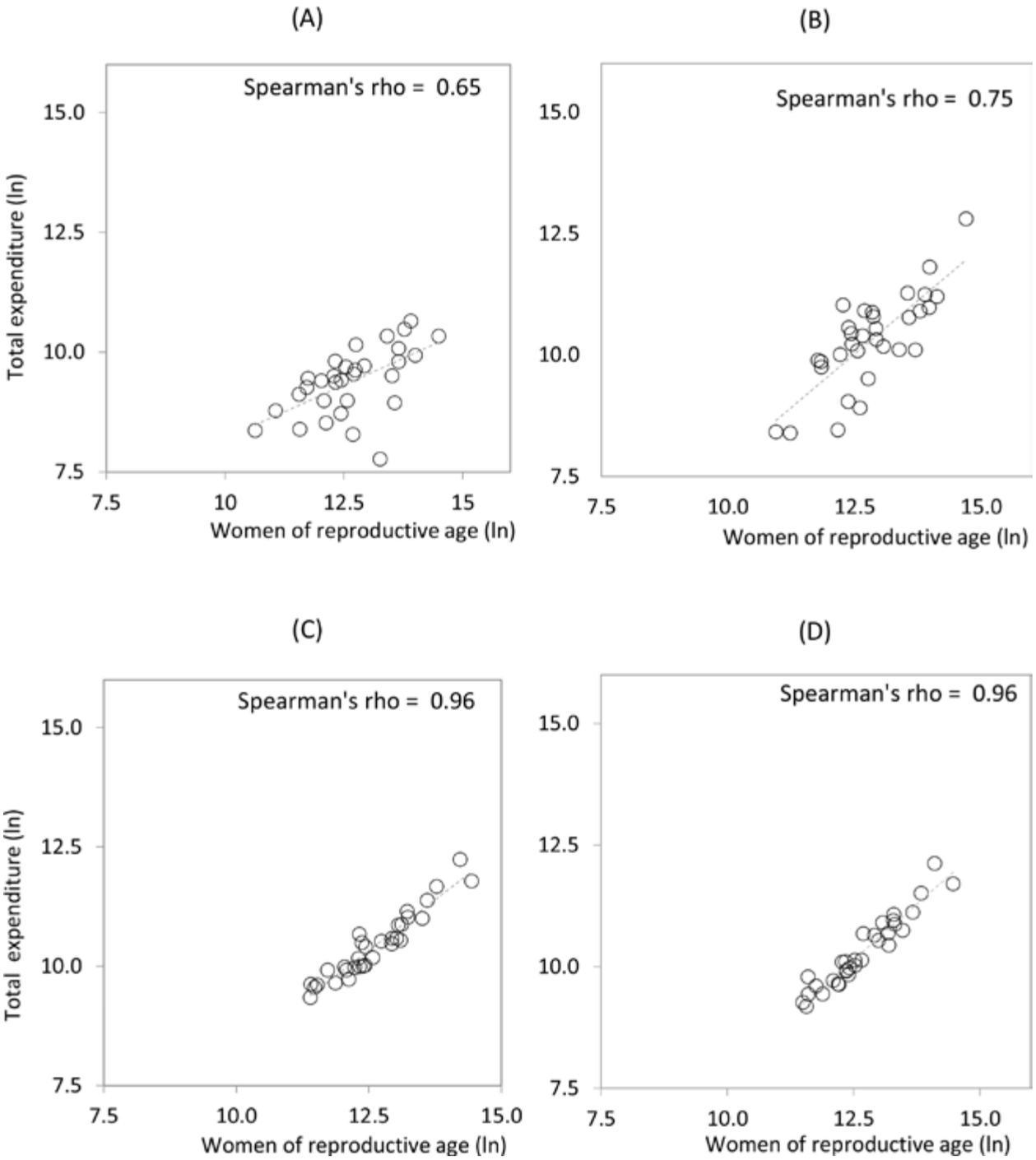


Fig 6. Public expenditure by state according to financing scheme and number of WoRA (logarithms), 2003 and 2012. (A) Government schemes, 2003. (B) Government schemes, 2012. (C) Social security, 2003. (D) Social security, 2012. Although government schemes improved the alignment of expenditure with potential demand from 2003–2012, a high degree of variability persists among states.

doi:10.1371/journal.pone.0147923.g006

central role of *SP* in increasing the use of public hospital services [37,38], especially for childbirth [32], and in enhancing the financial protection for households using services from the MoH [39,40].

The shift in public spending towards prevention rather than treatment of pregnancy and childbirth complications reflects the government's efforts to improve MHFP service coverage [32,41,42]. The apparently contradictory rise in public spending on complications can be explained by recent decisions to increase the number of *SP* affiliates and the launch of the Comprehensive Strategy for Reducing Maternal Mortality.

While many important improvements have been made in MHFP funding, various studies in Mexico have pointed out that the increase in institutionalized childbirth services does not appear to be linked to an adequate reduction in either maternal mortality or qualified obstetric care [32]. Research has also shown that gaps in the delivery of effective pregnancy and childbirth services persist in some states, particularly for vulnerable populations [42]. The need to improve coverage for these services and enhance availability of contraception is clear [41–43]. Achieving better maternal health outcomes requires not only increases in public spending on services, but also effective targeting to ensure the adoption of preventive actions in family planning and antenatal care. Pregnancy and childbirth services also need improvement.

The RHS are designed to collect the best and most complete financial data on reproductive health. They have their limitations, however, especially their sources of information. Analyzing household expenditure on family planning relies on a biannual household survey centered only on the purchase of family planning methods. We incorporated data from other sources, particularly the National Reproductive Health Survey, to complete this information. Financial data, particularly on government schemes, are not standardized, mainly because of the newly installed SSPH, but also as a result of delays and possible misreporting at the state level. This could cause errors in the assessment and comparability of public funding information. Seeking to reduce possible bias, we interviewed financial officers in each institution, and collected additional data to improve the quality of analysis.

The financial changes resulting from the policies implemented between 2003 and 2012 suggest that Mexico is on the right track. It is imperative, however, to reflect on the internal and external factors influencing resource allocation and expenditure efficiency (i.e. SESA mechanisms for purchasing and decision-making, political changes and economic policies), while also considering the need to modify such factors in the short and medium term to improve state-level performance. More in-depth analysis is required to determine the association between state-level MHFP expenditure and effective coverage of services, and to identify opportunities for improvement in maternal health policies.

Conclusions

The establishment and continuous development of RHS in Mexico over the past 10 years have made it possible to demonstrate their usefulness in charting the financial panorama of reproductive health at the national level. RHS have also contributed to clarifying the financial consequences of policies. As policies are developed to take the MDGs beyond 2015 [44], the RHS are useful in examining the resource flows related to these goals. The Commission on Information and Accountability for Women's and Children's Health [45] has recommended analysis of resource flows as the first step towards measuring the financial impact of MHFP policies. The second step is to analyze the achievements in health outcomes and contrast them with investments [46]. This requires a commitment from governments to strengthening their health accounting systems and creating new instruments to measure outcomes and better understand the consequences of policies on their target populations.

The global forums currently defining the Sustainable Development Goals and Post-2015 Development Agenda [47] have stipulated that actions to improve the health of women and families must play a central role in public policy. Within this context, tracking of resources in healthcare should be a means to assess accountability and a fundamental tool for evidence-based decision-making and resource allocation.

Supporting Information

S1 Appendix. Maternal health and family planning expenditure per woman of reproductive age in Mexico, 2003–2012, by state and financial scheme. 2012 PPP USD.
(DOCX)

Acknowledgments

The authors would like to express their gratitude to the Mexican Social Security Institute, the Institute of Social Security and Services for Civil Servants, the *IMSS-Oportunidades* program, and the Ministry of Health for granting access to financial data as well as hospital inpatient and outpatient databases.

Author Contributions

Conceived and designed the experiments: LAB LCH. Performed the experiments: LAB LCH JMH. Analyzed the data: LAB LCH JMH ESM. Wrote the paper: LAB LCH JMH ESM BAG ADZ.

References

1. The United Nations. Health in the post-2015 UN development agenda. Washington DC, 2012. Available: http://www.un.org/millenniumgoals/pdf/Think%20Pieces/8_health.pdf.
2. Organización de las Naciones Unidas. Objetivos de Desarrollo del Milenio. Geneva, Switzerland, 2014. Available: http://www.onu.org.mx/objetivos_de_desarrollo_del_milenio.html.
3. Hubert C. Maternal Mortality Trends in Mexico: State Differences. Population Research Center, University of Texas at Austin, 2013. Available: http://paa2013.princeton.edu/papers/131199
4. Gabinete de Desarrollo Humano y Social/Comisión Intersecretarial de Desarrollo Social. Los Objetivos de Desarrollo del Milenio en México: Informe de Avance 2006. Mexico City, Gabinete de Desarrollo Humano y Social/Comisión Intersecretarial de Desarrollo Social; 2006.
5. Presidencia de la República. Los Objetivos de Desarrollo del Milenio en México. Informe de Avances 2010. Mexico City, Presidencia de la República; 2011.
6. Knaul FM, Gonzalez-Pier E, Gomez-Dantes O, Garcia-Junco D, Arreola-Ornelas H, Barraza-Llorens M, et al. The quest for universal health coverage: achieving social protection for all in Mexico. Lancet. 2012; 380(9849):1259–79. doi: 10.1016/S0140-6736(12)61068-X PMID: 22901864
7. Gómez-Dantés O, Sesma S, Becerril VM, Knaul FM, Arreola H, Frenk J. Sistema de salud de México. Salud Publica Mex 2011; 53 supl 2:S220–S232
8. Secretaría de Salud. Financiamiento Justo y Protección Social Universal: La Reforma Estructural del Sistema de Salud en México. Mexico City: Secretaría de Salud, 2004.
9. Knaul FM A-OH, Méndez O. Protección financiera en salud: México, 1992 a 2004. Salud Publica Mex. 2005; 47:430–9. PMID: 16983988
10. Lopez J, Martínez-Valle A, Aguilera N. Reforming the Mexican Health System to Achieve Effective Health Care Coverage. Health Systems & Reform, 2015; 1(3):181–188.
11. Nigenda G, Wirtz V, González-Robledo LM, Reich M. Evaluating the Implementation of Mexico's Health Reform: The Case of Seguro Popular. Health Systems & Reform.2015; 1(3):217–228.
12. Frenk J, Gonzalez-Pier E, Gomez-Dantes O, Lezana MA, Knaul FM. Comprehensive reform to improve health system performance in Mexico. Salud Publica Mex. 2007; 49 Suppl 1:S23–36. PMID: 17469397

13. Knaul FM, Arreola-Ornelas H, Mendez-Carniado O, Bryson-Cahn C, Barofsky J, Maguire R, et al. Evidence is good for your health system: policy reform to remedy catastrophic and impoverishing health spending in Mexico. Lancet. 2006; 368(9549): 1828–41. PMID: 17113432

14. Cahuana-Hurtado L, Avila-Burgos L, Perez-Nunez R, Uribe-Zuniga P. Analysis of reproductive health expenditures in Mexico, 2003. Rev Panam Salud Publica. 2006; 20(5): 287–98. PMID: 17316486

15. Avila-Burgos L, Montañez-Hernández JC, Cahuana-Hurtado L, Aracena-Genao B. Cuentas en salud reproductiva y equidad de género. Estimación 2012 y comparativo 2003–2012. Mexico City, Instituto Nacional de Salud Pública; 2014.

16. Organisation for Economic Co-operation and Development, Eurostat, World Health Organization. A System of Health Accounts. Paris, OECD Publishing; 2011

17. World Health Organization. Guide to producing reproductive health subaccounts within the national health accounts framework. Geneve, Switzerland; World Health Organization, 2009.

18. European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank. 2009. New York, UN. Available: http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf.

19. World Health Organization. The World health report 2000: health systems: improving performance. Geneva, Switzerland: WHO, 2000. Available: http://www.who.int/whr/2000/en/wh00_en.pd?ua=

20. Diario Oficial de la Federación. Norma oficial mexicana NOM-007-SSA2-1993, Atención de la mujer durante el embarazo, parto y puerperio y del recién nacido. Criterios y procedimientos para la prestación del servicio. Mexico City, Diario Oficial de la Federación. 1993.

21. Secretaria de Salud. Sistema Nacional de Información en Salud. Boletín de Información Estadística. Volumen IV Recursos Financieros. Mexico City: Secretaría de Salud. 2003–2012. Available: http://www.dgis.salud.gob.mx/contenidos/publicaciones/p_bie.html

22. Asociación Mexicana de Instituciones de Seguros. Accidentes y enfermedades. Estadística Anual (SESA). 2003–2012. Available: http://www.amis.org.mx/InformaWeb/Documentos/Archivos/SESA%20AyE%202012.pdf

23. Instituto Nacional de Estadística y Geografía. Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2002–2014. Available http://www.inegi.org.mx/est/contenidos/Proyectos/encuestas/hogares/regulares/enigh

24. Instituto Nacional de Estadística y Geografía. Calculadora de inflación 2014. Available: http://www.inegi.org.mx/sistemas/indiceprecios/calculadorainflacion.aspx

25. Ávila-Burgos L. Cahuana-Hurtado L. Pérez-Nuñez R, Aracena-Genao B, Vázquez-Meseguer V. Desarrollo de Subanálisis de Cuentas en Salud. El caso de las Cuentas en Salud Reproductiva y Equidad de Género en México. Mexico City: FUNSALUD; 2006.

26. Secretaría de Salud. Dirección General de Información en Salud. Proyecciones de la población por condición de derechohabiencia, 2010–2015, DGIS. Available: http://pda.salud.gob.mx/cubos/

27. Secretaría de Salud. Dirección General de Información en Salud. Estimaciones de población de México 1990–2030, CONAPO Censo 2010 Available: http://pda.salud.gob.mx/cubos19.

28. Organisation for Economic Co-operation and Development. Purchasing power parities (PPPs) Data. Available: http://www.oecd.org/std/prices-ppp/purchasingpowerparitiespppsdata.htm

29. Bhutta ZA, Chopra M, Axelson H, Berman P, Boerma T, Bryce J, et al. Countdown to 2015 decade report (2000–10): taking stock of maternal, newborn, and child survival. Lancet 2010; 375(9730):2032–44 doi: 10.1016/S0140-6736(10)60678-2 PMID: 20569843

30. StataCorp. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP; 2013

31. Gobierno de la República. Sistema de Información de los ODM México2014 [updated 10 October 2014]. Available: http://www.objetivosdedesarrollodelmilenio.org.mx/odm/odm.htm.

32. Lazcano-Ponce E, Schiavon R, Uribe-Zuniga P, Walker D, Suarez-Lopez L, Luna-Gordillo R, et al. Coverage for birth care in Mexico and its interpretation within the context of maternal mortality. Salud Publica Mex. 2013; 55 Suppl 2:S214–24. PMID: 24626698

33. Dirección General de Información en Salud (DGIS). Base de egresos sobre egresos hospitalarios del Sector Salud 2004–2014: Sistema Nacional de Información en Salud (SINAIS). Available: http://www.dgis.salud.gob.mx/contenidos/basesdedatos/std_egresoshospitalarios.html

34. González Block MA; Nigenda López G; Téllez S, Trejo S, González-Robledo LM y cols. Evaluación del Sistema de Protección Social en Salud, 2007. Resumen Ejecutivo. Instituto Nacional de Salud Pública. Available: http://portal.salud.gob.mx/codigos/columnas/evaluacion_programas/pdf/EXT07_SPSS_SE.pdf

35. INSP, Secretaria de Salud. Evaluación del Sistema de Protección Social en Salud, 2009. Resumen Ejecutivo. Instituto Nacional de Salud Pública, Secretaria de Salud. Available: http://portal.salud.gob.mx/codigos/columnas/evaluacion_programas/pdf/EXT09_SPSS_SE.pdf.

36. Orozco E, Gonzalez-Block MA, Rouvier M, Arredondo A y T Bossert. Evaluación, retos e innovaciones de la gestión de los regímenes estatales de protección social en salud para la cobertura universal. Cuernavaca, INSP, 2011. Available: http://www.insp.mx/images/stories/Centros/ciss/publicaciones/Docs/retos_innovaciones.pdf.

37. Lazcano-Ponce E G-DH, Rojas R, Garrido-Latorre F. Sistema de Protección Social en Salud. Evaluación externa 2012. Cuernavaca, México: Instituto Nacional de Salud Pública; 2013. p. 256. Available: http://www.insp.mx/images/stories/Produccion/pdf/140108_proteccionSocial.pdf

38. Gutiérrez JP R-DJ, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L,Romero-Martínez M, Hernández-Ávila M. Encuesta Nacional de Salud y Nutrición 2012. Resultados Nacionales. Cuernavaca, Morelos: INSP; 2012. Available: http://ensanut.insp.mx/informes/ENSANUT2012ResultadosNacionales.pdf. [Accessed 13 July 2014].

39. Avila-Burgos L, Servan-Mori E, Wirtz VJ, Sosa-Rubi SG, Salinas-Rodriguez A. Effect of Seguro Popular on health expenditure in Mexican households ten years after its implementation. Salud Publica Mex. 2013; 55 Suppl 2:S91–9.

40. Sosa-Rubi SG, Galarraga O, Harris JE. Heterogeneous impact of the "Seguro Popular" program on the utilization of obstetrical services in Mexico, 2001–2006: a multinomial probit model with a discrete endogenous variable. Journal of health economics. 2009; 28(1):20–34. doi: 10.1016/j.jhealeco.2008.08.002 PMID: 18824268

41. Allen-Leigh B, Villalobos-Hernandez A, Hernandez-Serrato MI, Suarez L, de la Vara E, de Castro F, et al. Use of contraception and family planning in adolescent and adult women in Mexico. Salud Publica Mex. 2013; 55 Suppl 2:S235–40 PMID: 24626700

42. Heredia-Pi I S-ME, Reyes-Morales H, Lozano R. Gaps in the continuum of care during pregnancy and delivery in Mexico. Salud Publica Mex. 2013; 55 (Suppl 2):S282–8.

43. Campero Cuenca L, Atienzo EE, Suarez Lopez L, Hernandez Prado B, Villalobos Hernandez A. Sexual and reproductive health among adolescents in Mexico: evidence and proposals. Gaceta medica de Mexico. 2013; 149(3):299–307. PMID: 23807332

44. The Partnership for Maternal, Newborn and Child Health. Consultations on updating the Global Strategy for Women's, Children's and Adolescents' Health: Perspectives on the Global Financing Facility. 2014. Available: http://www.everywomaneverychild.org/news-events/news/1009-perspectives-on-the-global-financing-facility-pmnch-releases-consultation-report.

45. WHO. Manteniendo promesas evaluando los resultados Nueva York, NY2011. Available: http://whqlibdoc.who.int/publications/2011/9789243564326_spa.pdf.

46. Levine R BK. CGD Reports [Internet]. Development CfG, editor. Washington DC, United States2007. Available: http://www.isn.ethz.ch/Digital-Library/Publications/Detail/?ots591=0c5449.e3b3-1e9c-be1e-2c24-a6a8c7060233&lng=en&id=39588.

47. The United Nations. Sustainable Development Knowledge Platform. 2015. Internet. Available: https://sustainabledevelopment.un.org/post2015/declaration.

VALUE IN HEALTH 15 (2012) 593–603

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/jval

ORIGINAL RESEARCH
Economic Evaluation

Heterogeneous Effects of Health Insurance on Out-of-Pocket Expenditure on Medicines in Mexico

Veronika J. Wirtz, PhD[1], Yared Santa-Ana-Tellez, MSc[2], Edson Servan-Mori, MSc[2,], Leticia Avila-Burgos, PhD[1]*

[1]*Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Mexico;* [2]*Center for Evaluation and Survey Research, National Institute of Public Health, Cuernavaca, Mexico*

A B S T R A C T

Objective: Given the importance of health insurance for financing medicines and recent policy changes designed to reduce health-related out-of-pocket expenditure (OOPE) in Mexico, our study examined and analyzed the effect of health insurance on the probability and amount of OOPE for medicines and the proportion spent from household available expenditure (AE) funds. **Methods:** We conducted a cross-sectional analysis by using the Mexican National Household Survey of Income and Expenditures for 2008. Households were grouped according to household medical insurance type (Social Security, Seguro Popular, mixed, or no affiliation). OOPE for medicines and health costs, and the probability of occurrence, were estimated with linear regression models; subsequently, the proportion of health expenditures from AE was calculated. The Heckman selection procedure was used to correct for self-selection of health expenditure; a propensity score matching procedure and an alternative procedure using instrumental variables were used to correct for heterogeneity between households with and without Seguro Popular. **Results:** OOPE in medicines account for 66% of the total health expenditures and 5% of the AE. Households with health insurance had a lower probability of OOPE for medicines than their comparison groups. There was heterogeneity in the health insurance effect on the proportion of OOPE for medicines out of the AE, with a reduction of 1.7% for households with Social Security, 1.4% for mixed affiliation, but no difference between Seguro Popular and matched households without insurance. **Conclusion:** Medicines were the most prevalent component of health expenditures in Mexico. We recommend improving access to health services and strengthening access to medicines to reduce high OOPE.

Keywords: health insurance, medicines, Mexico, out-of-pocket expenditure, Seguro Popular.

Copyright © 2012, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.

Introduction

Medicines are essential for treating many diseases and for preventing health complications, disability, and mortality. Many low- and middle-income countries, however, struggle to achieve equitable, timely, and sustainable access to essential medicines. In low- and middle-income countries, health-related out-of-pocket expenditure (OOPE) for medicines represent between 26% and 63% of total OOPE [1]. Although the variation in the values for OOPE reported in the literature might be due to study design, the literature shows in general that medicines represent one of the most significant components of health OOPE. In 2003, Brazilian households spent 41% of health expenditures on medicines [2]; in India, 75% of household health OOPE were spent on medicines [3]; in Bangladesh, the figure was 70% [4]; in Burkina Faso, OOPE rose to more than 80% [5]; and in Vietnam, the total was 88% [6]. The largest inequities were reported for income groups in which the most disadvantaged in terms of income spend proportionally more on medicines [1,7].

In 2006, Mexico had the highest OOPE for pharmaceuticals (88%) among all Organisation for Economic Co-operation and Development (OECD) countries [8]. What are the reasons for such a high percentage of out-of-pocket expenditure? Plausible causes are 1) insufficient insurance coverage, which means that a considerable part of the population still lacks insurance; 2) insurance plans that only partly cover medicines; 3) insufficient availability of medicines at the point of care due to unreliable supply systems; and 4) personal preferences to use fee-for-service providers instead of services provided by public health organizations or prepaid insurance plans. Previous studies of health expenditures in Mexico have focused on catastrophic household expenditure on health and its components [9–11]; all these studies concluded that medicines are the first or second most important component, together with ambulatory care, of catastrophic health care expenditure. Knaul et al. [11] found that medicines are the most significant component of health expenditure for low-income households, amounting to approximately 50% of catastrophic health expenditure for households in the first quintile, whereas for the richest quintile they make up less than 20%.

* *Address correspondence to:* Edson Servan-Mori, Center for Evaluation and Survey Research, National Institute of Public Health, Avenue Universidad 655, Cuernavaca, CP 62100, Mexico.
E-mail: eservan@insp.mx.

1098-3015/$36.00 – see front matter Copyright © 2012, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.
doi:10.1016/j.jval.2012.01.006

Policies to reduce out-of-pocket expenditure

The 2001-2006 and 2007-2012 Mexican governments have implemented a series of policies that aim to reduce OOPE on health and medicines in particular. The principal policy to address access to health care and reduce household expenditure on health has been the creation of Seguro Popular (SP), which provides a basic package of around 250 health interventions including the provision of about 300 medicines free of charge at the point of care [12,13]. Other relevant policy changes have aimed to improve the availability of medicines at Ministry of Health facilities. For many decades these facilities have suffered from frequent medicines stock-outs because of a mix of underfunding, logistical failures, and lack of skilled personnel [14,15]. A presidential initiative was launched in 2003 to improve the logistics in distribution systems in each of the 31 federal states and the capital district [16]. In 2007, the newly incoming government signed agreements with the pharmaceutical industry and the Social Security institutions to ensure fair public procurement prices and functioning distribution systems [17]. The government organized several high-level meetings among all public health sector providers to kick-start an initiative to provide a comprehensive package of interventions to improve the availability of medicines in public institutions, including the establishment of an emergency plan in case of shortages of medicines, exchange of experiences with other institutions within and outside Mexico, and regular evaluations [17,18].

Given the importance of health insurance for financing medicines and the recent policy changes to promote the reduction of OOPE, the aim of our study was to analyze the causal effect of health insurance on the probability of incurring OOPE for medicines and the proportion of household available expenditure (AE) required.

Health insurance in Mexico

The Mexican health system is divided according to employment in the formal sector and informal or agricultural sectors [19]. Formal sector employees are enrolled (by mandate) in Social Security; the most important is the Mexican Institute of Social Security (Instituto Mexicano del Seguro Social), which provides services to private sector workers. In 2010, the Mexican Institute of Social Security enrollments represented 48.8% of the total population of 112 million. This was followed by the Social Security Institute for Government Employees, which provides health services to federal government and state employees, covering 10% of the population [20]. Social insurance (including the Mexican Institute of Social Security and Social Security Institute for Government Employees) provides a broad package of prepaid interventions, services, and medicines included in the institutional formulary; medicines prescribed by physicians working for the Social Security are dispensed at the point of care free of charge to the user. The System of Social Protection System in Health, or SP, a voluntary system of public insurance for the poor without access to Social Security, was implemented in 2004; in 2010, just over 43 million people were enrolled, 92% of whom were located in the first two income deciles [21]. Finally, in 2010, only 3% of the population had prepaid private health insurance; most of those were already covered by one of the Social Security plans. People older than 65 years do not automatically become covered by Social Security. Enrollment into Social Security depends on the employment (or former employment in case of pensioners).

Although in 2011 virtually all of the Mexican population was covered by some type of public insurance, it is relevant to note that the package of services and medicines provided as well as the quality varies significantly among different insurance types. An important issue is the availability of medicines included in the formularies of each insurance type and which should be provided without charge: between 78% and 89% of Social Security users receive their prescriptions free of charge, whereas in SP only 60% of users receive free prescriptions [22].

Methods

Data and sampling

By using the National Household Survey of Income and Expenditures (NHIES) 2008, we conducted a cross-sectional observational and causal analysis. The NHIES is the largest survey on income and expenditure in Mexico and represents the national level as well as rural and urban strata [23]. It includes detailed information on all types of income and expenditures for households in addition to individual socioeconomic and demographic characteristics for all household members. For the present study, the household was the unit of observation. In total, the database included 29,468 observations, out of which 28,260 were eligible for analysis (households with missing, incorrect, or incomplete information were not included).

Out of 28,260 households included in our analysis, 23.6% of households reported having no health insurance, 31.1% of households had Social Security, 34.0% had mixed affiliations, and 11.3% had SP (Table 1). Although there were only small differences with regard to mean age and proportion of females versus males among households according to insurance status, there were marked differences in socioeconomic characteristics and local development conditions: 71% of the heads of households with Social Security had a secondary or higher level education, only 4% reported no schooling, and 5% spoke an indigenous language. In contrast, only 32% of the heads of households with SP reported a secondary or higher level education, 15% received no schooling, and 18% spoke an indigenous language. Households with Social Security were characterized by the highest percentage of members older than 60 years (18%), while those with SP had the highest percentage of children younger than 5 years (12%). Although only around 18% of households with Social Security belonged to the socioeconomic status 1 and 2, 74% of households with SP belonged to these socioeconomic status groups. Around 31% of SP households were also beneficiaries of Progresa/Oportunidades and 68% were living in rural and 34% in highly deprived areas (vs. 17% and 4% with Social Security, respectively).

Exposure variables

Households were stratified according to the four types of members' medical insurance: 1) Social Security, 2) SP, 3) mixed affiliation (household members have either different insurance types or only some members of the household were insured), and 4) no insurance affiliation.

Outcome variables

We identified three outcome variables: the probability of OOPE for medicines, total OOPE on medicines, and the proportion of total medicines OOPE out of AE. All expenditures in Mexican pesos were converted into US dollars as of 2008 (exchange rate 11.8 Mexican pesos = 1 USD) [24]. The total OOPE on medicines was calculated by taking the sum of all expenditures reported by households in the last 3 months of 2008 for the purchase of medicines, regardless of whether obtained with a medical prescription; this was multiplied by 4 to obtain the annual OOPE on medicines (data in the survey are reported as quarterly expenditure).

The AE was calculated by using the methodology suggested by Xu et al. [25]: taking the average value of household food expenditures adjusted for household size for the range of 45% to 55%. The

Table 1 – Main characteristics of the sample.

	All (N = 28,260, 100%)	Social security (N = 8779, 31.07%)	Mixture (N = 9615, 34.02%)	Without coverage (N = 6682, 23.64%)	Seguro popular (N = 3184, 11.26%)	Without Seguro popular (N = 6529, 23.10%)
Head of household						
Sex						
Men	75.03	76.15	72.74	75.41	77.73	75.43
Women	24.97	23.85	27.26	24.59	22.27	24.57
Age (in yrs.)	48.28 (15.46)	47.69 (15.87)	51.14 (14.49)	46.48 (15.50)	45.44 (15.61)	46.42 (15.52)
Schooling						
None	9.89	3.88	11.25	13.44	14.95	13.65
Primary	39.78	25.47	44.65	44.87	53.27	45.81
Secondary	31.49	36.93	28.80	29.62	28.11	30.16
More than secondary	18.85	33.72	15.30	12.08	3.68	10.38
Indigenous						
Yes	10.87	4.83	11.09	14.92	18.37	15.26
No	89.13	95.17	88.91	85.08	81.63	84.74
Demographic						
Proportion of people aged younger than 5 yrs.	0.088 (0.143)	0.078 (0.141)	0.084 (0.131)	0.089 (0.149)	0.116 (0.161)	0.091 (0.149)
Proportion of people aged older than 60 yrs.	0.148 (0.292)	0.186 (0.346)	0.119 (0.208)	0.139 (0.299)	0.151 (0.318)	0.139 (0.298)
Household						
Beneficiary of Progresa/Oportunidades						
Yes	10.27	1.780	11.96	8.74	30.68	8.945
No	89.73	98.22	88.04	91.26	69.32	91.06
Healthy index	0.766 (0.117)	0.778 (0.125)	0.767 (0.102)	0.760 (0.122)	0.744 (0.124)	0.758 (0.121)
SES index, quintile						
1	19.85	4.740	17.50	30.38	43.84	31.09
2	20.15	12.80	20.89	23.87	30.40	24.32
3	20.11	20.77	21.92	18.93	16.08	19.05
4	20.03	28.17	20.78	14.71	7.35	14.49
5	19.86	33.52	18.90	12.11	2.32	11.04
Locality						
Rural						
Yes	34.50	17.26	32.79	42.10	68.22	43.05
No	65.50	82.74	67.21	57.90	31.78	56.95
Deprivation level						
Low	74.52	90.47	76.18	66.96	44.41	66.26
Middle	10.26	5.56	9.49	11.49	21.58	11.69
High	15.22	3.98	14.33	21.55	34.01	22.06

Source. 2008 National Survey on Household Income and Expenditure.
Notes. Mean or percentages reported (standard deviation in parentheses). For Healthy index construction, each household member was asked about his or her perceived health status, which was measured on a five-point Likert scale on which 0 indicated very poor and 5 indicated excellent health (the index had values of 0 to 1).
SES, socioeconomic status.

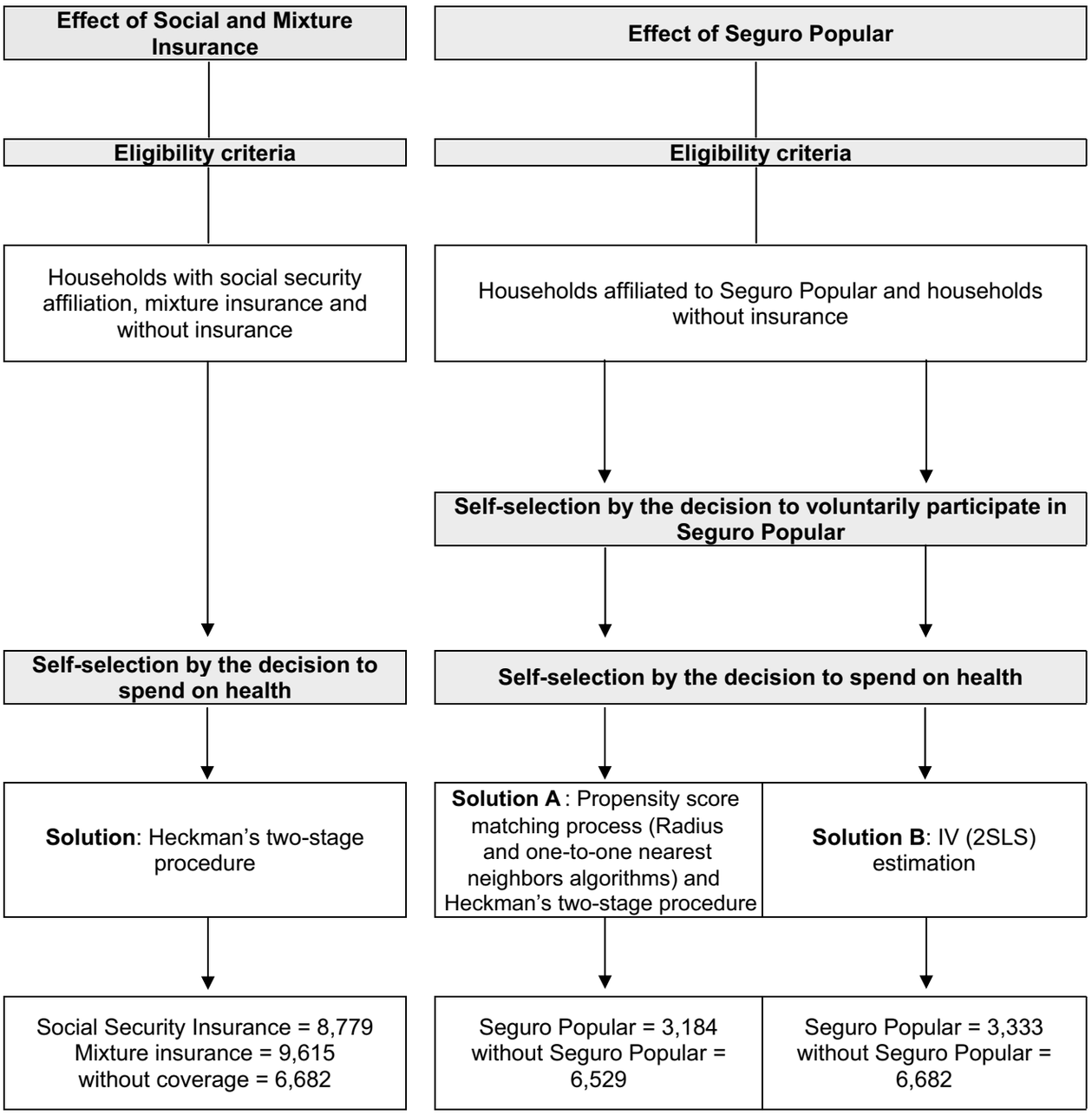


Fig. 1 – Analysis strategy. Source: 2008 National Survey on Household Income and Expenditure. The original sample size was estimated by considering 15% of nonresponse rate (n = 29,468). After excluding outliers and missing values in outcomes variables, the original sample was reduced 4.1%. The final sample analysis was 28,260. 2SLS, two-stage least squares; IV, instrumental variable.

AE was the difference between the total household and the subsistence household expenditures.

Control variables

The following characteristics of household heads were included: speaking an indigenous language, sex, age, and schooling level (no schooling, primary, secondary, more than secondary schooling). At the household level, the number of children (0–5 years old), age older than 60 years, household participation in the social conditional cash transfer program Oportunidades [26], and household insurance as defined above were included. A global household health index (each household member was asked about his or her perceived health status measured on a five-point Likert scale where 0 indicated very poor and 5 excellent health) was created to account for the self-reported health status of household members: each household member had to rate his or her health status on a scale of 1 (very poor) to 5 (excellent). The sum of the individual value for each household

Table 2 – Test of balancing property of the propensity score.

Sample	Mean		%reduction		t test	
	Treated	Control	%bias	|bias|	t	P > t
Head of household						
Men						
Unmatched	0.779	0.754	6.000		2.810	0.005
Matched	0.777	0.781	−0.800	86.60	−0.330	0.744
Age (y)						
Unmatched	45.16	46.49	−8.500		−4.030	0.000
Matched	45.44	45.26	1.100	86.80	0.450	0.656
Schooling level: Primary						
Unmatched	0.532	0.449	16.70		7.890	0.000
Matched	0.533	0.533	−0.200	99.00	−0.070	0.947
Schooling level: Secondary						
Unmatched	0.287	0.296	−2.100		−1.000	0.318
Matched	0.281	0.274	1.500	31.30	0.590	0.555
Schooling level: More than secondary						
Unmatched	0.035	0.121	−32.40		−14.10	0.000
Matched	0.037	0.037	0.000	99.90	0.020	0.986
Indigenous						
Unmatched	0.180	0.149	8.400		4.010	0.000
Matched	0.184	0.188	−1.000	87.80	−0.390	0.698
Demographic						
Proportion of people aged younger than 5 y						
Unmatched	0.121	0.090	19.700		9.440	0.000
Matched	0.116	0.117	−0.900	95.70	−0.330	0.744
Household						
SES index						
Unmatched	−2.579	−1.127	−44.00		−20.26	0.000
Matched	−2.481	−2.612	4.000	91.00	1.580	0.114
Healthy index						
Unmatched	0.743	0.760	−13.50		−6.400	0.000
Matched	0.744	0.743	0.900	93.10	0.360	0.719
Locality						
Rural						
Unmatched	0.696	0.421	57.60		26.84	0.000
Matched	0.682	0.677	1.200	97.90	0.480	0.630
Deprivation level						
Unmatched	1.918	1.546	43.70		20.82	0.000
Matched	1.896	1.904	−0.900	98.00	−0.340	0.735

Note. The matching process included dummy variables to the 32 Mexican states. The *t* test for these variables satisfies the balancing property. SES, socioeconomic status.

member was divided by the number of household members multiplied by 5 (for the maximum value in the scale). The index had values of 0.2 to 1 and was included as a continuous variable.

In addition, a proxy of socioeconomic level of each household was calculated and divided in quintiles by creating an asset index by using a principal component analysis with polychoric correlation matrix [27,28].

Finally, at locality level, we included urban and rural/semirural strata and economic development status; a social exclusion proxy was based on whether the household was located in an area classified as low, medium, or high deprivation according to the National Council of Population Deprivation Index. This index has been extensively validated and takes into account three major dimensions of economic development: education, housing, and household income [29].

Econometric and empirical approach

The probability of OOPE was calculated by using a linear regression model adjusted for head of household characteristics, socioeconomic and demographic characteristics of household, and local characteristics. For the estimates of the annual expenditure in health and medicines, a quantile regression model [30] was conducted where the expenditure at the 50th percentile was estimated.

Because catastrophic expenditure has been defined as 20% or 30% of AE [2], we explored the probability of spending more than 20% and 30% of the AE on medicines in association with insurance status. We included additional thresholds (1%, 2%, 5%, and 10%) to analyze tendencies [2].

To analyze the effect of household medical insurance on OOPE for medicines it was necessary to account for two potential biases: the first was related to the decision to spend funds on medicines because there may be particular household characteristics that increase the probability of health expenditure. This bias applied to all households irrespective of their insurance type. The second bias was linked to the decision to "buy" insurance because it was hypothesized that households that were regularly incurring or expecting health expenditures in the near future would be more likely to enroll than households without those characteristics. To address these biases, we decided to analyze households with Social Security, mixed affiliation, and without insurance separated from those households with SP where enrollment is voluntary in contrast to mandatory enrollment for Social Security (see Figure 1).

First, to address the selection bias of spending on medicines, we applied (in households with Social Security, mixed affiliation) a Heckman selection procedure [31,32]. The following log probability function was used:

$$L(\beta,\gamma,\sigma_\varepsilon^2,\rho)=\sum_{i=1}^{N}(1-D_i)\ln(1-\Phi(Z_i'\gamma))+\cdots+D_i\left(\ln\Phi\left(\left(Z_i'+\frac{\rho}{\sigma_\varepsilon}(Y_i-X_i'\beta)(1+\rho^2)^{-1/2}\right)+\ln\phi\left(\frac{(Y_i-X_i'\beta)}{\sigma_\varepsilon}\right)-\ln\sigma_\varepsilon\right)\right) \quad (1)$$

This equation assumes joint normality and describes first, the relationship between an outcome of interest Y_i and a vector of covariates X_i, and second, the selection equation, describing the relationship between a binary participation decision D_i and another vector of covariates Z_i. Rho is the correlation coefficient of unobservable characteristics associated with the decision to incur OOPE and the total amount of expenditure.

In this analysis the selection equation included social or mixed health coverage, indigenous language of head of household, the proportion of members being children (0–5 years old) and people aged older than 60 years, household health index, socioeconomic index, urban and rural strata, and the locality deprivation index. The outcome equation includes fixed effects at the state level. The effects of Social Security and mixed insurance were also estimated considering the sample weights given by the sample design [23]. In this case, the estimations suggest similar results.

Regarding the bias of buying insurance, a propensity score matching process [33] was conducted between SP-affiliated households and those without health insurance. The propensity score can be defined as the conditional probability of receiving a treatment given pretreatment characteristics:

$$p(X)=\Pr\{D=1\mid X\}=E\{D\mid X\} \quad (2)$$

where $D = \{0, 1\}$ is the indicator of exposure to SP and X is the multidimensional vector of pretreatment characteristics [33]. If the exposure to treatment is random within cells defined by X, it is also random within cells defined by the values of the monodimensional variable $p(X)$. The parameter that received the most attention in the evaluation literature is the "average treatment effect on the treated.". Given a population of units denoted by i, if the propensity score $p(X_i)$ is known, the average effect of treatment on the treated can be estimated as follows:

$$\begin{aligned}\tau&\equiv E\{Y_{1i}-Y_{0i}\mid D_i=1\}\\&=E\big[E\{Y_{1i}-Y_{0i}\mid D_i=1,p(X_i)\}\big]\\&=E\big[E\{Y_{1i}\mid D_i=1,p(X_i)\}-E\{Y_{0i}\mid D_i=0,p(X_i)\}\mid D_i=1\big]\end{aligned} \quad (3)$$

where the outer expectation is over the distribution of $(p(X_i) \mid D_i = 1)$ and Y_{1i} and Y_{0i} are the potential outcomes in the two counterfactual situations of (respectively) treatment and no treatment.

The nearest neighbor (NN) matching is a frequently used matching estimator. For a treated individual the closest in terms of propensity score in the comparison group is chosen. Alternative ways are the NN matching "with replacement" where an untreated individual can be used more than once as a match and NN matching "without replacement" where an individual is considered only once. The latter was chosen for the present study. To avoid matching by a neighbor very far from the treated individual but with the closest propensity score, we contrasted the NN matching without replacement with the so-called radius matching [34].

Both algorithms for the matching were done by characteristics of head of household (sex, age, education level, and indigenous

Table 3 – Out-of-pocket expenditure on health and medicines and its proportion of the available household expenditure by health insurance status.

	All	Social security	Mixed	Without coverage	Seguro popular	Without Seguro popular
Probability (OOPE in health)	0.542 (0.536–0.548)	0.514* (0.504–0.524)	0.571* (0.562–0.581)	0.562 (0.551–0.574)	0.494* (0.477–0.511)	0.560 (0.548–0.572)
Median OOPE in health	126.0 (120.4–131.6)	147.8* (141.0–154.6)	141.1* (134.9–147.2)	133.9 (126.4–141.4)	85.63* (71.82–99.44)	118.8 (110.7–128.8)
Probability (OOPE in medicines)	0.859 (0.853–0.864)	0.849* (0.839–0.859)	0.853* (0.844–0.862)	0.873 (0.862–0.885)	0.867 (0.851–0.884)	0.873 (0.863–0.884)
Median OOPE in medicines	59.82 (58.22–61.41)	64.16* (61.22–67.11)	61.06* (58.41–63.72)	59.73 (56.53–62.92)	49.43† (44.40–54.46)	56.30 (53.01–59.59)
Median of AE	4674.7 (4605.0–4744.4)	5832.3* (5719.6–5944.7)	4648.2* (4546.7–4749.8)	3229.8 (3106.1–3353.6)	1905.4* (1773.3–2037.4)	2717.2 (2630.6–2803.8)
OOPE in health/AE	0.091 (0.089–0.094)	0.067‡ (0.064–0.070)	0.086* (0.083–0.090)	0.115 (0.110–0.120)	0.117 (0.109–0.125)	0.112 (0.107–0.118)
OOPE in medicines/AE	0.046 (0.044–0.047)	0.034‡ (0.031–0.036)	0.041* (0.039–0.043)	0.058 (0.055–0.062)	0.062 (0.057–0.068)	0.063 (0.058–0.069)
OOPE in medicines/OOPE in health	0.655 (0.650–0.661)	0.652‡ (0.641–0.663)	0.655 (0.645–0.665)	0.665 (0.654–0.676)	0.719‡ (0.701–0.736)	0.653 (0.642–0.664)

Source. 2008 National Survey on Household Income and Expenditure.
Note. Confidence intervals at 95% in parentheses. Models estimated as linear regressions with robust standard errors.
AE, available expenditure; OOPE, out-of-pocket expenditure.
* Significant at the 1% level.
† Significant at the 5% level.
‡ Significant at the 10% level.

Table 4 – Probability of out-of-pocket expenditure on medicines being associated with health insurance status by percentage of the available expenditure thresholds.

Threshold	All	Social security	Mixture	Without coverage	Seguro popular	Without Seguro popular
≥1%	0.632 (0.624–0.640)	0.549* (0.533–0.564)	0.606* (0.593–0.620)	0.710 (0.702–0.732)	0.738† (0.714–0.759)	0.732 (0.709–0.754)
≥2%	0.448 (0.439–0.456)	0.349* (0.335–0.364)	0.427* (0.413–0.440)	0.528 (0.512–0.545)	0.582* (0.556–0.608)	0.520 (0.502–0.537)
≥5%	0.230 (0.223–0.237)	0.155* (0.144–0.166)	0.213* (0.201–0.224)	0.296 (0.282–0.311)	0.326‡ (0.301–0.351)	0.288 (0.273–0.304)
≥10%	0.114 (0.108–0.119)	0.069* (0.062–0.077)	0.099* (0.091–0.108)	0.152 (0.140–0.164)	0.183* (0.163–0.204)	0.147 (0.135–0.159)
≥20%	0.047 (0.043–0.050)	0.029* (0.025–0.035)	0.036* (0.030–0.041)	0.069 (0.060–0.077)	0.073 (0.059–0.086)	0.065 (0.057–0.074)
≥30%	0.025 (0.022–0.028)	0.017* (0.013–0.021)	0.019* (0.015–0.023)	0.036 (0.029–0.042)	0.039 (0.029–0.049)	0.034 (0.028–0.040)

Source. 2008 National Survey on Household Income and Expenditure.
Notes. Social Security and mixture affiliation coverage effects by thresholds adjusted by characteristics of head of household, demographic and socioeconomic at household-level characteristics, and locality characteristics. Thresholds expressed as dummy variables (yes = 1/no = 0). Confidence intervals at 95% in parentheses. Models estimated as linear regressions with robust standard errors.
* Significant at the 1% level.
† Significant at the 10% level.
‡ Significant at the 5% level.

language), the proportion of members being children (0–5 years old), household health index, socioeconomic index, urban and rural strata, the locality deprivation index, and fixed effects at state level. These variables were the most correlated to the probability of SP affiliation. However, results from the two matching methods did not show any differences. Table 2 shows several measures of the balancing of the variables before and after radius matching [33]. All variables included in the matching process satisfy the balancing property.

The results of the propensity score matching were contrasted with estimates that included instrumental variables (IV). Wooldridge [35] proposes a linear model:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_K x_K + u \quad (4)$$

where $E(u) = 0$ and $Cov(x_j, u) = 0$ ($j = 1, 2, \ldots, K-1$), but where x_K might be correlated with u. In other words, the explanatory variables $x_1, x_2, \ldots, x_{K-1}$ are exogenous, but x_K is potentially endogenous in Equation 4. To use the IV approach with x_K endogenous, we need a vector of observable variables, z_1, not in Equation 4 that satisfies two conditions. First, z_1 must be uncorrelated with u ($Cov(z_1, u) \neq 0$)

The second requirement involves the correlated relationship between z_1 and the endogenous variable x_K. A precise statement requires the linear projection of x_K onto all the exogenous variables:

$$x_K = \delta_0 + \delta_1 x_1 + \cdots + \delta_{K-1} x_{K-1} + \theta_1 z_1 + r_K \quad (5)$$

where, by definition of a linear projection error, $E(r_K) = 0$ and r_K is uncorrelated with $x_1, x_2, \ldots, x_{K-1}$ and z_1.

If x_K is the only explanatory variable in Equation 4, then the linear projection is $x_K = \delta_0 + \theta_1 z_1 + r_K$, where $\theta_1 = Cov(z_1, x_K)/Var(z_1)$. From the structural equation (Equation 4) and the reduced form for x_K, we obtain a reduced form for y by plugging Equation 5 into Equation 4 and rearranging:

$$y = \alpha_0 + \alpha_1 x_1 + \cdots + \beta_{k-1} x_{k-1} + \lambda_1 z_1 + v \quad (6)$$

where $v = u + \beta_k r_k$ is the reduced form error, $\alpha_j = \beta_j + \beta_k \delta_j$, and $\lambda_1 = \beta_k \theta_1$ (in addition, v is uncorrelated with all explanatory variables in Equation 6), and so ordinary least squares consistently estimates the reduced form parameters, the α_j and λ_1.

We used the proportion of people affiliated to SP statewide from 2004 to 2008 per state as IV [36]. These variables were used for the following reasons: the high correlation coefficient, the availability of information, and others who have suggested their use [37,38]. In addition, the suggested instrument has been used successfully as shown through statistical tests [35,39]. All analyses were performed with statistical software Stata/SE 11.1 [40].

Results

Descriptive statistics

The overall estimated probability of OOPE for health was 54.2%; the probability of incurring *health-related* OOPE was statistically significantly less for households with Social Security versus non-insured households and less for SP households than for those matched households without insurance. Even though statistically significant, however, the difference was not economically significant (49.4% for SP households vs. 56.0% for households without insurance). The median expenditure among those households spending on health was US$126 per year. Households with Social Security had a median health expenditure of US$147.8 and those with SP US$85.6. The median medicines OOPE was US$60, which for households with Social Security was US$64 versus US$49 for households with SP. Health spending represented 9.1% of the AE (6.7% for households with Social Security, 8.6% with mixed affiliation, and 11.7% with SP). Medicines OOPE represented 4.6% of AE (3.4% of AE for households with Social Security in comparison to 6.2% for SP). Regarding the total health expenditure, medicines OOPE accounted for the majority with nearly 66% overall, 65% in households with Social Security, and 72% for those affiliated with SP (see Table 3).

There was a difference in the probability of incurring OOPE on medicines between types of insurance, as shown in Table 4. Although there was a statistically significant difference in the percentage of OOPE on medicines out of the AE for each threshold between households with Social Security and those without, this was not the case for households with SP and those matched households but without coverage. The probability of incurring OOPE in medicines of more than 30% was 4% for households with SP. The probability of household medicine expenditure greater than 30% of household AE was 1.7% and 1.9% in households with Social Security or a mixture of insurance, respectively, significantly lower than the probability found in households without any type of coverage (3.6%).

Effect of health insurance on OOPE in medicines

There was variation in the probability in medicines OOPE and the amount of medicines OOPE between household health insurance

Table 5 – Effect of the health insurance on out-of-pocket expenditure on medicines.

	Heckman selection model		
PANEL A: Effect of the social security and mixture health insurance on OOPE on medicines			
	Select equal probability of OOPE > 0	Outcome equal amount (annual US$)	Proportion of the household available expenditure
Unweighted effects			
Social Security	−0.285* [0.022]	−26.53* [8.021]	−0.014* [0.002]
Mixture	−0.082* [0.020]	−13.51† [7.273]	−0.012* [0.002]
Sample size	25,076	25,076	25,076
Expanded effects			
Social Security	−0.260* [0.030]	−32.96* [10.45]	−0.017* [0.004]
Mixture	−0.084* [0.029]	−5.725 [9.585]	−0.014* [0.003]
Sample size	23,085,049	23,085,049	23,085,049
LR test of independent equations ($\rho = 0$)			
χ^2		7.120	4.920
Probability > χ^2		0.008	0.027
PANEL B: Effect of Seguro popular on OOPE on medicines			
	Probability of OOPE > 0	Amount (annual US$)	Proportion of the household available expenditure
ATT after PSM process			
One-to-one nearest neighbors matching without replacement	−0.032‡ [0.012]	−15.15* [3.765]	−0.002 [0.002]
Radius matching	−0.029* [0.013]	−12.47* [4.509]	−0.001 [0.002]
Sample size	9,713	9,713	9,713
Heckman selection model by full maximum likelihood after PSM process			
One-to-one nearest neighbors matching without replacement	−0.097* [0.031]	−24.51* [8.470]	−0.002 [0.004]
Sample size	6,666	6,666	6,666
LR test of independent equations ($\rho = 0$)			
χ^2		6.320	2.990
Probability > χ^2		0.012	0.084
Radius matching	−0.096* [0.028]	−21.00‡ [8.645]	0.001 [0.003]
Sample size	9,713	9,713	9,713
LR test of independent equations ($\rho = 0$)			
χ^2		7.910	6.350
Probability > χ^2		0.005	0.012
IV (2SLS) estimation			
Coefficient	−0.158* [0.056]	−30.61‡ [14.47]	−0.001 [0.008]
Anderson canon. corr. LM statistic	301.0	301.0	301.0
χ^2 (1) P value	0.000	0.000	0.000
Cragg-Donald Wald F statistic	81.92	81.92	81.92
Endogeneity test			
χ^2 (1) P value	0.028	0.672	0.383
Sample size	10,015	10,015	10,015

Source. 2008 National Survey on Household Income and Expenditure.
ATT, average treatment effect; OOPE, out-of-pocket expenditure; PSM, propensity score matching; 2SLS, two-stage least square; IV, instrumental variable; LR, Likelihood ratio; canon. corr. LM statistics, canonical correlations Lagrange multiplier. Standard errors in brackets.
* Significant at the 1% level.
† Significant at the 10% level.
‡ Significant at the 5% level.

types (Table 5). Households with Social Security had 28.5% ($P < 0.01$) less probability of spending on medicines; annual spending was reduced by $26.5 ($P < 0.01$), which means a reduction of 1.4% ($P < 0.01$) of medicines OOPE out of the AE in comparison to households without insurance. For households with mixed affiliation, the probability of spending on medicines was reduced by 8% ($P < 0.01$), an amount of US$13.5 ($P < 0.1$), and a reduction of 1.2% ($P < 0.01$) of such expenditure on AE. Finally, the results of the Heckman Selection Model after the propensity score matching process shows that being affiliated with SP reduced the probability by 9.7% ($P < 0.05$) and the annual amount spent by US$24.51 ($P < 0.01$) but showed no significant effect on the percentage of medicines expenditure on the AE in comparison to households without health insurance. The direction of the effect using IV was similar where the effect of SP on the probability (reduction of 15.8%) and the amount (US$30.6 reduction) was statistically significant but not the effect on the OOPE out of AE.

Finally, Figure 2 shows that the effect of insurance status was heterogeneous. Although the percentage of annual AE on medicines was very similar for households without and with mixed

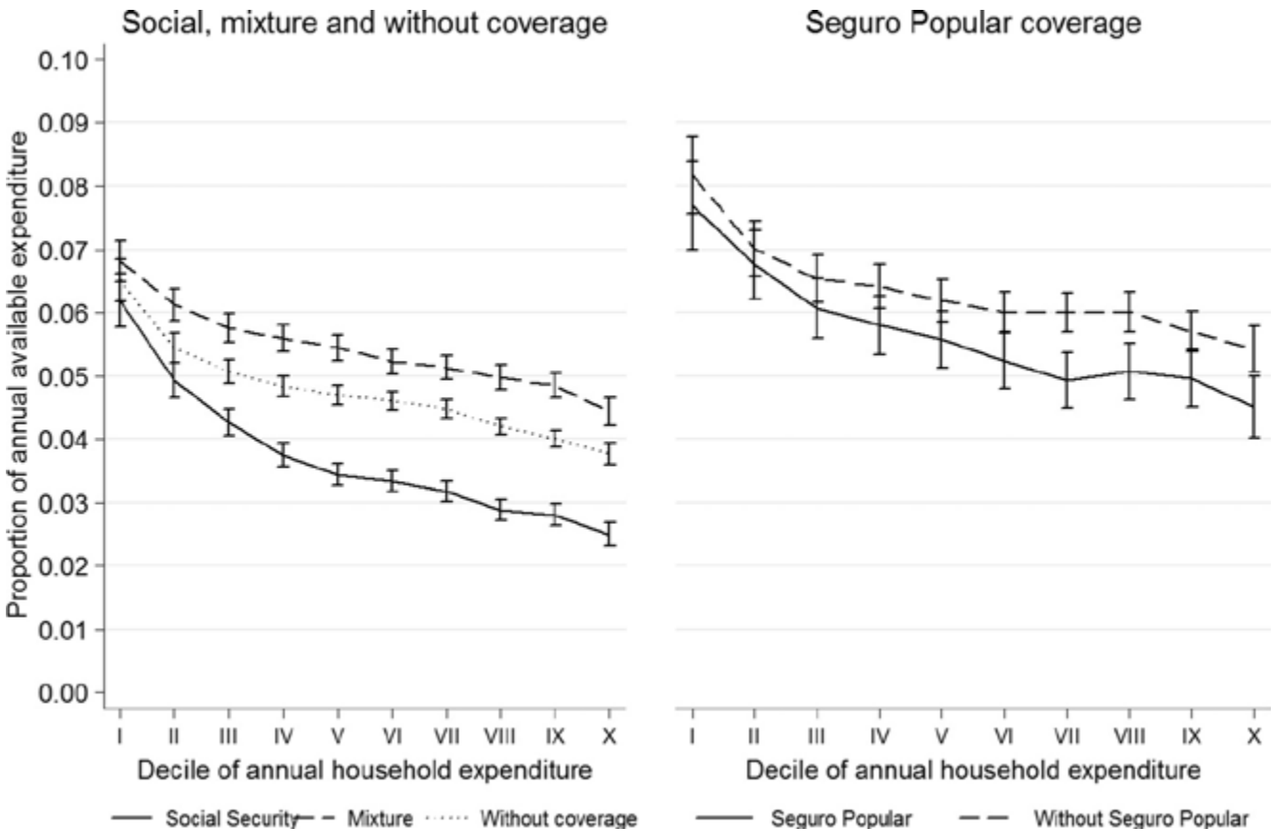


Fig. 2 – Effects of health insurance on the proportion of the available household expenditure spent on medicines by decile of annual household expenditure. Source: 2008 National Survey on Household Income and Expenditure. Whiskers: Confidence intervals at 95%. Models estimated as linear regressions with robust standard errors.

affiliation, those households with Social Security had a reduced percentage. There was an absence of an effect of SP on the percentage of annual AE spent on medicines for all deciles.

Discussion

The results of the present study are relevant in various ways: First, it is one of the first analyses that focuses on medicines OOPE, showing that medicines continue to be one of the principal components of OOPE related to health in Mexico representing 66% of health OOPE even after a series of policy reforms and therefore have an important impact on household economic situations. The proportion of health expenditure on medicines in our study is similar to the findings of a study of eight other low- and lower middle income countries [1]. For households with SP, health-related OOPE spent on medicines were 72%, very similar to India with 75% [3]. The proportion reported in previous analysis of NHIES in 2000 in Mexico was 60% out of health expenditure for the first quintile of the household income group [41].

Furthermore, the study sheds light on the differential effect of health insurance on medicines OOPE: although for households with Social Security the proportion of OOPE for medicines out of AE was reduced compared with those households without insurance, for those households with SP that had medicines OOPE, their insurance did not make a sufficient reduction in medicines OOPE to reduce the proportion of this expenditure on the AE.

It is worth pointing out that households with SP had a median AE of US$1955 compared with US$2252 for matched households without insurance, indicating that the program is targeting those households that are more vulnerable to incur catastrophic household expenditure, which is in line with the objectives of the program and has been reported by others [42]. At the same time, the results also mean that the medicines OOPE must decrease considerably more for SP households to show an effect on the AE and, hence, the proportion of households incurring catastrophic household expenditure, a key objective of the implementation of SP. Possible reasons for continuing OOPE on medicines despite affiliation with SP are: First, the current package of interventions includes 312 medicines [13]. There have been reports that indicate that the medicines included in the list of reimbursements should be revised to better match the clinical needs of pharmacotherapy of the affiliated households [43]. Second, continuing OOPE could be the result of the shortage of medicines in public facilities [14], which has improved in the last two decades but has not been eradicated despite recent strategies to strengthen supply systems [22]. Third, those households with SP with the opportunity to use health services free of charge at the point of the care have incentives to use the services (moral hazard); however, because medicines might not be available or necessary but are not included in the insurance packages, affiliated households are required to spend more on medicines than before [44]. In fact, some of the recent evaluations of SP highlighted problems related to increased demand but insufficient supply of medicines at the point of care [22,43]. Finally, additional analyses suggest that despite being affiliated with SP, households still used a significant percentage of private

providers. The fact that insurance coverage alone does not provide a guarantee of a reduction in OOPE on health and medicines has been highlighted by others [45,46].

The study has some limitations. Medicines expenditure is largely influenced by health status but NHIES does not provide information on diagnosis or any other clinical information for household members. Instead the self-reported health status of each member of the household was taken as a proxy variable for the need of pharmacotherapy, which is justified in the absence of controlled measures of health status. Other studies show that self-reported health status is a valid predictor of health including mortality, and offer the advantage over clinical assessment in being applicable in a household survey [47,48]. Another limitation of the NHIES that is related to the one mentioned before is the fact that the survey collects information about the type of medicines based on reported symptoms (cold, cough, pain, etc.) without collecting information about medical diagnosis or risk factors that would allow more precise information about the therapeutic group of the medicines bought. The study was based on a household survey that asked individual members about their spending, which is related to recall bias [49]. At the same time, the NHIES does not permit analysis at individual level because expenditure is reported at the household level. However, the survey is considered "gold standard" when analyzing income and expenditure in Mexico because it is the most detailed national representative survey available. Because the survey was carried out in the last quarter of 2008 one would expect that the expenditure on medicines related to some diseases such as respiratory infection is higher than in the first two quarters of the year. Finally, one of the main concerns is the existence of bias attributable to the process of deciding whether or not to spend on health. One possibility to correct this is using IV including the probability of spending on health, but this would mean the existence of independence between the steps that seek to correct both biases. We believe that an effective solution to this problem is possible through the estimation of models in three stages simultaneously addressing both types of bias; however, this remains to be a challenge for future studies.

To analyze the medicines OOPE in Mexico in more detail is warranted because the results reveal some relevant questions for policy making. First, what is the impact of SP on medicines OOPE? This study found no difference between households with SP and without insurance with respect to the proportion of medicines OOPE out of the AE. A longitudinal analysis of the medicines OOPE over time or a controlled study with an in-depth analysis of the kind of health expenditure, the therapeutic indication of medicines, and an assessment of diagnosis and therapy is warranted to analyze the impact of the reform on medicines OOPE in detail. The Mexican NHIES does not provide sufficient detail for this type of analysis. Second, are the shortage of medicines in public facilities and the selection of medicines reimbursed by SP the main causes for the fact that households with SP incur medicines expenditures and therefore result in no difference in the proportion of medicines OOPE between households with SP and those without when adjusting for other factors? A study of the medicines indicated for treatment and the diagnosed conditions resulting in OOPE is necessary to answer this question. Third, what are the differences of medicines OOPE between states? Other authors have reported very large differences in public expenditure between states [43]. The survey on which the present study was based is representative only at the national level; however, it would be relevant to obtain representative data for the state level. The states have relative autonomy to decide about the implementation of SP, and high variance in the performance indicators of SP between states has been reported [50].

The recent reforms in Mexico highlight the importance of strategies for strengthening the provision of medicines that accompany policy changes to increase insurance coverage. SP made some impact but has not gone far enough, particularly in relation to expenditure on medicines. Improving access to health services should go hand in hand with improving access to other resources, among them medicines, to ensure achieving one of the principal objectives of the policy reforms in Mexico—the protection of households against catastrophic health expenditure.

Acknowledgments

The authors thank to Sandra G. Sosa-Rubí and Sergio A. Bautista-Arredondo for their helpful comments. Additionally, we would like to thank Ann Payson for her support in editing the manuscript.

REFERENCES

[1] Wagner A, Reiss S, Johnson A, Ross-Degnan D. Results of Feasibility Study Using World Health Survey Data to Measure Medicines Need, Use and Out-of-Pocket Expenditures in Eight Low and Lower-Middle Income Countries. Boston: World Health Organization, Harvard Medical School and Harvard Pilgrim Health Care, 2007.
[2] Barros AJD, Bertoldi AD. Out-of-pocket health expenditure in a population covered by the Family Health Program in Brazil. Int J Epidemiol 2008;37:758–65.
[3] Garg CC, Karan AK. Reducing out-of-pocket expenditures to reduce poverty: a disaggregated analysis at rural-urban and state level in India. Health Pol Plan 2009;24:116–28.
[4] Van Doorslaer E, O'Donnell O, Rannan-Eliya RP, et al. 2005. Paying out-of-pocket for health care in Asia: catastrophic and poverty impact. EQUITAP Project. Working Paper No. 2. Available from: http://www.equitap.org/publications/wps/EquitapWP2.pdf. [Accessed December 10, 2010].
[5] Mugisha F, Kouyate B, Gbangou A, Sauerborn R. Examining out-of-pocket expenditure on health care in Nouna, Burkina Faso: implications for health policy. Trop Med Int Health 2002;7:187–96.
[6] Wagstaff A. Health Insurance for the Poor: Initial Impacts of Vietnam's Health Care Fund for the Poor. Impact Evaluation Series No. 11, Policy Research Working Paper No. WPS4134. Washington, DC: World Bank, 2007.
[7] Kilsztajn S, Camara MB, Carmo MS. Gasto privado com sau'de por classes de renda. Amb Rev Assoc Med Bras 2002;48:258–62.
[8] Moise P, Docteur E. Pharmaceutical Price and Reimbursement Policies—Mexico. Paris: Organization for Economic Cooperation and Development, 2007.
[9] Sesma-Vázquez S, Pérez-Rico R, Sosa-Manzano CL, Gómez-Dantés O. Gastos catastróficos por motivos de salud en México: magnitud, distribución y determinantes. Salud Publica Mex 2005;47(Suppl. 1): S37–46.
[10] Pérez-Rico R, Sesma-Vázquez S, Puentes-Rosas E. Gastos catastróficos por motivos de salud en México: estudio comparativo por grado de marginación. Salud Publica Mex 2005;47(Suppl. 1): S47–53.
[11] Knaul FM, Arreola-Ornelas H, Méndez-Carniado O, et al. Evidence is good for your health system: policy reform to remedy catastrophic and impoverishing health spending in Mexico. Lancet 2006;368: 1828–41.
[12] Knaul F, Frenk J. Health insurance in Mexico: achieving universal coverage through structural reform. Health Affairs 2005;24:1467–76.
[13] National Commission of Social Protection in Health. Intervenciones médicas Catálogo Universal de Servicios de Salud. Mexico City, Mexico: National Commission of Health and Social Protection, 2008.
[14] Gómez-Dantés O, Garrido-Latorre F, Tirado-Gómez LL, et al. Drug supplies in primary care units at the Ministry of Health in México. Salud Publica Mex 2001;43:224–32.
[15] Reséndez C, Garrido F, Gómez-Dantés O. Availability of essential medications at primary level units of the Health Department of Tamaulipas, Mexico. Salud Publica Mex 2000;42:298–308.
[16] Secretaria de Salud. Seguimiento a la Estrategia para la mejora en el Abasto de Medicamentos. Informe del mes de Agosto 2003. DF, Mexico: Secretaria de Salud, 2003.
[17] Secretaria de Salud, Subsecretaria de Innovación y Calidad. Programa Específico 2007–2012: Mejorar el Acceso a Medicamentos. DF, Mexico: Secretaria de Salud, 2007.
[18] Secretaria de Salud, [National Meeting about Successful Practices of Drug Distribution.]. DF, Mexico: Secretaria de Salud, 2009.

[19] Frenk J, González-Pier E, Gómez-Dantés O, et al. Reforma integral para mejorar el desempeño del sistema de salud en México. Salud Publica Mex 2007;49(Suppl. 1):S23–36.
[20] Instituto Nacional de Encuesta y Geografía (INEGI). Principales resultados del Censo de Población y Vivienda 2010. 2010. Available from: http://www.inegi.org.mx/est/contenidos/proyectos/ccpv/cpv2010/principales2010.aspx. [Accessed September 2, 2011].
[21] Secretaría de Salud. Sistema de Protección Social en Salud. Informe de resultados enero a junio 2011. Available from:http://www.seguro-popular.gob.mx/images/contenidos/Informes_Resultados/informe_resultados_1sem_2011.pdf[Accessed September 2, 2011].
[22] Wirtz V, Russo G, Kageyama Escobar M de la L. Access to medicines by ambulatory health service users in Mexico: an analysis of the national health surveys 1994 to 2006. Salud Publica Mex 2010;52:32–40.
[23] Instituto Nacional de Encuesta y Geografía. Encuesta nacional de ingresos y gastos de los hogares. DF, Mexico: Instituto Nacional de Encuesta y Geografía, 2009.
[24] Servicio de Administración Tributaria México. Currency Change. DF, Mexico: Servicio de Administración Tributaria México, 2008. Available from: http://www.sat.gob.mx/sitio_internet/asistencia_contribuyente/informacion_frecuente/tipo_cambio/42_10819.html. [Accessed June 10, 2010].
[25] Xu K, Evans DB, Kawabata K, et al. Household catastrophic health expenditure: a multicountry analysis. Lancet 2003;362(9378):111–7.
[26] Fernald LC, Gertler PJ, Neufeld LM. 10-year effect of Oportunidades, Mexico's conditional cash transfer programme, on child growth, cognition, language, and behaviour: a longitudinal follow-up study. Lancet 2009;374:1997–2005.
[27] Moser C, Felton A. The Construction of an Asset Index Measuring Asset Accumulation in Ecuador. Washington, DC: The Brooking Institute, 2007.
[28] Kolenikov S, Angeles G. Socioeconomic status measurement with discrete proxy variables: is principal component analysis a reliable answer? Working paper. 2008. Available from: http://web.missouri.edu/~kolenikovs/papers/polychoric-technical-4.pdf. [Accessed June 10, 2010].
[29] CONAPO (Consejo Nacional de Población). Índices de Marginación a nivel localidad 2005. 2005. Mexico City, Mexico: CONAPO. Available from: http://www.conapo.gob.mx/publicaciones/indice2005xloc.htm. [Accessed October 15, 2009].
[30] Angrist JD, Pischke JS. Mostly Harmless Econometrics: An Empiricist's Companion. Princeton, NJ: Princeton University Press, 2009.
[31] Heckman JJ. Sample selection bias as a specification error. Econometrica 1979;47:153–61.
[32] Heckman JJ. Selection bias and self-selection. In: Eatwell J, Milgate M, Newman P, eds., The New Palgrave: Econometrics. New York: Norton, 1990.
[33] Rosenbaum P, Rubin D. The central role of the propensity score in observational studies for causal effects. Biometrika 1983;70:41–50.
[34] Dehejia RH, Wahba S. Propensity score matching methods for nonexperimental causal studies. Rev Econ Stat 2002;84:151–61.
[35] Wooldridge JM. Econometric Analysis of Cross Section and Panel Data. Cambridge, MA: The MIT Press, 2002.
[36] National Commission of Health and Social Protection. Padrón Seguro Popular. Familias beneficiadas por Municipios y Localidades. DF, Mexico: National Commission of Health and Social Protection, 2009. Available from: http://www.seguro-popular.salud.gob.mx/index.php?option=com_content&view=article&id=76&Itemid=106. [Accessed December 12, 2009].
[37] Galárraga O, Sosa-Rubí S, Salinas-Rodríguez A, Sesma-Vázquez S. Health insurance for the poor: impact on catastrophic and out-of-pocket health expenditures in Mexico. Eur J Health Econ 2010;11:437–47.
[38] Trujillo AJ, Portillo JE, Vernon JA. The impact of subsidized health insurance for the poor: evaluating the Colombian experience using propensity score matching. Int J Health Care Fin Econ 2005;5:211–39.
[39] Cameron AC, Trivedi PK. Microeconometrics Using Stata. College Station, TX: Stata Press, 2009.
[40] Stata Corp LP. Stata/SE 11.0 for Windows XP 64 bits. College Station, TX: Stata Corp LP, 2009.
[41] Nigenda G, Troncoso E, Orozco E. Mezcla público-privada en el sector salud. In: Knaul FM, Nigenda G, eds., Reflexiones sobre la situación en México. Caleidoscopio de la salud: De la investigación a las políticas y de las políticas a la acción. Mexico City, Mexico: Fundación Mexicana para la Salud, 2003.
[42] Sosa-Rubi S, Ávila D, Téllez-Rojo MM, Nigenda G. In: González-Block MA, Nigenda-López G, Téllez M, eds., Evaluación de Procesos Administrativos. Sistema de Protección Social en Salud, 2007. Cuernavaca, Mexico: Instituto Nacional de Salud Publica, 2008.
[43] Ávila-Burgos L, Wirtz V, Cahuana L, Russo G. In: González-Block MA, Nigenda-López G, Téllez M, eds., Capítulo 5: Medicamentos. Evaluación de Procesos Administrativos. Sistema de Protección Social en Salud, 2007. Cuernavaca, Mexico: Instituto Nacional de Salud Publica, 2008.
[44] Gakidou E, Lozano R, González-Pier E, et al. Evaluación del impacto de la reforma mexicana de salud 2001-2006: un informe inicial. Salud Publica Mex 2007;49(Suppl. 1):88–109.
[45] Wagstaff A, Lindelow M. Can insurance increase financial risk? The curious case of health insurance in China. J Health Econ 2008;27:990–1005.
[46] Wagner AK, Johnson Graves A, Reiss SK, et al. Access to care and medicines, burden of health care expenditures and risk protection: results from the World Health Survey. Health Pol 2011;100:151–8.
[47] Avila-Burgos L, Ramirez-Valverde G, Martinez-Damian MA, et al. Socioeconomic determinants of inequality and self-reported morbidity among adolescents in a developing country. Saudi Med J 2005;26:1617–23.
[48] Kuhn R, Rahman O, Menken J. Relating Self-Reported and Objective Health Indicators to Adult Mortality in Bangladesh. Boston MA: Annual Meeting, Population Association of America, 2004.
[49] Bertoldi AD, Barros AJD, Wagner A, et al. A descriptive review of the methodologies used in household surveys on medicine utilization. BMC Health Serv Res 2008;8:222.
[50] González Robledo LM, Nigenda G, González Block M, et al. In: González-Block MA, Nigenda-López G, Téllez M, eds., Capitulo IV: Separación de Funciones. Evaluación de Procesos Administrativos. Sistema de Protección Social en Salud, 2007. Cuernavaca, Mexico: Instituto Nacional de Salud Publica, 2008.

Capítulo 4.
Recursos humanos para la salud

Los recursos humanos en salud son un pilar fundamental del sistema de salud. La fuerza de trabajo del personal de salud está directamente vinculada con la prestación de atención en todos los niveles. Su fortalecimiento no sólo mejora los indicadores sanitarios, sino que también fortalece las comunidades y asegura el avance hacia la cobertura universal, por lo que requiere mayor inversión, formación básica y capacitación continua, así como incentivos y otras medidas. Desde el personal comunitario hasta el que trabaja en las instituciones de salud más especializadas, su labor es esencial para garantizar el acceso equitativo a la atención médica, la calidad y la continuidad de la atención, la prevención de enfermedades y la promoción de la salud. Desde hace más de dos décadas, el CISS ha desarrollado estudios que sirven de evidencia para informar la toma de decisiones e impulsar políticas orientadas hacia su fortalecimiento.

A pesar de su importancia, el sistema de salud enfrenta múltiples desafíos relacionados con los recursos humanos en salud. En primer lugar, escasez de personal, tanto en zonas rurales como urbanas con alta demanda de atención, lo cual genera sobrecarga de trabajo, disminuye la calidad de la atención y prolonga los tiempos de espera. Además, el personal suele concentrarse en zonas urbanas privilegiadas, mientras que en regiones rurales y zonas urbanas con mayores desventajas sociales hay menor disponibilidad. El personal de salud también suele enfrentar condiciones laborales precarias caracterizadas por bajos salarios, largas jornadas y falta de seguridad laboral, las cuales afectan su desempeño y bienestar. Por otra parte, si bien las mujeres representan la mayor parte del personal de salud, generalmente enfrentan barreras para acceder a puestos de liderazgo y mejores condiciones laborales. Como resultado de las situaciones anteriores, las largas jornadas de trabajo y el multiempleo afectan la salud mental y provocan fatiga que, a su vez, es la causa de errores médicos y de la reducción de la calidad del servicio. Finalmente, los cambios y avances en medicina requieren actualización y formación permanente, pero en muchos sistemas de salud la inversión en educación continua es insuficiente.

Los artículos de investigadores del CISS que se reúnen en este capítulo abordan temas como la formación intercultural de los recursos humanos para ofertar servicios de salud adecuados a la población indígena, la ampliación de los roles de enfermería como estrategia para mejorar la eficiencia del sistema de salud y enfrentar la creciente expansión de enfermedades crónicas, y la experiencia de trabajadoras comunitarias en salud mental. En otro estudio, se analiza la desigualdad de género en el sistema de salud en México en cuanto al acceso a roles de liderazgo y condiciones laborales equitativas. Finalmente, presentamos un estudio que aborda las condiciones de trabajo en consultorios adyacentes a farmacias, en el cual se destaca la precarización laboral de los médicos y sus efectos sobre la calidad de la atención.

PAN AMERICAN JOURNAL OF PUBLIC HEALTH 100 YEARS

Investigación original

Exploración de facilitadores y barreras para implementar los roles ampliados de enfermería en México

María Guadalupe Casales-Hernández,[1] Hortensia Reyes-Morales,[2] Gustavo Nigenda[3] y Sebastián García-Saisó[4]

Forma de citar Casales-Hernández MG, Reyes-Morales H, Nigenda G, García-Saisó S. Exploración de facilitadores y barreras para implementar los roles ampliados de enfermería en México. Rev Panam Salud Publica. 2023,47:e142. https://doi.org/10.26633/RPSP.2023.142

RESUMEN

Objetivo. Explorar la percepción de los profesionales de enfermería respecto a los facilitadores y las barreras para la implementación de funciones ampliadas de enfermería en una entidad federativa de México.
Métodos. Estudio cualitativo de tipo descriptivo con enfoque fenomenológico. Durante el 2022 se realizaron 18 entrevistas semiestructuradas a tres tipos de informantes: a) jefaturas estatales de enfermería, b) jefaturas jurisdiccionales de enfermería, y c) jefaturas de unidad de salud y personal de enfermería operativo (atención directa a pacientes).
Resultados. Se identificaron los siguientes facilitadores: disposición de adopción de la estrategia (postura favorable de directivos y aceptabilidad del personal de enfermería), reorganización de funciones (simplificación de procesos y análisis de la situación de unidades de salud) y acceso a la capacitación y características del personal de enfermería (profesionalización, experiencia laboral y actitud favorable). Entre las barreras se encontraron: contexto del primer nivel de atención (falta de personal, exceso de actividades administrativas, falta de espacio físico, carencia de material, insumos y consumibles), resistencia al cambio (celo profesional por otras disciplinas y duplicidad de tareas), salarios del personal, falta de actualización, poca confianza para el incremento de funciones y actitud de los pacientes (resistencia a la atención por enfermería).
Conclusiones. Comprender la percepción de los profesionales de enfermería permite identificar elementos clave para la ampliación exitosa de las funciones de enfermería a partir de la expansión de competencias laborales del personal operativo; será necesaria una reorganización y una gestión adecuada en los diferentes niveles de toma de decisiones.

Palabras clave Enfermería; diabetes mellitus; investigación cualitativa; México.

El personal de enfermería representa aproximadamente la mitad de los recursos humanos para la salud a nivel mundial; y en la Región de las Américas constituye 56%. Sus funciones son fundamentales en los servicios de salud de todos los niveles de atención (1); la ampliación de sus funciones es una estrategia que tiene efectos potenciales en el desempeño del sistema de salud.

El rol ampliado de enfermería (RAE) surge como respuesta a las necesidades de salud de la población y como estrategia

[1] Programa de Doctorado en Ciencias Sociomédicas, Universidad Nacional Autónoma de México, Ciudad de México, México.
[2] Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública, Cuernavaca, México. ✉ Hortensia Morales-Reyes, hortensia.reyes@insp.mx
[3] Facultad de Enfermería y Obstetricia, Universidad Nacional Autónoma de México, Ciudad de México, México.
[4] Departamento de Evidencia e Inteligencia para la Acción en Salud, Organización Panamericana de la Salud, Washington, D. C., Estados Unidos de América.

Este es un artículo de acceso abierto distribuido bajo los términos de la licencia Creative Commons Attribution-NonCommercial-NoDerivs 3.0 IGO, que permite su uso, distribución y reproducción en cualquier medio, siempre que el trabajo original se cite de la manera adecuada. No se permiten modificaciones a los artículos ni su uso comercial. Al reproducir un artículo no debe haber ningún indicio de que la OPS o el artículo avalan a una organización o un producto específico. El uso del logo de la OPS no está permitido. Esta leyenda debe conservarse, junto con la URL original del artículo. Crédito del logo y texto open access: PLoS, bajo licencia Creative Commons Attribution-Share Alike 3.0 Unported.

Casales-Hernández MG, Reyes-Morales H, Nigenda G, García-Saisó S. Exploración de facilitadores y barreras para implementar los roles ampliados de enfermería en México. Rev Panam Salud Publica. 2023;47:e142. https://doi.org/10.26633/RPSP.2023.142

para el uso eficiente del personal de salud (2). Estos roles se conceptualizan en dos dimensiones: el desempeño autónomo de funciones y el tipo de competencias que se deben tener para realizar esas funciones (3). Sus competencias se relacionan con el fortalecimiento de la práctica clínica y de gestión, habilidades avanzadas para la valoración del estado de salud e incremento del razonamiento diagnóstico que le permite mayor grado de autonomía para la toma de decisiones clínicas y complejas, así como ser el punto de entrada a los servicios de salud (3).

Los sistemas de salud que redistribuyen las tareas entre los equipos de salud y fortalecen las competencias del personal de enfermería para ampliar sus roles aumentan la disponibilidad de servicios para la población al utilizar de manera eficiente el recurso humano y, con ello, mejorar la calidad de la atención (2). La ampliación de funciones en los ámbitos clínicos y comunitarios se ha observado en diversos países en años recientes, y México no es la excepción (4). Sin embargo, este crecimiento ha sido muy incipiente debido a la segmentación del sistema de salud en el país y que favorece la inequidad, con tres subsistemas que operan en paralelo con capacidad distinta en número y tipo de personal de salud: 1) esquemas de seguridad social para población con empleo formal, 2) servicios de asistencia pública para los no asegurados, y 3) sector privado (5). Si bien en México la formación de enfermería se categoriza en nivel técnico, profesional (licenciatura) y posgrado (especialidades, maestrías y doctorados) (6) aún la mayor proporción de los servicios se ofrece con un enfoque desde la atención médica individual, en el que poco participa el personal de enfermería, cuyo déficit en el sistema de salud ha sido documentado (7).

El incremento en los patrones epidemiológicos de la población mexicana hacia enfermedades crónicas como la diabetes mellitus de tipo 2 (DM2), la hipertensión y otras enfermedades metabólicas requieren de un cambio en la estrategia del sistema a través de un modelo que privilegie la atención primaria. Esto implica redefinir el rol del personal de salud.

Un elemento que justifica los RAE en el componente de DM2 es que México ocupa el séptimo lugar en el mundo con 11,7 millones de personas adultas que viven con DM2 (8). Desde el 2013, la mortalidad por DM2 se encuentra en segundo lugar entre las enfermedades no transmisibles y en primer lugar como causa básica de muerte en el país (9, 10), con una prevalencia en el 2018 de 10,3% y de 18,3% en el 2022 (11).

Por ello, desarrollar estrategias nuevas como los RAE en el contexto mexicano puede tener resultados efectivos como se ha comprobado en otras latitudes (12) y, así, incrementar la capacidad del sistema de salud para la atención de personas con DM2. Sin embargo, antes de aplicar estrategias nuevas, es conveniente valorar sus ventajas; entre ellas, explorar la percepción del personal de enfermería (con identificación de ideas y juicios) para planificar la expansión de los roles para el cuidado de los pacientes con DM2. Por lo anterior, el objetivo del presente estudio es explorar la percepción de los profesionales de enfermería respecto a los facilitadores y las barreras para la implementación de RAE en una entidad federativa de México.

MATERIALES Y MÉTODOS

Se realizó un estudio cualitativo descriptivo con base en un enfoque fenomenológico (13) para explorar, a través de casos individuales y desde una perspectiva construida colectivamente y a profundidad, la percepción del personal de enfermería en un estado del centro de México.

La recopilación de la información se realizó durante el 2022 a través de entrevistas semiestructuradas presenciales con tres tipos de informantes: a) jefas de enfermería a nivel directivo del estado; b) jefes y jefas jurisdiccionales de enfermería (la jurisdicción sanitaria es una unidad técnico-administrativa desconcentrada por región); y c) jefes y jefas de unidades de salud y personal de enfermería en contacto directo con pacientes.

La investigadora principal acudió con las autoridades estatales de salud, a quienes presentó el proyecto y obtuvo la aprobación para realizarlo. Se solicitó a la jefa de enfermería a nivel estatal invitar a participar a todas las enfermeras responsables estatales de gestión de enfermería, de primer nivel de atención y gestión hospitalaria, así como a las seis jefas de enfermería jurisdiccionales. Estas últimas invitaron a seis jefes de enfermería de unidades primarias y a dos enfermeras asignadas a la atención de pacientes. Todos los informantes aceptaron participar en la entrevista de manera voluntaria, previo consentimiento escrito. Cada entrevista tuvo una duración promedio de 50 minutos, y se realizaron en espacios privados.

La guía de entrevista utilizada fue diseñada exprofeso con base en criterios metodológicos de redacción y estructura (14). Los temas para explorar fueron: el contexto general de las unidades de primer nivel; las habilidades y destrezas del personal de enfermería; la actualización, el desempeño, las funciones y el compromiso del personal; la identificación de RAE; y los facilitadores, barreras y aceptabilidad para implementar los RAE.

Dos expertas en investigación cualitativa en RAE revisaron de forma independiente la versión inicial de la guía de entrevista, se realizó un piloto que permitió identificar el rigor y replicabilidad y, por último, se ajustó para su versión final.

Se audiograbaron las entrevistas y luego se les transcribió para el análisis de contenido (15). Con foco en el discurso de los participantes, tres investigadores generaron de forma independiente un listado de categorías y códigos, el cual se organizó según temas y subtemas identificados, con previa verificación de la calidad de las transcripciones al comparar la grabación de audio con los textos. Además, la investigadora principal verificó la concordancia de codificación y se agregaron temas emergentes (no considerados en la guía de entrevista). Las percepciones se registraron en tres matrices, una por cada tipo de informante; se clasificaron las recurrentes (mencionadas por al menos dos de los tres tipos de informantes) y se categorizaron las de influencia positiva en facilitadores, mientras que las barreras incluyen aquellas que pueden tener una influencia negativa para implementar RAE. El análisis se realizó con el programa ATLAS.ti v.7®.

El estudio fue aprobado por el Comité de Ética del Instituto de Salud del Estado de México (#208C0101100000L/798/2022).

RESULTADOS

Participaron un total de 18 enfermeras y enfermeros, con una edad promedio de 44,6 años (desviación estándar [DE] ± 7,6); 88,8% eran mujeres y 50% contaban con nivel licenciatura. Del total, 88% tenían cargo de jefatura, 44% eran contratados como enfermera general y, en promedio, tenían una antigüedad laboral de 17,2 años (DE ± 9,7) (cuadro 1).

Los principales resultados se encuentran ordenados por facilitadores y barreras en el cuadro 2.

CUADRO 1. Características sociodemográficas y laborales de las personas encuestadas

Variables	Total n = 18	Jefatura estatal n = 4	Jefatura jurisdiccional n = 6	Jefatura de unidad y operativo n = 8
Edad (años)[a]	44,6 (±7,2)	48,8 (±11,9)	45,3 (±4,1)	42,0 (±6,1)
Sexo				
Femenino	16	4	5	7
Masculino	2	0	1	1
Nivel de escolaridad				
Licenciatura	9	2	4	3
Especialidad	1	0	0	1
Maestría	6	2	2	2
Doctorado	2	0	0	2
Jurisdicción sanitaria				
Atizapán de Zaragoza	2	0	1	1
Cuautitlán	2	0	1	1
Ecatepec	3	0	1	2
Nezahualcóyotl	3	0	1	2
Texcoco	2	0	1	1
Toluca	6	4	1	1
Cargo laboral				
Personal operativo	2	0	0	2
Jefatura de enfermería	16	4	6	6
Tipo de contrato				
Auxiliar de enfermería	2	0	1	1
Enfermera general	8	2	0	6
Enfermera especialista	4	0	3	1
Jefatura de servicios	4	2	2	0
Antigüedad laboral (años)[a]	17,2 (±9,7)	25,5 (±15,1)	18,8 (±7,6)	11,8 (±4,2)

*[a]Valores expresados con la media (desviación estándar).
Fuente: elaboración propia con base en los datos obtenidos.

CUADRO 2. Facilitadores y barreras identificadas a partir de la expresión de las personas encuestadas

Facilitadores	Barreras
Disposición de adopción • Postura favorable de directivos a la implementación de RAE • Aceptabilidad por parte de enfermería a la ampliación de funciones	Contexto del primer nivel de atención • Falta de personal • Exceso de actividades administrativas • Falta de espacio físico • Carencia de material, insumos y consumibles
Reorganización de funciones • Simplificación de procesos • Análisis de la situación de las unidades de salud	Resistencia al cambio • Celo profesional • Duplicidad de tareas
Capacitación • Acceso a la formación • Se otorga tiempo por parte de los directivos para tomar la capacitación dentro de la jornada laboral	Salarios del personal • Resistencia a desarrollar más actividades sin incremento de ingresos o sin beneficios adicionales
Características del personal de enfermería • Aumento en el nivel de formación de la enfermería • Experiencia laboral • Actitud favorable	Falta de actualización • Falta de entrenamiento para generar notas basadas en evidencia
	Baja confianza para el incremento de funciones
	Actitudes de los pacientes • Resistencia de los pacientes

Fuente: elaboración propia con base en los datos obtenidos.

Facilitadores

Disposición de adopción

Desde la perspectiva de los tomadores de decisiones de enfermería, uno de los facilitadores fue la disposición y postura favorable de mandos directivos del trabajo que realiza enfermería y, en particular, con la aceptación en la redistribución de funciones a partir de los RAE.

"La jefa de la unidad tiene toda la disposición de que nos convirtamos en enfermeras de rol ampliado […]" **Per_enfermería_operativo_1**.

Reorganización de funciones

Otro facilitador fue la promoción que se realiza en los diferentes niveles de toma de decisiones, lo que viabiliza la simplificación de procesos:

"[…] simplificar los procesos, es una parte de la mejora continua o de las acciones esenciales […]" **Jef_enfermería_unidad_2**

Las personas entrevistadas identificaron como facilitador la realización de un análisis de situación en las unidades de atención:

"Estudio de las realidades que viven las unidades, revisión de personal, infraestructura y de servicios." **Jef_enfermería_unidad_1.**

"Es bueno que tomen en cuenta nuestra opinión antes de implementar, muchas veces sólo llegan y nos incrementan procesos sin conocer lo que hacemos o lo que pensamos." **Per_enfermería_operativo_2**.

Capacitación

Se señaló la capacitación como incentivo para que el personal lo perciba como un beneficio y no como una imposición, con horarios flexibles para adquirir nuevas competencias:

"Otorgar cursos y diplomados como un incentivo […]" **Jef_enfermería_unidad_3**

"Les otorgaré dos horas diarias dentro de su jornada laboral para que puedan capacitarse […]" **Jef_enfermería_estado_1**

Características del personal de enfermería

Se resaltó el hecho del incremento del nivel de formación del personal de enfermería:

"[…] tenemos personal graduado, con nivel maestría y algunos doctores en este nivel de atención […]" **Jef_enfermería_estado_3**

"[…] hay bastante personal con especializaciones y experiencia que podría ayudarnos para ampliar el rol […]" **Jef_enfermería_unidad_5**

Se identificó un respaldo por los años de experiencia para quienes no cuentan con formación universitaria:

"[…] por lo menos el 40% de la fuerza laboral tiene grado de licenciatura…las enfermeras generales tienen una larga experiencia y saben cómo tratar a los pacientes, e identificar las metas de los programas prioritarios […]" **Jef_enfermería_juris_1**

Se resaltó como facilitador una actitud favorable del personal de enfermería hacia los RAE:

"[…] la actitud, la aptitud, el respeto, el compromiso y la responsabilidad que caracterizan a la disciplina de enfermería" **Jef_enfermería_unidad_4**

Barreras

Contexto del primer nivel de atención

Las barreras fueron, en su mayoría, condiciones de trabajo preexistentes en las unidades de primer nivel, como falta de personal de enfermería y la excesiva demanda de actividades administrativas, que pueden complicar las funciones extendidas:

"Supongo que los obstáculos estarán en la provisión de los recursos necesarios… si pudieran ver a mi colega que no puede llenar estos 20 formularios […]." **Jef_enfermería_unidad_1.**

También se citaron las condiciones de infraestructura, de manera específica los espacios físicos necesarios para que el personal de enfermería realice las actividades de RAE:

"[…] requerimos de consultorios no médicos, con ello, haríamos que los pacientes tuvieran una mejor adherencia al tratamiento". **Jef_enfermería_unidad_1**

La escasez de materiales, insumos y consumibles fue otra barrera identificada para la implementación de RAE. La escasez de formularios para registros clínicos de enfermería fue mencionada en reiteradas ocasiones:

"… la única limitante serían los formatos en los que vamos a realizar los registros clínicos. Solo por mencionar, los termómetros, los cuadernos y muchas cosas más que podría decirle que nos hace falta en la unidad. Vamos las enfermeras, van comprando, pero pues no siempre vamos a estar comprando". **Jef_enfermería_unidad_4.**

Resistencia al cambio

Junto con la capacidad técnica limitada, se mencionó la resistencia al cambio como barrera para el desarrollo de otras actividades que son consideradas exclusivas de los médicos:

"[…] el choque con el equipo multidisciplinario pudiera ser cuando el médico diga: ¿Cómo lo va a hacer la enfermera? Si ella no puede hacer eso, eso es lo que hago yo." **Jef_enfermería_juris_2**

Supongo que los primeros que no estarán de acuerdo en que ahora tengamos un rol más amplio serán los médicos, pero también creo que, si se les involucra, podrán aceptar de una mejor manera una nueva organización de funciones […]". **Per_enfermería_operativo_2.**

Otra de las consecuencias relacionada con la resistencia al cambio es la duplicidad de tareas. Se destacó que los médicos duplican funciones que las enfermeras realizan, lo que genera confusión, estrés y un ambiente de trabajo precario:

"[…] ¿por qué duplicar acciones?, ese tiempo que va a usar para confirmar lo que hizo ya un profesional de enfermería, ocúpelo para otras cosas. **Jef_enfermería_estado_2**

Salarios del personal

El nivel de remuneración es otra barrera expresada. Los ingresos recibidos no siempre responden al nivel educativo del personal de enfermería:

"[…] los salarios han sido una limitación… lo que provoca desmotivación del personal". **Jef_enfermería_estado_1**

Falta de actualización

La falta de actualización para generar notas clínicas de enfermería basadas en evidencia fue expresada como otra limitante. Sin embargo, este aspecto se percibe diferente por los operativos y los jefes:

"[…] a veces hay capacitaciones, pero ¿cómo le explico? Solo para cubrir el requisito, no son capacitaciones de calidad […]" **Per_enfermería_operativo_1.**

"[…] regularmente se otorga capacitación, pero como son de diferentes turnos (vespertino, nocturno A, nocturno B y especiales), no acuden **Jef_enfermería_unidad_6.**

Baja confianza para realizar otras funciones

La baja autoconfianza fue referida como una barrera y puede representar una dificultad. En algunos casos, se identificó inseguridad para realizar más funciones, como la prescripción farmacológica, o al generar notas clínicas inconclusas a partir de:

"[…] a veces no confiamos lo suficiente en nosotros mismos para decir, "sí puedo, sí tengo conocimientos de farmacología y conozco las indicaciones y contraindicaciones". **Jef_enfermería_unidad_4**

Perspectiva acerca de las actitudes de los pacientes

Los informantes expresaron algunas barreras relacionadas con los pacientes, como la resistencia en ser atendidos por enfermería en lugar de recibir atención por medicina:

"[…] nos ha costado mucho trabajo… hay algunos pacientes que prefieren la figura médica […]" **Jef_enfermería_estado_3**

"la población va a decir 'es que tú no eres médico, tu no me atiendas. Háblale al médico para que me atienda […]" **Jef_enfermería_unidad_2**

DISCUSIÓN

El presente trabajo permitió comprobar aspectos relevantes que, desde la perspectiva de distintos actores clave, deben ser considerados para la implementación exitosa de los RAE. Un hallazgo fundamental fue la capacitación, debido a que los participantes valoran el tiempo y la oportunidad de ampliar sus habilidades y conocimientos. Según la evidencia, la capacitación con enfoque en competencias y otorgada por mentores con experiencia en guiar debates constructivos, mejora el conocimiento, habilidades y actitudes, con incremento de la confianza y la autonomía para la resolución de problemas clínicos (16). Esto es relevante debido a que los equipos exitosos incorporan en su formación el desarrollo de las relaciones y la seguridad emocional (17). Por ello, el marco mexicano de RAE documento que orienta la aplicación de la estrategia, considera el liderazgo y trabajo en equipo fundamentales en la capacitación del personal (18).

Además de la capacitación, la simplificación de procesos y la actitud favorable, fueron facilitadores relevantes debido a que el personal de enfermería es el actor principal de la estrategia RAE. La estandarización de formularios y algoritmos diseñados para redistribuir funciones centrados en la participación del personal de enfermería favorecen la comunicación y permiten un mejor clima laboral, lo que concuerda con la evidencia en otros países que han impulsado nuevos roles mediante el cambio de tareas clínicas y no clínicas, para que los servicios de salud se puedan ofrecer de manera efectiva (19, 20).

El avance en los niveles de formación de enfermería en México facilita la implementación de los RAE, debido a la factibilidad de adopción cuando el personal tiene mayor nivel educativo (18). En México, 50% de las enfermeras cuentan con título universitario, este incremento se ha sostenido en el primer nivel de atención, y pasó de 28% a 43,4% entre el 2015 y el 2021 (6). Lo anterior concuerda con recomendaciones sobre transferencia de tareas de la Organización Mundial de la Salud, como iniciativa para mejorar la provisión de servicios a partir del análisis de los recursos humanos y de sus funciones (21). La comprensión del funcionamiento de los equipos y su organización son factores fundamentales que mejoran la planificación de estrategias y propician un mejor diseño en los programas de formación (22).

Por otra parte, las referencias a la autonomía de práctica del personal de enfermería deben considerarse más una expresión ideológica que un hecho en sí mismo. La autonomía está relacionada a la capacidad de un profesional para tomar decisiones con base a su conocimiento experto ganado a partir de la formación y por el uso de evidencia científica. La enfermería se encuentra en ese proceso, pero no es posible afirmar que en el quehacer cotidiano sea capaz de tomar todas las decisiones relacionadas a su práctica. Por lo tanto, la autonomía de la profesión de enfermería se ubica en un marco de complejidad de un sistema centrado en la enfermedad y el control del modelo biomédico institucional el cual continúa dominando la mayor parte de las decisiones (23).

Además, se identifica voluntad de los directivos para facilitar la adopción de una nueva estrategia y, al hacerlo, obtener el

apoyo necesario para su implementación. Estudios realizados sobre la teoría de la implementación, refieren que incluir actores clave y partes interesadas, permite esclarecer el propósito de la intervención, el flujo financiero y el seguimiento de los procesos (24). La disposición de los tomadores de decisiones para la implementación de RAE es una oportunidad para analizar los procesos clínicos y administrativos que el personal (no sólo de enfermería, sino del equipo clínico) realiza en la prestación de servicios. Este análisis debe incluir la exploración del contexto y planificar la ampliación de las competencias laborales para lograr un rol extendido de la enfermería.

En contraste con los facilitadores, se identificaron barreras para la implementación de RAE, como la insuficiencia de personal de enfermería y el exceso de actividades administrativas. La redistribución de algunas funciones que pueden ser realizadas por otro personal, permitiría a las enfermeras centrarse en intervenciones clínicas y de gestión de casos. Como refieren otros estudios, el incremento de la carga de trabajo en el personal de enfermería repercute de forma negativa en la calidad de la atención y en la seguridad de los pacientes (25), así como la mejor distribución de las funciones promueve un entorno de atención más seguro (20). Relacionado con ello, la falta de espacios físicos asignados a enfermería es un limitante en los servicios públicos de salud de México, situación que inicialmente puede restringir la implementación de estos nuevos roles. Existen mejores resultados en la adherencia de los pacientes al contar con espacios asignados a cada área prestadora de servicio (26).

La resistencia al cambio detectada en este trabajo coincide con estudios previos en los que las barreras más pronunciadas se encuentran al interior de los equipos de salud. En países como México esto es especialmente importante, ya que el personal médico ejerce un monopolio en la prestación de servicios que limita el cambio de tareas (27). Esta visión sesgada del rol que debe corresponder a cada grupo requiere una respuesta en diferentes niveles. Uno es, mejorar la formación de los enfermeros para la adquisición de conocimientos asertivos, con base en la evidencia, que empoderen su práctica y favorezcan un mejor desempeño. Otro nivel es realizar investigación demostrativa sobre los efectos del rol ampliado en la mejora de procesos clínicos en las unidades de salud y en la salud de las poblaciones.

Otra complicación que puede generar la resistencia al cambio es la duplicidad de tareas. La falta de una planificación adecuada al aplicar una nueva estrategia, o no incluir a los involucrados puede generar mayor desgaste en el capital humano (28). Para reducir esta barrera, es importante, en principio, desarrollar un modelo regulatorio de la ampliación de funciones de enfermería independiente del sistema de salud en el que se inserte, como se ha propuesto en publicaciones recientes (4, 29). Además, es importante entender cómo funcionan los equipos y considerar estos factores al planificar la ampliación de los roles e impartir un programa educativo acorde a la normativa y a la experiencia de los participantes con el fin de mejorar la calidad del trabajo en equipo (30).

Los niveles de ingresos del personal es otra limitante, lo que concuerda con otros estudios de enfermeras mexicanas que reflejan el incremento de la precariedad laboral en los últimos años, lo cual puede tener implicaciones importantes en la calidad de los servicios otorgados (31, 32). Una alternativa para disminuir esto, es desarrollar un entorno normativo en el que se pueda organizar la redistribución de funciones en el equipo de salud y establecer categorías laborales nuevas que garanticen una retribución económica acorde a la fuerza laboral ejercida (33).

Como hallazgo relevante, se debe considerar la percepción del personal sobre la dificultad de los usuarios para aceptar las nuevas funciones de enfermería. Sin embargo, la evidencia muestra que, cuando reciben atención por parte del personal de enfermería, los pacientes expresan mayor satisfacción debido a que las conversaciones se prolongan más que las consultas médicas, además de la educación recibida sobre sus cuidados, estilos de vida, medicación prescrita y otras necesidades ajenas a su enfermedad (34). Sin duda, se requerirán esfuerzos para familiarizar a los pacientes y cuidadores primarios con los nuevos roles de enfermería y propiciar la aceptación en la población.

Por último, algunas limitaciones de este trabajo son comunes a otros estudios cualitativos que se basan en la comunicación de percepciones subjetivas de los informantes sin contrastar con otras fuentes de información o perspectivas de otros actores como distintos profesionales de la salud o usuarios. Las percepciones aportan información esencial para determinar las ideas que el sujeto tiene del fenómeno y sus actitudes, por lo que es relevante que en estudios futuros se incorporen análisis de mayor amplitud que permitirán contar con una comprensión integral sobre los roles nuevos de enfermería.

En conclusión, la exploración de la percepción de los profesionales de enfermería permitió identificar elementos clave para ser considerados en la implementación de modelos que incorporen la redistribución de tareas a partir de la ampliación de competencias laborales del personal operativo, así como posibles obstáculos a atender. Esto requerirá una reorganización y una gestión adecuada en los diferentes niveles de toma de decisiones, lo que permitirá una mejor planificación para la implementación de la estrategia para este contexto.

Contribución de los autores. MGCH realizó el diseño, planificación y desarrollo del proyecto, trabajo de campo, análisis e interpretación de la información, preparación y redacción del manuscrito; HRM contribuyó en el diseño y planificación del estudio, interpretación de datos, preparación, redacción y revisión crítica del manuscrito; GN apoyó en la interpretación de datos, preparación, redacción y revisión crítica del manuscrito; SGS contribuyó en la redacción y revisión crítica del manuscrito. Todos los autores aprobaron la versión final.

Agradecimientos. Los autores agradecen la disposición del Instituto de Salud del Estado de México-ISEM (coordinación de enfermería y al programa de enfermedades cardiometabólicas), del Centro Nacional de Programas Preventivos y Control de Enfermedades-CENAPRECE y de la Organización Panamericana de la Salud-OPS de México para llevar a cabo este estudio, así como al Consejo Nacional de Humanidades, Ciencia y Tecnología-CONAHCYT quien otorgó a MGCH beca de posgrado (CVU 442989).

Declaración. Las opiniones expresadas en este manuscrito son responsabilidad del autor y no reflejan necesariamente los criterios ni la política de la *RPSP/PAJPH* y/o de la OPS.

Conflicto de intereses. Ninguno declarado por los autores.

REFERENCIAS

1. Cassiani SHDB, Munar Jimenez EF, Umpiérrez Ferreira A, Peduzzi M, Leija Hernández C. La situación de la enfermería en el mundo y la Región de las Américas en tiempos de la pandemia de COVID-19. Rev Panam Salud Publica. 2020;44(64):1. [Acceso el 20 de diciembre del 2021]. Disponible en: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7213064/
2. Gysin S, Sottas B, Odermatt M, Essig S. Advanced practice nurses' and general practitioners' first experiences with introducing the advanced practice nurse role to Swiss primary care: a qualitative study. BMC Fam Pract. 2019;20(1):163.
3. Aguilar-Montoya C, Chaves-Morales O, Loaiza Madriz C, Monge Medina J, Vega Zúñiga MC, Rojas Arias JM, et al. Identificación del marco de competencias laborales en enfermería en el Sistema del Seguro Social Costarricense. REVENF. 2019;37:245-62.
4. Nigenda G, Lee G, Aristizabal P, Walters G, Zárate-Grajales RA. Progress and challenges for advanced practice nursing in Mexico and the United Kingdom. J Nurs Manag. 2021;29(8):2461-9.
5. González-Block M, Reyes-Morales H, Cahuana-Hurtado L, Balandrán A, Méndez E, Allin S. Mexico: health system review. Sara Allin, Greg Marchildon (eds.). Ciudad de México: Health Systems in Transition; 2020(2):1-260. [Acceso el 31 de julio del 2023]. Disponible en : https://apps.who.int/iris/bitstream/handle/10665/334334/HiT-22-2-2020-eng.pdf?sequence=1%26isAllowed=y
6. Secretaría de Salud. La fuerza laboral de enfermería en el primer nivel de atención. Ciudad de México: Secretaría de Salud; 2022. [Acceso el 5 de marzo del 2023]. Disponible en: http://www.cpe.salud.gob.mx/site3/publicaciones/docs/fuerza_laboral_primer_nivel_atencion.pdf
7. Montañez-Hernández JC, Alcalde-Rabanal J, Reyes-Morales H. Socioeconomic factors and inequality in the distribution of physicians and nurses in Mexico. Rev Saude Publica. 2020;54:58. [Acceso el 31 de julio del 2023]. Disponible en: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7274212/
8. King H, Aubert RE, Herman WH. Global Burden of Diabetes, 1995-2025 Prevalence, numerical estimates, and projections. Diabetes Care. Switzerland; 1998(21). [Acceso el 11 de junio del 2023]. Disponible en: https://diabetesjournals.org/care/article/21/9/1414/22253/Global-Burden-of-Diabetes-1995-2025-Prevalence
9. Joshi R, Subedi P, Yadav GK, Khadka S, Rijal T, Amgain K, et al. Prevalence and risk factors of chronic kidney disease among patients with type 2 diabetes mellitus at a tertiary care hospital in Nepal: a cross-sectional study. BMJ Open. 2023;13(2):e067238.
10. Centro Nacional de Programas Preventivos y Control de Enfermedades. Declaratoria de Emergencia Epidemiológica EE-4-2016. Ciudad de México: CENAPRECE; 2016. [Acceso el 2 de marzo del 2023]. Disponible en: http://www.cenaprece.salud.gob.mx/programas/interior/emergencias/descargas/pdf/EE_4.pdf
11. Basto-Abreu A, López-Olmedo N, Rojas-Martínez R, Aguilar-Salinas CA, Moreno-Banda GL, Carnalla M, et al. Prevalencia de prediabetes y diabetes en México: Ensanut 2022. Salud Publica Mex. 2023;65:s163-8. [Acceso el 26 de julio del 2023]. Disponible en: https://saludpublica.mx/index.php/spm/article/view/14832
12. Innab A, Alammar K, Alqahtani N, Aldawood F, Kerari A, Alenezi A. The impact of a 12-hour educational program on nurses' knowledge and attitudes regarding pain management: a quasi-experimental study. BMC Nurs. 2022;21(1):250.
13. Farfán Pimentel DE, Huerto-Caqui E, Asto-Huamaní AY, Sanabria-Rojas LG, Sánchez-Glorio JF, Lizandro-Crispín R, et al. Aporte de la hermenéutica y la fenomenología en la investigación: una reflexión teórica. Ciencia Lat Rev Cient Multi. 2023;7(3):4064-75. [Acceso el 26 de julio del 2023]. Disponible en: https://ciencialatina.org/index.php/cienciala/article/view/6466
14. Belina A. Semi-structured interviewing as a tool for understanding informal civil society. VSR. 2023;14(2):331-47. [Acceso el 26 de julio del 2023]. Disponible en: https://bristoluniversitypressdigital.com/view/journals/vsr/14/2/article-p331.xml
15. Montecinos-Guíñez D, Lorca Nachar A, Lara Jaque R, García Vallejos G, Quijada Sánchez D. Enfermería, liderazgo y relaciones de poder, una mirada desde lo cualitativo. Index de Enfermería. 2023;e14293.
16. Melo e Lima TR, Maia PFC de M, Valente EP, Vezzini F, Tamburlini G. Effectiveness of an action-oriented educational intervention in ensuring long term improvement of knowledge, attitudes, and practices of community health workers in maternal and infant health: a randomized controlled study. BMC Med Educ. 2018;18(1):224.
17. Nirisha PL, Malathesh BC, Kulal N, Harshithaa NR, Ibrahim FA, Suhas S, et al. Impact of technology driven mental health task-shifting for Accredited Social Health Activists (ASHAs): results from a randomised controlled trial of two methods of training. Community Ment Health J. 2023;59(1):175-84. [Acceso el 26 de julio del 2023]. Disponible en: https://link.springer.com/article/10.1007/s10597-022-00996-w#citeas
18. Secretaría de Salud. Marco Mexicano de Competencias de Enfermería de Práctica Avanzada. Ciudad de México: Secretaría de Salud; 2019. Disponible en: www.cpe.salud.gob.mx
19. Ordunez P, Campbell NRC, Giraldo Arcila GP, Angell SY, Lombardi C, Brettler JW, et al. HEARTS en las Américas: innovaciones para mejorar el manejo de la hipertensión y del riesgo cardiovascular en la atención primaria. Rev Panam Salud Publica. 2022;46:1.
20. Leong SL, Teoh SL, Fun WH, Lee SWH. Task shifting in primary care to tackle healthcare worker shortages: an umbrella review. Eur J Gen Pract. 2021;27(1):198-210.
21. Organización Mundial de la Salud. Task Shifting Global Recommendations and Guidelines HIV/AIDS. Ginebra: OMS; 2010. [Acceso el 12 de marzo del 2023]. Disponible en: http://www.who.int/healthsystems/task_shifting/en/
22. Weston MJ. Strategic Planning for a Very Different Nursing Workforce. Nurse Lead. 2022;20(2):152-60.
23. Gottlieb LN, Gottlieb B, Bitzas V. Creating empowering conditions for nurses with workplace autonomy and agency: how healthcare leaders could be guided by strengths-based nursing and healthcare leadership (SBNH-L). J Healthc Leadersh. 2021;13:169-81.
24. Ridde V, Pérez D, Robert E. Using implementation science theories and frameworks in global health. BMJ Glob Health. 2020;5(4):e002269.
25. AL-Mugheed K, Bayraktar N, Al-Bsheish M, AlSyouf A, Jarrar M, AlBaker W, et al. Patient safety attitudes among doctors and nurses: associations with workload, adverse events, experience. Healthcare. 2022;10(4):631.
26. Sosa-Rubí SG, Contreras-Loya D, Pedraza-Arizmendi D, Chivardi-Moreno C, Alarid-Escudero F, López-Ridaura R, et al. Cost-effectiveness analysis of a multidisciplinary health-care model for patients with type-2 diabetes implemented in the public sector in Mexico: a quasi-experimental, retrospective evaluation. Diabetes Res Clin Pract. 2020;167:108336.
27. Ruiz Sánchez JJ. Resistencia al cambio: prescripción enfermera. Aten Primaria. 2018;50(6):379-80.
28. Ahmed Z, Jani Y, Franklin BD. Qualitative study exploring the phenomenon of multiple electronic prescribing systems within single hospital organisations. BMC Health Serv Res. 2018;18(1):969.
29. Lee GA, Aristizabal P, Walters G, Zárate-Grajales RA, Nigenda G. Advanced Practice nursing roles: a comparison between Mexico and the United Kingdom. J Nurs Regul. 2022;13(1):27-34.
30. Giraldo GP, Joseph KT, Angell SY, Campbell NRC, Connell K, DiPette DJ, et al. Mapping stages, barriers and facilitators to the implementation of HEARTS in the Americas initiative in 12 countries: a qualitative study. J Hypertens. 2021;23(4):755-65.
31. Aristizabal P, Nigenda G, Serván-Mori E. The precarization of the Mexican nursing labor market: a repeated cross-sectional analysis for the period 2005-2018. Hum Resour Health. 2019;17(1):87.
32. Nigenda G, Serván-Mori E, Fuentes-Rivera E, Aristizabal P, Zárate-Grajales RA. Performance of the Mexican nursing labor market: a repeated cross-sectional study, 2005-2019. Hum Resour Health. 2022;20(1):24.
33. Leija-Hernández C, Olivera-Carrasco H, Acuña-Díaz MC, Zárate-Grajales RA, Choperena-Aguilar DG. Estrategia integral para la ampliación del rol de enfermería en la atención primaria de salud. Enfermería Universitaria. 2020;17(2):243-57.
34. Graarup J, Højskov IE. Patients' perspective of attending nursing consultations: a pilot and feasibility study. Nurs Open. 2020;7(5):1482-8.

Manuscrito recibido el 13 de junio del 2023. Aceptado, tras revisión, para su publicación, el 3 de agosto del 2023.

Exploring facilitators and barriers to implementing expanded nursing roles in Mexico

ABSTRACT

Objective. To explore the perceptions of nursing professionals regarding facilitators and barriers to the implementation of expanded nursing functions in a state in central Mexico.
Methods. Qualitative descriptive phenomenological study. During 2022, 18 semi-structured interviews were conducted with three types of informants: a) head nurses at state-level facilities; b) head nurses at local-level facilities; and c) heads of health units and operational nursing staff who have direct contact with patients.
Results. The following facilitators were identified: willingness to adopt the strategy (seen as favorable by managers and acceptable by nursing staff); reorganization of functions (simplification of processes and analysis of the situation of health units); access to training; and characteristics of nursing staff (professionalization, work experience, and favorable attitude). Barriers included: conditions at the first level of care (personnel shortages, too many administrative activities, lack of physical space, materials, supplies, and consumables), resistance to change (professional jealousy of other disciplines and duplication of tasks), staff salaries, lack of training, not trusted with expanded duties, and attitude of patients (resistance to nursing care).
Conclusions. By understanding the perceptions of nursing professionals, we can identify key elements for the successful expansion of nursing functions through expansion of the competencies of operational staff. Reorganization and proper management at different levels of decision-making will be necessary.

Keywords Nursing; diabetes mellitus; qualitative research; Mexico.

Estudo de facilitadores e barreiras para a implementação de funções ampliadas de enfermagem no México

RESUMO

Objetivo. Explorar as percepções dos profissionais de enfermagem sobre os facilitadores e as barreiras à implementação de funções ampliadas de enfermagem em um estado do México.
Métodos. Estudo qualitativo descritivo com abordagem fenomenológica. Em 2022, foram realizadas 18 entrevistas semiestruturadas com três tipos de informantes: a) chefes estaduais de enfermagem; b) chefes jurisdicionais de enfermagem; e c) chefes de unidades de saúde e profissionais de enfermagem que fazem atendimento direto aos pacientes.
Resultados. Os seguintes facilitadores foram identificados: disposição para adotar a estratégia (atitude favorável dos gerentes e aceitação da equipe de enfermagem), reorganização das funções (simplificação dos processos e análise da situação das unidades de saúde) e acesso a capacitação e características da equipe de enfermagem (profissionalização, experiência de trabalho e atitude favorável). As barreiras encontradas incluem: contexto do primeiro nível de atenção (falta de pessoal, excesso de atividades administrativas, falta de espaço físico, falta de materiais, insumos e consumíveis), resistência à mudança (zelo profissional de outras disciplinas e duplicação de tarefas), salários do pessoal, falta de atualização, pouca confiança na expansão das funções e atitude dos pacientes (resistência ao atendimento por profissionais de enfermagem).
Conclusões. Entender as percepções dos profissionais de enfermagem permite a identificação de elementos-chave para a expansão bem-sucedida das funções de enfermagem por meio da expansão das competências de trabalho dos profissionais que atendem pacientes; serão necessários reorganização e gerenciamento adequado nos diferentes níveis de tomada de decisão.

Palabras-chave Enfermagem; diabetes mellitus; pesquisa qualitativa; México.

ARTÍCULO ORIGINAL

Trabajadoras comunitarias de salud: experiencias en el abordaje de la salud mental en zonas rurales de Chiapas

María Cecilia González-Robledo, D en C,[1] Luz María González-Robledo, D en C,[2]
Alejandra Nudel-Ontiveros, M en Gest y Polít S,[3] Marcela Agudelo-Botero, D en Est de Pobl,[4]
Fátima Gabriela Rodríguez-Cuevas, MC,[5] Hortensia Reyes-Morales, D en C.[1]

González-Robledo MC, González-Robledo LM, Nudel-Ontiveros A, Agudelo-Botero M, Rodríguez-Cuevas FG, Reyes-Morales H. Trabajadoras comunitarias de salud: experiencias en el abordaje de la salud mental en zonas rurales de Chiapas. Salud Publica Mex. 2023;65:275-284.
https://doi.org/10.21149/14183

Resumen

Objetivo. Analizar, desde la perspectiva de las trabajadoras comunitarias de salud (TCS), los conocimientos y experiencias en la atención de la salud mental (SM) en comunidades rurales de Chiapas. **Material y métodos.** Se utilizó el enfoque fenomenológico descriptivo. Se realizaron 18 entrevistas semiestructuradas a TCS, las cuales fueron audiograbadas, transcritas, codificadas y analizadas utilizando como técnica, el análisis cualitativo de contenido con ayuda del software Atlas ti. **Resultados.** Las TCS mental tienen una amplia comprensión de la cultura, el lenguaje y los problemas de sus comunidades, permitiéndoles fungir como enlace entre los servicios de salud y la población. Identifican que hay buena SM cuando "una persona tiene ánimo de realizar su trabajo diario" y enfermedad cuando "las personas sufren o tienen pensamientos chuecos". Sus experiencias de trabajo están ligadas con el acompañamiento individual (psico-educación) y el apoyo de actividades realizadas por profesionales de Compañeros En Salud (CES). **Conclusión.** Las TCS mental que trabajan con CES desarrollan un papel importante en la promoción de la SM, de riesgos y acompañamiento de pacientes con trastornos mentales. Estos hallazgos consolidan la evidencia e importancia del desarrollo de las intervenciones comunitarias en SM a través de este personal, en contextos de escasa disponibilidad de servicios de salud.

Palabras clave: agentes comunitarios de salud; salud mental; atención primaria de salud; México

González-Robledo MC, González-Robledo LM, Nudel-Ontiveros A, Agudelo-Botero M, Rodríguez-Cuevas FG, Reyes-Morales H. Role of community health workers in addressing mental health in rural areas of Chiapas. Salud Publica Mex. 2023;65:275-284.
https://doi.org/10.21149/14183

Abstract

Objective. To analyze, from the perspective of community health workers (CHW), the knowledge and experiences in mental health care (MH), in rural communities in Chiapas. **Materials and methods.** The descriptive phenomenological approach was used. Eighteen semi-structured interviews were conducted with CHW, which were audio-recorded, transcribed, codified and analyzed using qualitative content analysis with the help of Atlas ti. **Results.** Mental CHW have a broad understanding of the culture, language and problems of their communities, allowing them to act as liaisons between health services and the population. They identify that there is good MH when a "person is in the mood to do their daily work" and illness when "people are suffering or have wicked thoughts". Their work experiences are linked to individual accompaniment (psycho-education) and the support of activities carried out by professionals of *Compañeros En Salud* (CES). **Conclusion.** The mental CHW who work with CES, develop an important role in the promotion of mental health, of risks and accompaniment of patients with mental disorders. These findings contribute to strengthen the evidence on the importance of developing community interventions in MH through these personnel, in contexts of scarce availability of health services.

Keywords: community health workers; mental health; primary health care; Mexico

(1) Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
(2) Facultad de Medicina, Universidad Autónoma del Estado de Morelos. Cuernavaca, Morelos, México.
(3) Investigadora independiente. Ciudad de México, México.
(4) Centro de Investigación en Políticas, Población y Salud, Facultad de Medicina, Universidad Nacional Autónoma de México. Ciudad de México, México.
(5) Compañeros En Salud. Jaltenango, Chiapas, México.

Fecha de recibido: 6 de agosto de 2022 • **Fecha de aceptado:** 7 de diciembre de 2022 • **Publicado en línea:** 21 de abril de 2023
Autor de correspondencia: Dra. Luz María González-Robledo. Facultad de Medicina, Universidad Autónoma del Estado de Morelos. Calle Iztaccíhuatl esq. Leñeros s/n, Col. Los Volcanes. 62350 Cuernavaca, Morelos, México.
Correo electrónico: luz.gonzalez@uaem.mx

Licencia: CC BY-NC-SA 4.0

González-Robledo MC, González-Robledo LM, Nudel-Ontiveros A, Agudelo-Botero M, Rodríguez-Cuevas FG, Reyes-Morales H. Trabajadoras comunitarias de salud: experiencias en el abordaje de la salud mental en zonas rurales de Chiapas. Salud Publica Mex. 2023;65(3):275-284. https://doi.org/10.21149/14183

A nivel global, en 2021 se estimó una prevalencia de depresión y ansiedad en personas ≤18 años de 25.2 y 20.5%, respectivamente.[1] En la población adolescente mexicana, la prevalencia de síntomas depresivos fue de 7.8%,[2] aunque se prevé que ésta sea más elevada si se considera junto con el abuso de sustancias y la ideación suicida.[3] En Chiapas, en 2020, 20.6% de los jóvenes presentó síntomas depresivos y 31% ansiedad, siendo éstos más frecuentes en mujeres que en hombres.[4]

Los determinantes sociales de los trastornos mentales han sido descritos ampliamente en la bibliografía, donde destacan condiciones como pobreza, marginación, falta de oportunidades laborales y de educación, entre otras.[5] También se ha identificado la influencia de los medios de comunicación (que distorsionan las percepciones de la realidad) y la imposición de normas de género (que muchas veces desencadenan violencia hacia las mujeres), lo cual puede originar problemas emocionales.[6]

Por otro lado, en el ámbito mundial existe escasez de personal especializado para la atención de la salud mental (SM), con 0.67 especialistas por cada 100 000 habitantes, concentrados principalmente en zonas urbanas.[7] En México, además de esta situación, la atención a la SM recae en el nivel hospitalario, lo que hace inaccesible el servicio para las poblaciones rurales.[8] Es por ello que, con el fin de subsanar estas deficiencias, diversas organizaciones han estado trabajando en la incorporación de la atención de la SM a la salud comunitaria, a través de modelos basados en atención primaria de la salud y operados por equipos multidisciplinarios.[9,10] Se ha demostrado que esta integración mejora el diagnóstico temprano, el acceso, la continuidad del tratamiento y los resultados en la SM.[11]

Dentro de los equipos de atención primaria se encuentran los trabajadores comunitarios de salud (TCS), los cuales tienen diversas denominaciones y categorías, de acuerdo con su nivel educativo y de capacitación (cuadro I).[12-14] En general, los TCS son personas con una comprensión profunda de la cultura y el idioma de la comunidad donde operan y, generalmente, reciben capacitación por parte de profesionales de la salud y que, con o sin una remuneración, desempeñan un rol mediador cultural y de enlace entre los servicios de salud y sus comunidades.[15] Las actividades que realizan son diversas y dependen de cada contexto, siendo las más comunes educación, identificación de personas enfermas y su canalización a servicios de salud, además del apoyo en el seguimiento terapéutico (cuadro I).[16]

En las últimas décadas, se ha demostrado que el trabajo realizado por TCS en el cuidado de la salud en las comunidades (especialmente rurales y apartadas), ayuda a mejorar los estados de salud, tanto físicos como mentales. Esto justifica la importancia de desarrollar estudios sobre este tema en México donde hay pocas investigaciones al respecto.[13]

Para la atención de la SM en México, se desarrolló una guía para implementar un modelo comunitario basado en una estructura piramidal, situando el autocuidado y la atención comunitaria no formal en la base y, en el vértice, los centros de larga estancia y servicios especializados.[17] Este modelo incorpora a los TCS dentro de la atención comunitaria, no obstante, su implementación es aún insuficiente en el país.

En el estado de Chiapas, Compañeros En Salud (CES), filial mexicana de la organización internacional sin fines de lucro *Partners in Health*, desarrolla un novedoso modelo de atención con un fuerte componente comunitario, que incorpora a los TCS, los cuales se denominan "acompañantes" (ACMPS) y "cuidadoras de salud mental" (CSM).[18,19] CES trabaja en comuni-

Cuadro I
Denominaciones, clasificación y otras características de los Trabajadores Comunitarios De Salud (TCS). Chiapas, 2021

Denominaciones de los TCS	*Clasificación de los TCS*	*Nivel de educación y de capacitación*	*Remuneración*
Promotores de salud Agentes comunitarios de salud Doulas Trabajadores de salud no profesionales Trabajadores de salud legos Especialistas en apoyo de pares Trabajador de salud auxiliar Asistente de salud comunitario Ayudantes de salud	Trabajadores comunitarios de salud legos	Personas con poca o ninguna educación formal que se someten a una capacitación informal de unos días a unas pocas semanas.	Tienden a brindar servicios básicos de salud como voluntarios no remunerados
	Paraprofesionales nivel 1	Personas con algún tipo de educación secundaria y capacitación informal posterior.	Pueden recibir una asignación en dinero o especie
	Paraprofesionales nivel 2	Personas con algún tipo de educación secundaria y capacitación formal posterior que dure unos pocos meses a más de un año.	Usualmente son asalariados

Nota: elaborado a partir de Olaniran A y colaboradores (2017).[14]

dades marginadas de la Sierra Madre de Chiapas en coordinación con la Secretaría de Salud y el Instituto Mexicano del Seguro Social (IMSS), brindando atención médica a poblaciones vulnerables.[20] El objetivo de este estudio fue analizar, desde la perspectiva de las TCS, los conocimientos y experiencias en la atención de la SM en comunidades rurales de Chiapas en el año 2021.

Material y métodos

Se realizó un estudio cualitativo de tipo exploratorio. Se recolectó información durante febrero y marzo de 2021 en siete comunidades rurales de la Sierra Madre de Chiapas, sede de trabajo de CES. Estas comunidades se caracterizan por tener un alto y muy alto nivel de marginación y fueron seleccionadas por conveniencia.[21]

Selección de las participantes

Las TCS mental se seleccionaron por muestreo intencional (casos típicos), tomando en cuenta la edad (para representar ciclos de vida diferentes que pudieran incidir en la aptitud y disponibilidad para el trabajo comunitario), nivel educativo (para ajustarse a la clasificación de TCS) (cuadro I), lugar de residencia (que pertenecieran a diferentes localidades) y antigüedad (con el fin de conocer diversas experiencias como TCS). El número de informantes fue determinado a través del principio de saturación de datos.[22]

Recolección de la información

Se realizaron 18 entrevistas a TCS a partir de una guía semiestructurada, con una duración promedio de 45 minutos. Se llevaron a cabo en español, previo consentimiento informado, siendo audiograbadas y transcritas literalmente en Word. Se recabó información sociodemográfica y se exploró sobre: 1) cómo se incorporaron al trabajo comunitario y antigüedad en estas labores; 2) significados y conocimientos sobre la SM y los padecimientos mentales más usuales en sus comunidades; 3) tipo de capacitación recibida para el desempeño de su trabajo; 4) papel que tienen en la atención de la SM en sus comunidades; y 5) experiencias como TCS mental.

Con el apoyo de la Coordinadora de Salud Mental de CES, se reclutaron las TCS y las entrevistas se realizaron utilizando *Google Meet* (plataforma virtual) y la aplicación de mensajería y llamadas por *WhatsApp*, dadas las restricciones de acceso a las comunidades derivadas por la pandemia de Covid-19. Para ello, se facilitó el acceso a dispositivos electrónicos y a internet dentro de los centros de salud de las localidades y se procuró un lugar privado para que ellas respondieran abiertamente a las preguntas. En este estudio se siguieron los lineamientos específicos para el desarrollo de trabajos de campo virtual en investigación cualitativa.[23,24] Para fines de análisis de la información, se omitieron los nombres de las informantes, con el fin de asegurar la confidencialidad y privacidad. En su lugar, a cada participante se le asignó un código único que se emplea a lo largo de este artículo.

Análisis de la información

Se utilizó el enfoque fenomenológico descriptivo,[25] utilizando como técnica el análisis cualitativo de contenido con el fin de identificar patrones de significados (siguiendo el proceso descrito por Cáceres) (figura 1).[26]

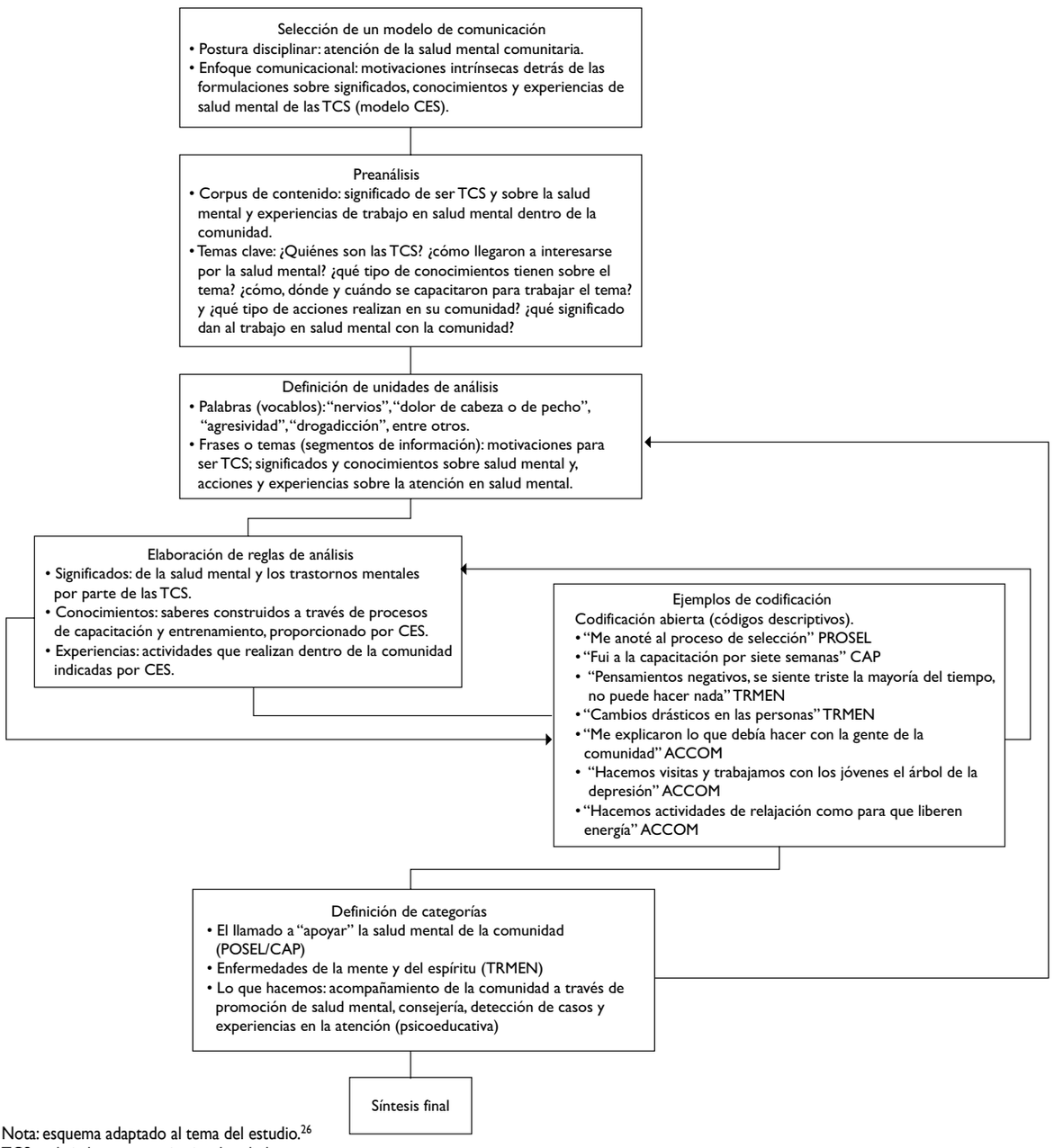
Cuadro II
PERFIL Y CARACTERÍSTICAS DE LAS TRABAJADORAS COMUNITARIAS DE SALUD (TCS). CHIAPAS, 2021

Características	*Perfil*			
	Cuidadoras de salud mental	*Acompañante de enfermedades crónicas*	*Acompañante de cuidado materno-infantil*	*Acompañante de modelo hogar*
No. de entrevistas	5	7	3	3
Edad mediana en años (valor mínimo-valor máximo)	30 (20-40)	36 (24-64)	30 (28-45)	32 (25-33)
Nivel de escolaridad	0 Sin estudios 1 Primaria 2 Secundaria 2 Preparatoria	2 Sin estudios 1 Primaria 2 Secundaria 2 Preparatoria	0 Sin estudios 0 Primaria 1 Secundaria 2 Preparatoria	0 Sin estudios 0 Primaria 1 Secundaria 2 Preparatoria
Estado civil	0 Soltera 4 Casada 1 Unión libre	4 Soltera 1 Casada 2 Unión libre	0 Soltera 2 Casada 1 Unión libre	0 Soltera 1 Casada 2 Unión libre
Antigüedad como TCS (valor mínimo-valor máximo)	1.5 (1-2)	3.6 (1-7)	2.5 (2-4)	2.6 (1-5)

La codificación fue realizada por dos de las coautoras, con ayuda del software ATLAS.ti V9, y se identificaron tres temas principales: dos de contexto (conocimientos sobre SM y cómo llegaron a ser TCS) y otro sobre las experiencias que han vivido las TCS mental dentro de sus comunidades (figura 2).[27]

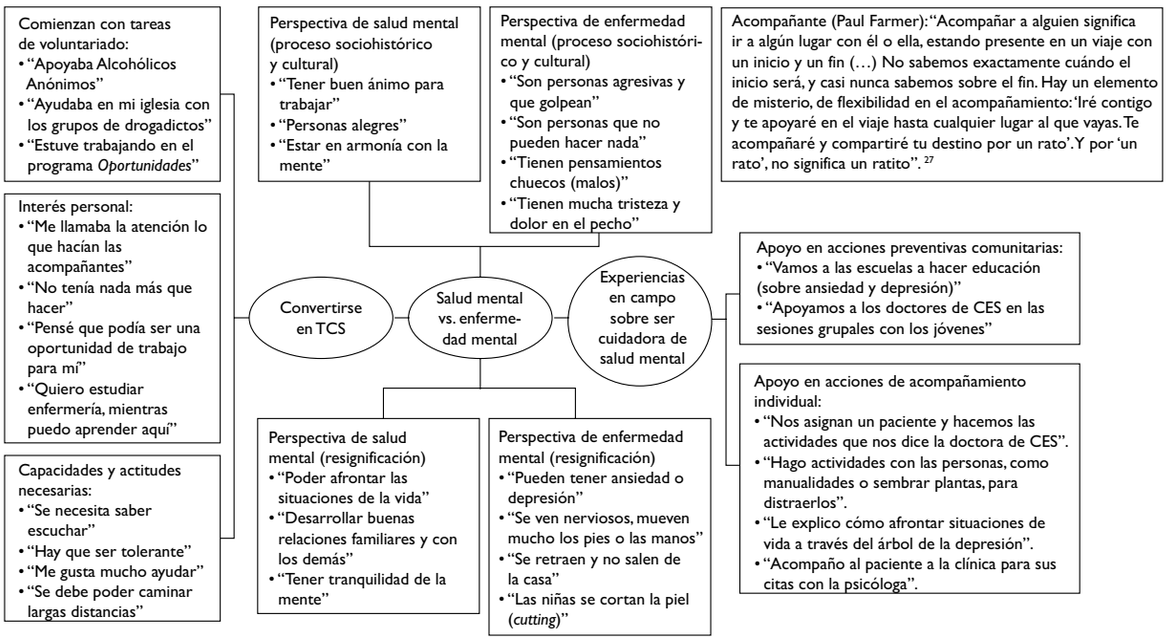
Consideraciones éticas

El estudio hace parte de un proyecto marco financiado por el Consejo Nacional de Ciencia y Tecnología. Se obtuvo la aprobación de los Comités de Investigación (FM/CI/004/18) y Ética (CEI-F006/2019) de la Facultad



Nota: esquema adaptado al tema del estudio.[26]
TCS: trabajadoras comunitarias de salud.
CES: Compañeros En Salud.

Figura 1. Esquema descriptivo del proceso de análisis cualitativo de contenido. Chiapas, 2021



TCS: trabajadoras comunitarias de salud.
CES: Compañeros En Salud.

FIGURA 2. MAPA DE LOS TEMAS CENTRALES RELACIONADOS CON LOS CONOCIMIENTOS DE SALUD MENTAL Y EXPERIENCIAS DE LAS TCS MENTAL EN SU ATENCIÓN. CHIAPAS, 2021

de Medicina de la Universidad Autónoma del Estado de Morelos.

Resultados

Descripción general de las TCS

La edad mediana fue de 28 años (mínima 20, máxima 64). Las participantes llevaban trabajando como TCS de uno a siete años. Las comunidades donde viven y prestan sus servicios tienen una densidad poblacional menor a 1 000 habitantes y altos índices de marginación. Todas realizaban labores en el hogar y algunas trabajaban en el campo cultivando maíz y café (cuadro II).

Los perfiles de las TCS son variados: siete estaban encargadas del acompañamiento a pacientes crónicos, cinco eran cuidadoras de SM, tres incorporadas al "modelo hogar" y tres más al cuidado infantil. Si bien todas las entrevistadas señalaron realizar actividades de promoción de la SM y detección de trastornos mentales, las TCS mental realizaban actividades más especializadas, como se describe más adelante.

Conocimientos y experiencias de las TCS en la atención de la salud mental

Se identificaron dos temas de contexto y uno de experiencias en el trabajo comunitario para la atención de la salud mental.

Tema 1: Proceso de incorporación como TCS

Se realizó mediante un proceso por etapas previamente establecido por CES, a través de convocatorias abiertas o por invitación personal. El proceso se inició con la inscripción, seguida de una entrevista con el personal de CES, para evaluar motivaciones, actitudes y cumplimiento de los criterios preestablecidos. Una vez seleccionadas las trabajadoras, éstas tomaron un curso de capacitación sobre temas de salud y trabajo comunitario impartido por profesionales de la salud, con una duración de una semana. Dentro de los temas a desarrollar se encuentran los procedimientos para realizar visitas domiciliarias (registro de pacientes, sus padecimientos y reportes de seguimiento) y, de manera específica, sobre las actividades propias de su asignación (salud mental,

cuidado materno-infantil, pacientes crónicos y modelo hogar). Posteriormente, participan en capacitación continua cada quince días. Su trabajo es supervisado en campo por profesionales de la medicina, la enfermería o la psicología de CES.

Las aspirantes indican que para participar en el proceso de selección deben ser reconocidas en su comunidad, tener compromiso y actitud de ayuda, tiempo disponible y capacidad para caminar largas distancias, interés por aprender y enseñar temas de salud, ser tolerantes y respetuosas ante las diferencias y tener facilidad para comunicarse. Además, señalan que se valora mucho el haber realizado previamente actividades de voluntariado.

Todas las TCS recibieron información en temas de SM dada la alta prevalencia de depresión, ansiedad y otros trastornos psicosociales en la población. Sin embargo, son las TCS mental las que reciben capacitación más específica.

Para las informantes ser TCS significa la oportunidad de aprender, mejorar y tener un trabajo, y apoyar en el cuidado de la SM familiar y de su comunidad a través de acciones educativas y preventivas (cuadro III). Adicionalmente, les permite aportar recursos al hogar por medio de dos tipos de incentivos que reciben por parte de CES, uno económico y el otro en especie (despensa mensual).

Tema 2: Conocimientos sobre salud-enfermedad mental por parte de las TCS

Los conceptos "salud" y "enfermedad mental" fueron definidos por las TCS desde dos perspectivas. La primera, desde los procesos sociohistóricos y culturales de subjetivación (cosmovisión) y, la segunda, desde la resignificación que hacen a partir de la capacitación que reciben y del trabajo que realizan a diario.

Las TCS mental emplean diversas expresiones para dar sentido y significado a los estados de SM (estados emocionales placenteros) como "estar sano", "ser feliz" o cuando "la persona está tranquila", "sin estrés" y "tiene ánimo de realizar su trabajo diario". Por su parte, para la enfermedad (estados emocionales alterados) utilizan términos como "sufrimiento", "tener pensamientos malos, negativos o chuecos" o señalar que son "personas que se descontrolan y son violentas" (cuadro III).

La depresión y la ansiedad (como resignificación de la enfermedad) fueron consideradas trastornos que afectan el "estado de ánimo" y "las emociones", los cuales pueden incluso desencadenar síntomas físicos. Las TCS señalaron que en la ansiedad se puede sentir "intranquilidad", "miedo", "nerviosismo", "dolor de cabeza y de pecho". En la depresión se presentan "cambios en el apetito", "falta de sueño", "dolor de cabeza" y "autolesiones" (*cutting*: cortes en la piel de manera intencionada y repetitiva). Explican que estos trastornos están relacionados con condiciones de pobreza, falta de oportunidades laborales y de desarrollo personal, *bullying* y traumas que sufren los jóvenes dentro de los hogares (principalmente violencia física o psicológica hacia las mujeres).

Tema 3: Capacitación y experiencias de las TCS en la atención de la salud mental

La capacitación que reciben las TCS mental incluye contenidos específicos sobre trastornos mentales, comunicación efectiva y acompañamiento, así como temas de género, psicoeducación, resolución de problemas, técnicas de relajación y apoyo familiar.

Las TCS aplican instrumentos de tamizaje para depresión y ansiedad en jóvenes (para uso del personal no especializado) como PHQ9 (por sus siglas en inglés *Patient Health Questionnaire*) herramienta que mide la presencia de síntomas depresivos por autoinforme[28] y GAD-7, escala de ansiedad de siete ítems (detecta los síntomas de ansiedad generalizada).[29] Una vez identificados los casos, los jóvenes son referidos y acompañados a la consulta médica en los centros de salud (sedes de CES) para la confirmación diagnóstica y tratamiento (en casos leves o moderados) o referencia (en casos severos).

Dentro de sus experiencias, las TCS señalan que a veces no es sencillo identificar jóvenes con trastornos de ansiedad o depresión a través de estos instrumentos, porque a pesar de que se observan signos y síntomas evidentes, el puntaje que se obtuvo no coincide con lo observado. Esto se debe a que los adolescentes no hablan abiertamente de sus problemas emocionales y de las situaciones que desencadenan esas condiciones, porque en la comunidad "de lo que sucede dentro de la familia no se habla".

El acompañamiento se realizó a través de pláticas y actividades lúdicas que ayudaron a los adolescentes a reconocer y a entender sus emociones y problemas. Por ejemplo, con el "árbol de la depresión y ansiedad" identifican situaciones estresantes y conflictos emocionales, y se les brindan consejos para afrontarlos. Otras actividades de activación conductual sugeridas son dar paseos cortos o realizar manualidades para distraerlos de tener "pensamientos chuecos". También se desarrollan ejercicios de respiración y se les asignan tareas psicoeducativas que deben realizar durante la semana antes de la siguiente visita, y se hacen supervisiones de adherencia a la medicación y cumplimiento de citas cuando es requerido (cuadro III).

Cuadro III
TESTIMONIOS DE LAS INFORMANTES. CHIAPAS, 2021

Categoría	*Subcategoría*	*Testimonio*
¿Cómo llegó a ser TCS en su comunidad?	Incorporación	"Pues por un anuncio [en el centro de salud] supe que estaban buscando más acompañantes. Nos entrevistaron y éramos como ocho, pero de ocho, quedamos nada más cuatro.Y una de esas cuatro fui yo". E1/28/SU
	Proceso de capacitación	[¿Qué capacitación recibió?] "(…) sobre salud mental, al principio nos dijeron sobre qué es la depresión, la ansiedad, los tipos de problemas que llegan a presentar algunas personas (…), las complicaciones que puede llegar a tener una depresión, por qué a ciertas personas les da depresión, por qué a otras les da ansiedad, bueno, muchos temas relacionados con estas dos enfermedades [depresión y ansiedad]". [También]) (…) vimos lo que es el trauma, el duelo y cómo afecta a las personas". E16/31/HO
	Asignación a labores de salud mental	"Cuando nos dijeron que íbamos a ser cuidadores de salud mental fue un proceso realmente grande (…), vinieron médicos de salud mental para dar las capacitaciones y las entrevistas y todo eso, y pues de 11 que entrevistaron, quedé yo (…), yo creo que buscan experiencia previa como acompañante (…)" E17/40/SO
		[¿Qué experiencias has tenido?] "Un muchacho vino a pedir ayuda aquí en la clínica, el médico pasante me lo asignó a mí (…). Empezamos a trabajar la evaluación de riesgos y qué tanto beneficio iba a ir obteniendo. [Cuando lo conocí] no se bañaba, no se cambiaba, no salía, no quería ir a la escuela, no quería nada, entonces, yo pues con actividades y charlas lo fui ayudando. Al final ya él mismo fue agarrando valor para la escuela (…) después empezó a salir y ahora lo veo, sale a jugar, ahora es la estrella de basquetbol de aquí (…) Él y su familia me han tomado cariño". E12/31/CA
	Retribución	"Acá en la clínica, de parte de Compañeros De Salud sí recibimos una pequeña despensa, que para nosotros es mucho, y también nos dan un pago en efectivo " E18/27/PA
La salud mental, emocional o espiritual	Definiendo los trastornos mentales	"Una persona enferma de la mente es en la que vemos un cambio drástico como que ha dejado de hacer algunas cosas o ya no es la misma". E3/20/SU
		"(…) Son los pensamientos negativos, también los llaman pensamientos chuecos (…), se pone uno a pensar cosas que no deberíamos". E8/25/LC
		"(…) Una persona que sale de control (…), que hay veces que se porta agresivamente con las personas, llega a pegar y llega igual a ver cosas, a hablar cosas, ajá, a salir a correr pues donde él quiera (…)". E18/27/PA
	Los trastornos depresivos	"Los jóvenes se aislan, no platican sus cosas con nadie, porque luego los chicos creen que todas las personas se enterarían de lo que tiene… luego dicen que está loco, entonces le dicen que tienen psicosis, utilizan sobrenombres (…)" E16/31/HO
	Los trastornos de ansiedad	[¿Cómo sabía que tenía ansiedad?] "Porque siempre que estaba sentada no podía estar quieta con las manos, siempre las tenía jugando, no hablaba o respondía con sí o no mirando hacia otro lado (…) y se mordía las uñas. Al preguntarle qué le pasaba, no contestaba, y le pregunté si le daba pena hablar y me dijo que sí". E3/20/SU
Papel de las TCS	Detección de problemas emocionales y trastornos mentales	"Cuando vamos a las visitas hacemos el árbol de la depresión; le decimos a la persona que dibuje un árbol (…) entonces le ponemos las raíces, las hojas y la fruta. En las raíces ponemos lo que vivimos y los problemas de nuestra vida, o sea las raíces son las condiciones como la pobreza, los problemas familiares, el desamor, muchas cosas llenan las raíces. Luego vamos escribiendo hasta llegar al tronco y después hasta las ramas y los frutos, entonces ya ahí sacamos una conclusión, que si la raíz está mal, pues también los frutos van a estar mal". E17/40/SO
	Detección de la sintomatología de depresión y ansiedad	"Nosotras aplicamos PHQ9 y GAD7 para saber si la persona tiene ansiedad o depresión. Pero una vez a una persona que le apliqué no aparecía nada porque contestan a las preguntas con no. Pero yo veía que estaba muy inquieta o si escuchaba que alguien llegaba estaba muy alerta para ver quién iba". E3/20/SU
		"(…) hay una diferencia entre ansiedad, depresión y tristeza (…). La diferencia es que la tristeza es, por ejemplo, un duelo, pero a los tres meses de duelo hay personas que empiezan a hacer sus actividades normales (…) aunque siga la tristeza (…); al contrario, la depresión no deja trabajar, no deja hacer actividades, sólo quiere estar encerrado o solo, o vagando en la calle.Y la ansiedad también es otro tipo, pareciera que fuera lo mismo, pero realmente es diferente". E17/40/SU
	Apoyo y seguimiento terapéutico	"Hacemos actividades de relajación y ejercicios como para liberar energía, las practicamos juntas y aparte se les deja de tarea y luego una vez a la semana que la tengo que estar viendo. Creo que es lo que más trabajamos con personas con ansiedad". E7/28/LC
		"(…) lo que estamos haciendo ahorita es un curso que nosotros le damos a los pacientes que se llama SP [psicoeducación]. Son cinco sesiones, o sea visitas. La doctora (de CES) nos da a nosotros el paciente; ella nos dice: tienes que visitar este paciente, por tal y tal motivo, y ya nosotros vamos. En la primera visita nos presentamos; cada visita toma de hora y media a dos horas y todas son diferentes, para ayudar a controlar lo que es la ansiedad o la depresión". E18/27/PA
	Puente entre la comunidad y los servicios de salud	"Me ha tocado ver también, cuando los muchachos estaban en clase, lo que llaman el *bullying*; el mismo maestro nos dice que hay muchachos y muchachas que tienen ansiedad y depresión; nos buscan para llevarlos a la consulta". E7/28/LC

TCS: trabajadoras comunitarias de salud.

Para las TCS mental, el hecho de haber sido capacitadas y acompañar a los profesionales de la salud mental de CES en sesiones psicoeducativas les permitió transformar la percepción que tenían sobre los trastornos mentales, como padecimientos que deben ser diagnosticados y tratados. Asimismo, entender que los roles de género dentro de las comunidades, diferenciados para los hombres y las mujeres (quedarse en casa para realizar los quehaceres, practicar deportes de "niñas", no poder salir en la noche, entre otras), las condiciones de pobreza y el uso de redes sociales son factores que pueden afectar la SM de los adolescentes. También señalan la importancia de trabajar en la erradicación del estigma y la discriminación que sufren las personas con estos padecimientos.

En general, las TCS mental comentaron que tuvieron experiencias "buenas" en su trabajo como, por ejemplo, ser contactadas por profesores de escuelas que identifican jóvenes con cambios de comportamiento, retraídos, con cambios en sus calificaciones o, incluso, en situaciones de *bullying*, para tener su intervención o que funjan como puente para que los adolescentes tengan acceso a atención de SM en los centros de salud operados por CES. También señalaron que se observan algunos indicios de cambios en la comunidad sobre la necesidad de detectar y atender los trastornos mentales.

Finalmente, las informantes notaron un incremento en los casos de ansiedad y depresión en los adolescentes de las comunidades por causa de la suspensión de las actividades escolares y del confinamiento por la pandemia de Covid-19; esto incrementó la exposición a situaciones de violencia intrafamiliar que afectaron negativamente su SM.

Discusión

Hace más de 40 años las/los TCS se han incorporado a los equipos de atención primaria como parte de la política sanitaria en países con ingresos medios y bajos (incluido México) en respuesta a la escasez del personal médico y de salud calificado (particularmente en zonas remotas y marginadas).[30,31]

En este estudio todas las TCS fueron mujeres dedicadas a labores del hogar, con un nivel de educación medio-bajo y sin un empleo formal, pero que muestran liderazgo, iniciativa e interés por su comunidad, lo cual se asemeja a lo reportado en la bibliografía.[32] CES elige principalmente a mujeres para promover el desarrollo de capital social y económico en esta población dados los altos niveles de inequidad y los problemas sociales que se presentan y con el fin de darles una oportunidad laboral.

Son diversas las motivaciones que llevan a las mujeres de la comunidad a incorporarse como TCS mental. Algunas de ellas estarían relacionadas con la satisfacción de sentirse útiles y ayudar a otros, el reconocimiento por parte de su comunidad y el propio desarrollo personal (factores internos), la posibilidad de contar con incentivos económicos o en especie, lo que les permite complementar el ingreso familiar, y el desarrollo de relaciones interpersonales con autoridades de salud y de otros sectores dentro de la localidad (factores externos).

Los conocimientos sobre salud-enfermedad mental por parte de las TCS estaban muy asociados con creencias culturales, lo cual se asemeja a los resultados de otros estudios realizados en contextos rurales.[33] Igualmente contaban con escasos conocimientos previos sobre la salud y los trastornos mentales. A partir de la capacitación ofrecida por profesionales de CES, ellas comienzan a modificar sus actitudes frente a las personas con padecimientos mentales, al igual que en cuestiones de discriminación y estigma hacia dichas personas. Estos hallazgos coinciden con información publicada.[34]

Si bien la mayoría de las experiencias vividas por las TCS mental son descritas como útiles y positivas, aún se deben enfrentar importantes retos como las distancias a recorrer, muchas veces bajo condiciones climáticas adversas, y escasez del material didáctico para distribuir. Pese a ello, las TCS se sienten satisfechas por la labor realizada, pues perciben que su trabajo es bien recibido por la comunidad y señalan que "hay mucho por hacer".

Este es uno de los pocos estudios que se han realizado en el país que centran su atención en las TCS, sin embargo, hay algunas limitaciones que deben considerarse. La primera es que, si bien se exploró uno de los actores más relevantes en la atención de la salud mental en estas comunidades, no se contrastó con la visión de otro tipo de actores, como los adolescentes o la población en general. Tampoco se exploró la perspectiva del personal de salud que opera en estas localidades. Otra limitación se refiere al hecho de que los resultados podrían diferir respecto de otras comunidades donde también prestan servicios las TCS, ya que el modelo de atención desarrollado por CES tiene elementos muy particulares que responden al contexto socioeconómico y cultural del estado de Chiapas.

Conclusión

Dado que la atención a la SM es una prioridad en salud pública y que existen serias limitaciones para que las personas de zonas rurales de México puedan acceder a este tipo de servicios de salud, el rol de las TCS constituye una valiosa oportunidad para conectar el trabajo comunitario con los servicios de salud convencionales, de manera que se pueda brindar una respuesta integral a las necesidades de las poblaciones más vulnerables.

En este sentido, es fundamental fortalecer las capacidades de este personal para que se pueda incrementar el impacto de sus acciones en cada uno de los lugares donde se desempeñan.

Agradecimientos

Al Consejo Nacional de Ciencia y Tecnología (Conacyt) (Subvención No. 291102) y al *Global Alliance for Chronic Diseases* por su apoyo y a todas las personas que hicieron posible este trabajo, en especial a las TCS que brindaron su valioso tiempo y sus testimonios.

Declaración de conflicto de intereses. Las autoras declararon no tener conflicto de intereses.

Referencias

1. Racine N, McArthur BA, Cooke JE, Eirich R, Zhu J, Madigan S. Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: a meta-analysis. JAMA Pediatr. 2021;175(11):1142-50. https://doi.org/10.1001/jamapediatrics.2021.2482
2. Berenzon S, Lara MA, Robles R, Medina-Mora ME. Depresión: estado del conocimiento y la necesidad de políticas públicas y planes de acción en México. Salud Publica Mex. 2013;55(1):74-80. https://doi.org/10.1590/S0036-36342013000100011
3. Carreño-García S, Medina-Mora ME. Panorama epidemiológico de los trastornos mentales, su impacto entre el balance trabajo familia, 2018 [citado junio 25, 2022]. Disponible en: https://www.imss.gob.mx/sites/all/statics/salud/estreslaboral/1erjornada/07-Panorama-Trastornos-Mentales.pdf
4. Serván-Mori E, Gonzalez-Robledo LM, Nigenda G, Quezada AD, González-Robledo MC, Rodríguez-Cuevas FG. Prevalence of depression and generalized anxiety disorder among mexican indigenous adolescents and young adults: challenges for healthcare. Child Psychiatry Hum Dev. 2021;52:179-89. https://doi.org/10.1007/s10578-020-01001-9
5. Leiva-Peña V, Rubí-González P, Vicente-Parada B. Determinantes sociales de la salud mental: políticas públicas desde el modelo biopsicosocial en países latinoamericanos. Rev Panam Salud Publica. 2021;45:e158. https://doi.org/10.26633/RPSP.2021.158
6. Organización Mundial de la Salud. Salud mental del adolescente. Ginebra: OMS, 2021 [citado noviembre 17, 2021]. Disponible en: https://www.who.int/es/news-room/fact-sheets/detail/adolescent-mental-health
7. Organización Mundial de la Salud. Global Health Observatory data repository. Human resources Data by country, c2014. Ginebra: OMS, 2018 [citado noviembre 15, 2018]. Disponible en: https://apps.who.int/gho/data/node.main.MHHR?lang=en
8. Díaz-Castro L, Cabello-Rangel H, Medina-Mora ME, Berenzon-Gorn S, Robles-García R, Madrigal-de León EA. Necesidades de atención en salud mental y uso de servicios en población mexicana con trastornos mentales graves. Salud Publ Mex. 2020;62(1):72-9. https://doi.org/10.21149/10323
9. Kohrt BA, Asher L, Bhardwaj A, Fazel M, Jordans M, Mutamba BB, *et al.* The role of communities in mental health care in low- and middle-income countries: a meta-review of components and competencies. Int J Environ Res Public Health. 2018;15(6):1279. https://doi.org/10.3390/ijerph15061279
10. Hoeft TJ, Fortney JC, Patel V, Unützer J. Task-Sharing approaches to improve mental health care in rural and other low-resource settings: a systematic review. J Rural Health. 2018;34(1):48-62. https://doi.org/10.1111/jrh.12229
11. Funk M, Saraceno B, Drew N, Faydi E. Integrating mental health into primary healthcare. Ment Health Fam Med. 2008;5(1):5-8 [citado noviembre 15, 2018]. Disponible en: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2777555/
12. Pérez LM, Martinez J. Community health workers: social justice and policy advocates for community health and Well-Being. Am J Public Health. 2008;98(1):11-4. https://doi.org/10.2105/AJPH.2006.100842
13. Barnett ML, Gonzalez A, Miranda J, Chavira DA, Lau AS. Mobilizing community health workers to address mental health disparities for underserved populations: a systematic review. Adm Policy Ment Health. 2018;45:195-11. https://doi.org/10.1007/s10488-017-0815-0
14. Olaniran A, Smith H, Unkels R, Bar-Zeev S, van den Broek N. Who is a community health worker? - a systematic review of definitions. Glob Health Action. 2017;10(1):1272223. https://doi.org/10.1080/16549716.2017.1272223
15. WestRasmus EK, Pineda-Reyes F, Tamez M, Westfall JM. "Promotores de Salud" and community health workers: an annotated bibliography. Fam Community Health. 2012;35(2):172-82 [citado noviembre 15, 2018]. Disponible en: https://www.jstor.org/stable/44953456
16. Scott K, Beckham SW, Gross M, Pariyo G, Rao KD, Cometto G, Perry HB. What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers. Hum Resour Health. 2018;16:1-17. https://doi.org/10.1186/s12960-018-0304-x
17. Organización Panamericana de la Salud, USAID, CONAPRA. Salud Mental. Guía del promotor comunitario. México: OPS, 2013 [citado noviembre 15, 2018]. Disponible en: https://iris.paho.org/bitstream/handle/10665.2/31342/salud-mental-guia-promotor.pdf?sequence=1&isAllowed=y
18. Newman PM, Franke MF, Arrieta J, Carrasco H, Elliott P, Flores H, *et al.* Community health workers improve disease control and medication adherence among patients with diabetes and/or hypertension in Chiapas, Mexico: an observational stepped-wedge study. BMJ Glob Health. 2018;3:e000566. https://doi.org/10.1136/bmjgh-2017-000566
19. Rodríguez-Cuevas FG, Valtierra-Gutiérrez ES, Roblero-Castro JL, Guzmán-Roblero C. Living six hours away from mental health specialists: Enabling access to psychosocial mental health services through the implementation of problem management plus delivered by community health workers in rural Chiapas, Mexico. Intervention. 2021;19(1):75-83. https://doi.org/10.4103/INTV.INTV_28_20
20. Compañeros en Salud. ¿Qué hacemos? México: CES, 2021 [citado junio 24, 2022]. Disponible en: https://companerosensalud.mx/
21. Consejo Nacional de Población. Índice de marginación por entidad federativa y municipio 2020. Nota técnico-metodológica. México: Conapo, 2021 [citado junio 25, 2022]. Disponible en: https://www.gob.mx/cms/uploads/attachment/file/685354/Nota_te_cnica_IMEyM_2020.pdf
22. Guest G, Namey E, Chen M. A simple method to assess and report thematic saturation in qualitative research. PLoS One. 2020;15(5):e0232076. https://doi.org/10.1371/journal.pone.0232076
23. Gray LM, Wong-Wylie G, Rempel GR, Cook K. Expanding qualitative research interviewing strategies: Zoom video communications. The Qual Rep. 2020;25(5):1292-1301. https://doi.org/10.46743/2160-3715/2020.4212
24. Retamal S. Entrevista cualitativa mediante videoconferencia: características y recomendaciones. Apuntes MIDE. 2020 [citado agosto 1, 2022]. Disponible en: https://www.evalperu.org/wp-content/uploads/2021/04/APUNTES-MIDE-UC_Entrevistas-cualitativas-1.pdf
25. Lopez KA, Willis DG. Descriptive versus interpretive phenomenology: Their contributions to nursing knowledge. Qualitative Health Research, 2004;14(5):726-735. https://doi.org/10.1177/1049732304263638

26. Cáceres P. Análisis cualitativo de contenido: una alternativa metodológica alcanzable. Psicopersp. Indiv. Soc. 2003;2(1):53-82. https://doi.org/10.5027/psicoperspectivas-vol2-issue1-fulltext-3
27. Harvard Magazine. Paul Farmer: "Accompaniment" as Policy. Harvard Magazine. 25 de mayo de 2011 [citado abril 17, 2022]. Disponible en: https://www.harvardmagazine.com/2011/05/paul-farmer-accompaniment-as-policy
28. Arrieta J, Aguerrebere M, Raviola G, Flores H, Elliott P, Espinosa A, *et al.* Validity and utility of the patient health questionnaire (PHQ)-2 and PHQ-9 for screening and diagnosis of depression in rural Chiapas, Mexico: a cross-sectional study. J Clin Psychol. 2017;73(9):1076-1090. https://doi.org/10.1002/jclp.22390
29. García-Campayo J, Zamorano E, Ruiz MA, Pardo A, Pérez-Páramo M, López-Gómez V, *et al.* Cultural adaptation into Spanish of the generalized anxiety disorder-7 (GAD-7) scale as a screening tool. Health Qual Life Outcomes. 2010;8(1):1-11. https://doi.org/10.1186/1477-7525-8-8
30. Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: An overview of their history, recent evolution, and current effectiveness. Annu Rev Public Health. 2014;35:399-421. https://doi.org/10.1146/annurev-publhealth-032013-182354
31. Balcazar H, Perez-Lizaur AB, Izeta EE, Villanueva MA. Community health workers-promotores de salud in Mexico. History and potential for building effective community actions. J Ambul Care Manage. 2016;39(1):12-22. https://doi.org/10.1097/JAC.0000000000000096
32. Oliveira-Pinheiro PM, de Souza-Medeiros AE, Jardsom-Moura F, Mendes G, Colares J, de Lucena G, *et al.* Knowledge of community health agents about visually impaired people. Acta Paul Enferm. 2022;35:eAPE03372. https://doi.org/10.37689/acta-ape/2022AO03372
33. Monteiro NM, Balogun SK. Perceptions of mental illness in Ethiopia: a profile of attitudes, beliefs and practices among community members, healthcare workers and traditional healers. Int J Cult Ment Health. 2014;7(3):259-72. https://doi.org/10.1080/17542863.2013.784344
34. Sibeko G, Milligan PD, Roelofse M, Mofele L, Jonker D, *et al.* Piloting a mental health training programme for community health workers in South Africa: an exploration of changes in knowledge, confidence and attitudes. BMC Psychiatry. 2018;18:1-10. https://doi.org/10.1186/s12888-018-1772-1

Montañez-Hernández *et al. Human Resources for Health* (2020) 18:40
https://doi.org/10.1186/s12960-020-00481-z

Human Resources for Health

RESEARCH Open Access

Gender inequality in the health workforce in the midst of achieving universal health coverage in Mexico

Julio César Montañez-Hernández[1], Jacqueline Elizabeth Alcalde-Rabanal[1*], Gustavo Humberto Nigenda-López[2], Gladis Patricia Aristizábal-Hoyos[3] and Lorena Dini[4]

Abstract

Background: The third Sustainable Development Goal aims to ensure healthy lives and to promote well-being for all at all ages. The health system plays a key role in achieving these goals and must have sufficient human resources in order to provide care to the population according to their needs and expectations.

Methods: This paper explores the issues of unemployment, underemployment, and labor wastage in physicians and nurses in Mexico, all of which serve as barriers to achieving universal health coverage. We conducted a descriptive, observational, and longitudinal study to analyze the rates of employment, underemployment, unemployment, and labor wastage during the period 2005–2017 by gender. We used data from the National Occupation and Employment Survey. Calculating the average annual rates (AAR) for the period, we describe trends of the calculated rates. In addition, for 2017, we calculated health workforce densities for each of the 32 Mexican states and estimated the gaps with respect to the threshold of 4.45 health workers per 1000 inhabitants, as proposed in the Global Strategy on Human Resources for Health.

Results: The AAR of employed female physicians was lower than men, and the AARs of qualitative underemployment, unemployment, and labor wastage for female physicians are higher than those of men. Female nurses, however, had a higher AAR in employment than male nurses and a lower AAR of qualitative underemployment and unemployment rates. Both female physicians and nurses showed a higher AAR in labor wastage rates than men. The density of health workers per 1000 inhabitants employed in the health sector was 4.20, and the estimated deficit of workers needed to match the threshold proposed in the Global Strategy is 70 161 workers distributed among the 16 states that do not reach the threshold.

Conclusions: We provide evidence of the existence of gender gaps among physicians and nurses in the labor market with evident disadvantages for female physicians, particularly in labor wastage. In addition, our results suggest that the lack of physicians and nurses working in the health sector contributes to the inability to reach the health worker density threshold proposed by the Global Strategy.

Keywords: Gender inequality, Physicians, Nurses, Employment, Labor wastage

* Correspondence: jackeline.alcalde@gmail.com
[1]National Institute of Public Health, Avenida Universidad 655, 62100 Col Santa María de Ahuacatitlán, CP, Mexico
Full list of author information is available at the end of the article

© The Author(s). 2020, corrected publication 2020. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Resumen (Spanish)

Antecedentes: El tercer Objetivo de Desarrollo Sostenible busca alcalzar vidas saludables y promover el bienestar para todos en todas las edades. Por lo cual, el sistema de salud es clave para lograr estos objetivos, y debe tener suficientes recursos humanos para brindar atención a la población de acuerdo con sus necesidades y expectativas.

Métodos: Exploramos el desempleo, subempleo y desperdicio laboral en médicos y enfermeras en México como barreras para lograr la Cobertura Universal de Salud. Realizamos un estudio descriptivo, observacional y longitudinal para analizar las tasas de empleo, subempleo, desempleo y desperdicio laboral en el período 2005-2017, por género en ambas profesiones. Utilizamos la Encuesta Nacional de Ocupación y Empleo. Calculamos tasas anuales promedio (TAP) para el período para describir las tendencias. Además, para 2017 calculamos las densidades de la fuerza laboral para todos los 32 estados, y estimamos sus brechas con respecto al umbral de 4.45 propuesto en la Estrategia Global sobre Recursos Humanos para la Salud.

Resultados: La TAP de las médicas empleadas era más bajo que el de los médicos, y la TAP del subempleo, el desempleo y el despilfarro laboral para las médicas eran más altas que en los hombres. Las enfermeras tienen una TAP más alta en el empleo que los enfermeros y una TAP más baja de subempleo y desempleo. Tanto las médicas como las enfermeras muestran unas TAP más altas en las tasas de desperdicio laboral. La densidad de trabajadores por cada 1,000 habitantes empleados en el sector de la salud fue de 4.2, y el déficit estimado para alcanzar el umbral propuesto en la Estrategia Global es de 70,161 trabajadores. Hipotéticamente, si todos los desempleados, subempleados y aquellos dedicados a las actividades del hogar estuvieran empleados en el sector de la salud, la densidad sería de 7.16.

Conclusiones: Encontramos evidencia sobre la existencia de brechas de género entre médicos y enfermeras en el mercado laboral con desventajas evidentes para las médicas, y particularmente en el desperdicio laboral. Además, mostramos la falta de médicos y enfermeras trabajando en el sector de la salud para alcanzar el umbral propuesto en la Estrategia Global.

Palabras clave: Desigualdad de género, médicos, enfermeras, mercado laboral, desperdicio laboral

Background

The third Sustainable Development Goal (SDG 3) aims to ensure healthy lives and promote well-being for all at all ages. To this end, all national governments have been called upon to achieve universal health coverage (UHC), which must include financial risk protection, access to basic quality health care services, and access to safe, effective, quality essential medicines. Consequently, health systems play a key role in achieving these ends, and therefore, they must have an adequate number of available and accessible human resources for health (HRH) to offer a wide variety of services to the population [1–3] and accelerate progress towards UHC [4, 5]. In addition, increases in HRH have been linked to a better quality of health services and increased development of solid and sustainable health systems [6].

The 2016 Human Resources for Health Report highlights the importance of aligning the health workforce with the population's health needs, service coverage, and health outcomes [2, 7, 8]. Currently, most middle-income countries have a greater health workforce availability than a few years ago [3], which has been shown to positively impact health outcomes [6, 7]. Nevertheless, despite progress in HRH, there are still problems related to shortages of health workers, imbalances in geographical distribution, barriers to inter-professional collaboration, poor working conditions, unequal gender distribution, and limited availability of data regarding health workforce [9, 10].

Globally, we must address the HRH deficit, as well as inequalities in its distribution [11]. These problems with lack of medical personnel are widely recognized as the most insurmountable obstacles to improving health system performance and access to health services, especially in low- and middle-income countries (LMIC). Besides, the health workforce is changing its gender profile. While there is an increase of women in medicine, an increase in men has been reported in nursing [12]. These phenomena can, in part, be explained by changing gender roles in Western societies.

The World Health Organization (WHO) estimated that in order to achieve the SDGs by 2030 as planned, 18 million more health workers are needed in LMIC [6]. In the Global Strategy on Human Resources for Health (GSHRH), the WHO deemed that a density of 4.45 physicians, nurses, and midwives per 1000 inhabitants is the threshold required to achieve UHC [4].

In the Americas, about 70% of countries have enough physicians, nurses, and midwives to provide basic health services, but those countries still face challenges related to distribution, migration, and lack of training [13], especially in rural or high-marginalized areas [14].

In Mexico, in the 1990s, the unemployment rate of physicians was 12% while 8% had a job in a non-medical area [15]. Importantly, inactivity, unemployment, underemployment, and lower wages were concentrated in female physicians [16]. In 2008, 87% of physicians were working in the health sector and 10% had a non-medical job.

In Mexico, there is a great heterogeneity among nurses in terms of levels of training (i.e., technical, professional, and postgraduate) [17], which has contributed to the appearance of inequities in wages, as well as allocation and geographic distribution.

According to the Organisation for Economic Co-operation and Development (OCDE) [18], Mexico has a density above the threshold of 4.45 proposed in the GSHRH. However, we hypothesized that not all the 32 Mexican states reach the threshold due to unequal distribution throughout the country, and even if there was no unemployment, underemployment, and labor wastage in the health sector, some states of high marginalization would not reach the threshold. In addition, behind this hypothesis, we believe that although the number of professionals has increased over time, a possible cause of labor wastage in the country may be partly because women in both professions have fewer job opportunities and a large percentage of them are dedicated to household activities in a full-time basis.

Methods

Objective

The present study analyzes trends in employment, quantitative and qualitative underemployment, unemployment, and labor wastage rates for both physicians and nurses by gender between 2005 and 2017. Additionally, for 2017, we estimate the gap in the availability of HRH for each of the 32 Mexican states and compare it to the threshold proposed in the GSHRH, 4.45 health workers per 1000 inhabitants. For the second objective, we consider two scenarios: (a) calculating the densities only with the personnel employed in the health sector and (b) calculating the densities considering the entire available health workforce, including health personnel that are employed, unemployed, underemployed, and those dedicated to household activities on a full-time basis.

Study design

We conducted a descriptive, observational, and longitudinal study to estimate the rates of employment, underemployment, unemployment, and labor wastage for both physicians and nurses from 2005 to 2017. For our estimates, we used data from the National Occupation and Employment Survey (ENOE, in Spanish). This survey uses a two-stage sampling, probabilistic design to enhance representativeness at the national and state levels. It is carried out with the objective of collecting information about the occupational characteristics of the Mexican population. The data is used to calculate and release official employment indicators. The units of analysis are households and the population aged 15+. Data is collected every 3 months using a longitudinal design, where, each quarter, 20% of households are replaced, so that each household remains in the sample for five quarters (INEGI) [19]. In order to describe trends, we analyze data from the third quarter (Trim-III) of each year from the period 2005–2017 (excluding each quarter of the remaining sample from the third quarter of the following year, except for 2017 where we take all households). The estimations for the size of the population are based on the projections of the National Population Council (CONAPO, in Spanish) [20] as well as the grouping of the states according to their level of marginalization (i.e., very high, high, medium, low, and very low) [21].

Variables

We estimate the rates of employment, unemployment, underemployment, and labor wastage as well as the average annual rate (AAR) and the average annual growth rate (AAGR) from 2005 to 2017. Our definition of health workforce (HW) includes two occupational categories: physicians and nurses (including technicians) who have completed professional schooling. The following definitions are used to estimate the rates and constitute the employment pattern of the HW [15, 16, 22, 23]:

- Employed health workforce (E): physicians and nurses who work 20 h or more per week and perform health care or administrative functions in the health sector.
- Unemployed health workforce (U): physicians and nurses who were seeking work at the time of the survey because they were not linked to an economic activity.
- Quantitative underemployment (QnU): physicians and nurses whose work are underutilized because they work less than 20 h per week performing functions according to their profession or practice their profession as a secondary occupation.
- Qualitative underemployment (QlU): physicians and nurses who work but in a non-medical job.
- Household activities (H): physicians and nurses who exclusively perform household activities on a full-time basis.

- Potential health workforce (PHW): we included the following groups as potential workforce E, U, QnU, QlU, and H.

Employment, unemployment, underemployment, and labor wastage rates are calculated as follows:

- Rate of employment = $\frac{E}{E+QnU+QlU+U} \times 1000$
- Rate of unemployment = $\frac{U}{E+QnU+QlU+U} \times 1000$
- Rate of quantitative underemployment = $\frac{QnU}{E+QnU+QlU+U} \times 1000$
- Rate of qualitative underemployment = $\frac{QlU}{E+QnU+QlU+U} \times 1000$
- Rate of labor wastage = $\frac{QnU+QlU+U+H}{PHW} \times 1000$

To summarize and describe the trends in rates over the period 2003–2017, the AAR and AAGR were estimated as follows:

- Average annual rate (AAR) = $\frac{\sum_{i=2005}^{2017} \text{rate}_i}{13}$
- Average annual growth rate (AAGR) = $\frac{\sum_{i=2005}^{2016} (\text{rate}_{i+1} - \text{rate}_i)}{12}$ (where i is the rate of E, U, QnU, QlU, and wastage)

Finally, in order to estimate the gap between the current number of health workers and the 4.45 per 1000 inhabitants threshold recommended in GSHRH, we estimate two measures for health workforce density:

- Employed health workforce density (EHWD) = $\frac{E}{\text{Total population}} \times 1000$
- Potential health workforce density (PHWD) = $\frac{E+QnU+QlU+U+H}{\text{Total population}} \times 1000$

Statistical analysis

We performed the analysis on two levels. (1) At the national level, we estimated the rates of employment, quantitative and qualitative underemployment, unemployment, and labor wastage by gender and profession, and their AAR and AAGR from 2005 to 2017. (2) For 2017 and for each profession stratified by gender, we calculated the percentages and CI95% according to the employment pattern, age, schooling, and marital status; chi-square tests for nominal variables and Wilcoxon tests for ordinal variables were performed in order to assess the statistical differences. Further, at the state level, we estimated the percentages of employment and labor wastage for both physicians and nurses; states were grouped according to the level of marginalization, and we calculated the average percentage of each group.

Finally, considering the EHWD and PHWD for each state in Trim III-2017, we estimated the gap between each of these density indicators and the threshold of 4.45 per 1000 inhabitants as recommended in the GSHRH. The analyses were performed using STATA MP 13.0 accounting for the complex survey design, and statistical significance was set to the value $P < 0.05$.

Results

During the period 2005–2017, the average annual rate (AAR) of employment was 792 per 1000 physicians and the average annual growth rate (AAGR) was 0.22%. Both quantitative and qualitative underemployment rates remained stable with no major changes (AAGR 0.89 and 1.81, respectively), and for every 1000 physicians, on average, 128 had a non-medical job (Table 1). The analysis of employment rates by gender reveals a lower AAR for women than for men (767 vs. 806). Likewise, the AAR and AAGR of qualitative underemployment and unemployment estimations for female physicians were higher than those for men.

Regarding nursing, the calculated AAR revealed that, for every 1000 nurses, there were 701 employed for 20 h or more per week, 43 were employed for fewer than 20 h, 226 held a non-medical job, and 30 were unemployed (Table 2). The analysis by gender showed that even though the employment rate of nurses was higher for women (706) than in men (654), the rate was decreasing for both genders. That said, the decrease is more rapid for men (AAGR = − 0.76%). The AAR and AAGR of qualitative underemployment and unemployment were lower for female nurses.

Table 3 shows that labor wastage rates in both physicians and nurses were greater for women than for men in almost every year of the 2005–2017 period. In 2005, women represented 35.4% and 95.8% of workforce among physicians and nurses, respectively, whereas in 2017, those percentages were 48.5% and 87.8%, respectively. Nevertheless, the AAR of labor wastage in both female physicians and female nurses is higher than men.

In 2017, in Mexico, there were 292 035 physicians and 591 801 nurses, of which 72.7% and 51.8% were employed 20 h or more in the health sector, respectively. By age, 16.8% of physicians and 27.7% of nurses were younger than 30 years of age, and 15.2% of physicians and 8.3% of nurses were 60 years and older. With regard to education, 25.7% of physicians were specialists or had postgraduate schooling, while 48.3% of nurses were technicians, and only 0.9% had a specialization (Table 4).

For both physicians and nurses, women had lower percentages of employment (68.2 and 50.7%, respectively) compared to men (77.0 and 59.8%, respectively). A higher percentage of women were dedicated to household activities (14.5% of female physicians and 24.8% of female nurses compared to 5.3% male physicians and 2.0% of male nurses). Regarding age, 13.4% of male

Table 1 Physicians: rates of employment, quantitative and qualitative underemployment, and unemployment, by gender. Mexico 2005–2017

Rates × 1 000*	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AAR	AAGR
All physicians															
N*	**202 421**	**222 017**	**202 619**	**239 011**	**242 738**	**261 089**	**238 299**	**251 861**	**243 903**	**220 122**	**229 035**	**215 676**	**263 538**		
Employment	797	770	835	809	796	773	787	776	793	809	733	806	806	792	0.22
Quantitative underemployment	55	76	62	55	66	78	72	70	70	61	67	48	51	64	0.98
Qualitative underemployment	131	133	97	127	124	117	125	120	130	112	176	138	127	128	1.81
Unemployment	17	21	5	9	14	32	16	34	7	17	24	8	16	17	34.49
Women															
N*	**64 624**	**73 314**	**79 531**	**79 875**	**87 532**	**98 042**	**93 623**	**96 338**	**100 171**	**81 358**	**88 736**	**94 496**	**121 128**		
Employment	785	699	861	788	771	719	743	728	821	762	704	789	797	767	0.61
Quantitative underemployment	76	89	40	57	53	95	87	58	52	64	61	47	49	64	2.09
Qualitative underemployment	120	162	94	139	161	113	137	157	119	150	207	154	148	143	6.13
Unemployment	18	49	6	16	16	73	34	57	8	23	29	9	6	26	54.55
Men															
N*	**137 797**	**148 703**	**123 088**	**159 136**	**155 206**	**163 047**	**144 676**	**155 523**	**143 732**	**138 764**	**140 299**	**121 180**	**142 410**		
Employment	802	806	819	819	810	805	815	806	774	836	751	818	813	806	0.22
Quantitative underemployment	45	69	77	54	74	68	62	78	83	59	71	49	54	65	4.80
Qualitative underemployment	136	119	99	121	104	119	118	97	137	90	157	126	109	118	1.82
Unemployment	16	7	4	6	12	8	5	19	6	14	22	7	24	12	45.37

AAR average annual rate, *AAGR* average annual growth rate
*Professionals dedicated to household activities are not included in this table

Table 2 Nurses: rates of employment, quantitative and qualitative underemployment, and unemployment rates, by gender. Mexico 2005–2017

Rates × 1 000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AAR	AAGR
All nurses															
N*	**242 615**	**262 686**	**265 191**	**267 477**	**313 070**	**293 819**	**265 734**	**322 045**	**333 749**	**338 678**	**368 520**	**374 248**	**461 377**		
Employment	689	712	721	716	710	681	668	697	705	723	716	707	664	701	-0.26
Quantitative underemployment	51	37	25	48	51	59	46	40	49	34	42	33	46	43	4.16
Qualitative underemployment	232	233	225	210	208	209	261	227	226	219	212	222	248	226	0.95
Underemployment	28	18	29	26	30	51	25	36	20	23	29	38	41	30	10.76
Women															
N*	**229 379**	**243 848**	**244 208**	**243 485**	**288 128**	**264 242**	**243 441**	**282 406**	**296 571**	**290 456**	**320 630**	**320 293**	**390 397**		
Employment	684	721	737	716	717	681	664	703	723	729	721	712	674	706	-0.06
Quantitative underemployment	52	35	27	50	55	64	48	45	46	35	43	34	49	45	4.18
Qualitative underemployment	235	225	207	211	198	201	261	217	212	211	209	223	246	220	0.93
Underemployment	29	19	29	23	30	53	26	34	19	25	27	31	31	29	7.95
Men															
N*	**13 236**	**18 838**	**20 983**	**23 992**	**24 942**	**29 577**	**22 293**	**39 639**	**37 178**	**48 222**	**47 890**	**53 955**	**70 980**		
Employment	767	603	530	715	632	682	706	648	559	689	683	675	610	654	-0.76
Quantitative underemployment	42	65	9	23	3	10	21	4	77	29	38	26	29	29	170.96
Qualitative underemployment	183	332	436	202	327	274	260	300	333	270	237	219	262	280	8.92
Underemployment	8	0	25	60	39	35	13	47	32	12	42	80	99	38	54.17

AAR average annual rate, *AAGR* average annual growth rate
*Professionals dedicated to household activities are not included in this table

Table 3 Rates of labor wastage in physicians and nurses, by gender; Mexico

Rates × 1 000**	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	AAR	AAGR
Physicians (*N*)	**216 073**	**235 672**	**219 424**	**255 268**	**262 094**	**284 615**	**264 306**	**266 915**	**264 245**	**241 550**	**246 442**	**234 733**	**292 035**		
Women (%)	**35.4**	**35.0**	**42.1**	**36.9**	**38.8**	**41.3**	**41.7**	**40.6**	**43.4**	**40.9**	**40.8**	**46.4**	**48.5**		
Men (%)	**64.6**	**65.0**	**57.9**	**63.1**	**61.2**	**58.7**	**58.3**	**59.4**	**56.6**	**59.1**	**59.2**	**53.6**	**51.5**		
Physicians (rate)	253	274	229	243	263	291	291	267	268	263	319	260	273	269	1.23
Women	336	379	258	332	336	400	369	352	282	372	379	315	318	341	1.31
Men	208	218	207	190	217	214	235	210	257	187	278	212	230	220	2.64
Nurses (*N*)	**313 245**	**337 709**	**335 117**	**351 807**	**393 197**	**368 618**	**359 431**	**388 177**	**428 357**	**436 853**	**455 892**	**482 463**	**591 801**		
Women (%)	**95.8**	**94.2**	**93.6**	**93.2**	**93.6**	**91.9**	**93.7**	**89.7**	**91.0**	**88.7**	**89.3**	**88.3**	**87.8**		
Men (%)	**4.2**	**5.8**	**6.4**	**6.8**	**6.4**	**8.1**	**6.3**	**10.3**	**9.0**	**11.3**	**10.7**	**11.7**	**12.2**		
Nurses (rate)	467	446	430	456	435	457	506	422	451	439	421	452	482	451	0.57
Women	477	448	426	468	439	469	520	429	450	454	432	464	493	459	0.63
Men	233	420	478	285	377	321	308	359	461	325	331	357	402	358	8.71

AAR average annual rate, *AAGR* average annual growth rate
**Includes employment, quantitative and qualitative underemployment, underemployment, and household activities

Table 4 Characteristics of physicians and nurses. Mexico, ENOE Trim III-2017

	Physicians			Nurses		
	Total	Women	Men	Total	Women	Men
N	**292 035**	**141 728**	**150 307**	**591 801**	**519 408**	**723 93**
n	**1 070**	**444**	**626**	**2 118**	**1 824**	**294**
%	**100.0**	**48.5**	**51.5**	**100.0**	**87.8**	**12.2**
Employment pattern						
Employment	72.7 [68.4, 76.6]	68.2 [60.6, 74.9]	77.0 [72.2, 81.2]*	51.8 [48.5, 55.0]	50.7 [47.3, 54.1]	59.8 [54.6, 64.8]*
Quantitative underemployment	4.6 [3.2, 6.6]	4.1 [2.6, 6.6]	5.1 [3.1, 8.3]	3.6 [2.5, 5.2]	3.7 [2.5, 5.5]	2.9 [1.5, 5.4]
Qualitative underemployment	11.5 [9.2, 14.2]	12.7 [9.3, 17.0]	10.3 [7.7, 13.6]	19.4 [16.7, 22.3]	18.5 [15.6, 21.7]	25.7 [20.7, 31.4]
Underemployment	1.4 [0.7, 2.8]	0.5 [0.2, 1.1]	2.3 [1.1, 4.8]	3.2 [2.0, 5.1]	2.3 [1.5, 3.5]	9.7 [8.2, 11.3]
Household activities	9.8 [7.5, 12.5]	14.5 [11.0, 18.9]	5.3 [3.3, 8.2]	22.0 [19.4, 24.9]	24.8 [21.9, 28.1]	2.0 [0.9, 4.3]
Age group						
20–29	16.8 [13.2, 21.2]	20.5 [14.2, 28.6]	13.4 [9.8, 18.1]*	27.7 [24.8, 30.9]	25.0 [22.2, 28.1]	47.2 [42.8, 51.6]*
30–39	24.7 [19.6, 30.7]	27.2 [19.1, 37.1]	22.4 [17.3, 28.3]	24.3 [21.4, 27.5]	24.1 [21.0, 27.6]	25.5 [19.4, 32.7]
40–49	21.8 [14.1, 32.2]	26.6 [13.0, 46.8]	17.4 [12.8, 23.2]	22.8 [19.9, 25.9]	23.2 [20.1, 26.5]	20.0 [12.9, 29.6]
50–59	21.4 [18.0, 25.2]	20.5 [15.6, 26.4]	22.3 [18.3, 26.9]	16.8 [14.4, 19.5]	18.2 [15.5, 21.2]	6.9 [5.4, 8.7]
60–69	12.7 [10.2, 15.7]	4.6 [2.9, 7.1]	20.3 [16.7, 24.5]	5.7 [4.0, 8.2]	6.5 [4.5, 9.3]	0.4 [0.3, 0.7]
70+	2.5 [1.6, 4.0]	0.7 [0.3, 1.8]	4.2 [2.5, 6.9]	2.6 [1.6, 4.3]	3.0 [1.8, 4.9]	
Schooling						
Technician				48.3 [45.1, 51.6]	49.0 [45.5, 52.5]	43.9 [38.9, 48.9]
Graduate	74.3 [65.0, 81.9]	74.0 [54.8, 86.9]	74.7 [69.1, 79.6]	50.8 [47.5, 54]	50.2 [46.7, 53.6]	55.0 [49.9, 60]
Specialty/postgraduate	25.7 [18.1, 35.0]	26.0 [13.1, 45.2]	25.3 [20.4, 30.9]	0.9 [0.5, 1.7]	0.9 [0.4, 1.7]	1.2 [0.4, 3.5]
Marital status						
No partner	36.3 [30.9, 42]	44.7 [34.4, 55.5]	28.3 [23.8, 33.3]*	43.0 [39.5, 46.6]	42.9 [39.1, 46.7]	44.1 [39.3, 48.9]
With partner	63.7 [58, 69.1]	55.3 [44.5, 65.6]	71.7 [66.7, 76.2]	57.0 [53.4, 60.5]	57.1 [53.3, 60.9]	55.9 [51.1, 60.7]
Location						
Rural	2.7 [2.4, 3.0]	2.0 [1.7, 2.5]	3.3 [3.1, 3.4]	6.5 [5.9, 7.1]	6.8 [6.2, 7.5]	3.8 [3.3, 4.3]
Urban	97.3 [97, 97.6]	98.0 [97.5, 98.3]	96.7 [96.6, 96.9]	93.5 [92.9, 94.1]	93.2 [92.5, 93.8]	96.2 [95.7, 96.7]

*P value < 0.05

physicians were in the 20–29 age group, whereas 20.5% of female physicians were in that age bracket. For nurses, a lower percentage of female nurses were in the age bracket 20–25 (25.0%) compared to the percentage of men in that bracket (47.2%).

Figure 1 shows the heterogeneity of employment and labor wastage rates for physicians and nurses among the states grouped by level of marginalization. States with the highest marginalization had the highest employment average for both physicians and nurses (Fig. 1a, b). The highest physician labor wastage percentage was found in states with high and moderate marginalization (Fig. 2c). For nurses, the opposite was true, higher labor wastage percentages were found in the states categorized as low and very low categories (Fig. 2d).

In 2017, there were a total of 212 359 physicians (72.7%) and 306 491 nurses (51.8%) employed 20 h or more per week in the health sector in Mexico. Given that there is a population of 123.51 million, and that the EHWD per 1000 inhabitants was 4.2 (1.72 physicians and 2.48 nurses), we estimated a deficit of 70 161 workers to reach the threshold of 4.45 per 1000 as proposed by the GSHRH. At the state level, the estimated gap is heterogeneous. There were 18 states which did not reach the threshold, and the state deficits ranged from 87 workers to 14 264 workers (Fig. 2a). If we consider the potential health workforce density (PHWD), the density per 1000 inhabitants would reach 7.16 (Table 5) and only three states would still remain below the threshold (Fig. 2b). In this scenario, we calculated that a total of 8662 health workers would be required.

Discussion

Our study showed that male physicians and female nurses have higher rates of employment compared to

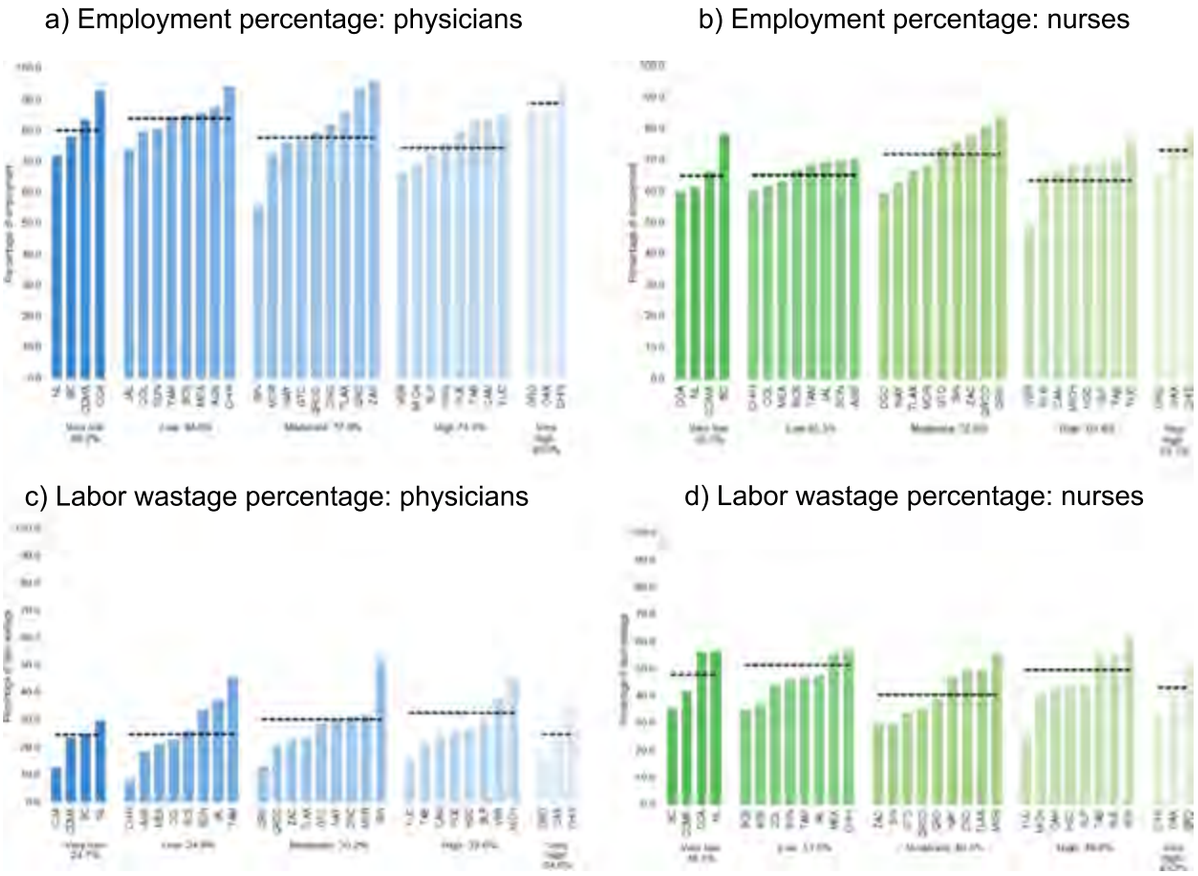


Fig. 1 Rates of employment and labor wastage in physicians and nurses. ENOE TrimIII-2017

their female and male counterparts, respectively. Qualitative underemployment and unemployment are higher in female physicians and male nurses, and labor wastage is higher in both female physicians and female nurses. In this regard, a previous study in Mexico reported that qualitative underemployment among physicians was particularly higher in women in 2006, regardless of the type of academic qualifications, whereas, among nurses, qualitative underemployment was higher among men [22]. Ten years later, although the number of female

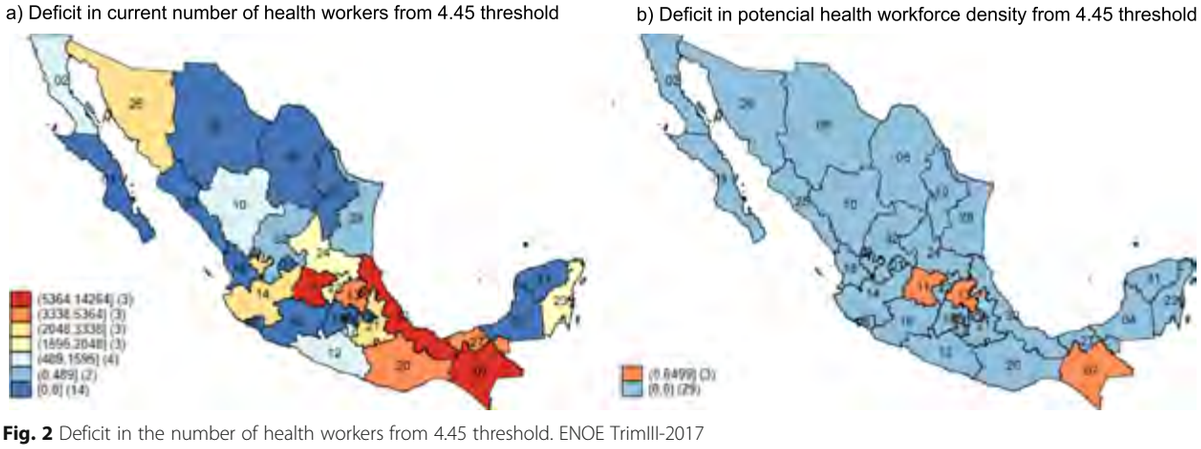


Fig. 2 Deficit in the number of health workers from 4.45 threshold. ENOE TrimIII-2017

Table 5 Density of health workers by employment pattern. ENOE TrimIII-2017

Employment pattern	Number of health workers	Cumulative number of health workers	Density	Need	States under the 4.45 threshold
Employed (E)	518 850	518 850	4.2	70 161	18
Quantitative underemployment (QnU)	34 849	553 699	4.48	57 832	15
Qualitative underemployment (QlU)	148 031	701 730	5.68	23 174	8
Unemployment (U)	23 185	724 915	5.87	21 405	7
Household activities (H)	158 921	883 836	7.16	8 662	3

In 2017, the total population in Mexico in 2017 was 123 518 269

physicians and male nurses has increased, gender discrepancies still exist, and underemployment and unemployment remain higher among female professionals. Moreover, some studies highlight wage differences in favor of male professionals [24, 25]. In addition, we found that quantitative underemployment is higher in female nurses. Some studies argue that women physicians are more likely to work part-time [26]. Both in medicine and nursing, common reasons for preferring part-time work include time to take care of children under 18 years old [27] or to continue with traditional household activities [28]. It is additionally highlighted that part-time physicians spend more time on teaching and research [26].

Regarding the feminization of physicians, a pattern is observed in most middle-income countries [29, 30] and is likewise becoming evident in Mexico. Between 2005 and 2017, the available workforce of female physicians in Mexico increased by 87% while available male physicians increased by only 3%. By 2017, in Mexico, almost half of the physicians employed in the health sector were women and around 75% of the health workforce (physicians and nurses) were women, with greater participation of women under 50 years than ever before. A similar trend has been observed in China, where about 51% of graduating physicians in 2005 were female, and by 2015, this percentage increased to 56% [31]. In general, the motivating factors for enrolling in medical schools are the scientific rigor of medicine and socioeconomic status and financial perspectives. For females, additional motivators include the social prestige of the profession, better opportunities to marry a professional [32], cultural preference for female physicians in conservative communities, and a desire to help poor people [33]. In response to this feminization of healthcare professions, some studies show positive and negative consequences. Researchers in Africa reported a trend that female physicians perform better standardized examinations [34], spending more time with their patients [35], writing fewer prescriptions, and referring cases more often [36]. However, some developing countries reported that female physicians work fewer hours and perform a lesser workload than their male counterparts [37, 38]. A systematic review showed a small negative impact of feminization on the availability of primary health care services in high-income countries [36].

About nursing in Mexico, we found that 12% of nurses were men in 2017, and the highest percentage of them were in the age category under 30 years old, indicating a recent trend in the growth of male nurses. A similar percentage is observed in the United States of America, where 13.6% of licensed nurses in 2015 were men [39]. The low numbers of males in nursing may be influenced by the social structure, given that this profession has been historically considered to be feminine [40]. Some authors argue that men reduce their social status when choosing the nursing profession, in contrast to women who raise their status [41]. In general, some studies explain gender discrimination in the health workforce due to the persistence of structural, social, and cultural factors that are perceived differently by stakeholders, physicians, and nurses [42].

We found a gap in training at the postgraduate level between physicians and nurses; while 25% of Mexican physicians had a postgraduate degree or specialty, only 1% of nurses had a specialty. This inequity in professional development is partly explained by the fact that the medical profession has specialty programs that are implemented under an academic program and is offered by public institutions with a monthly salary [43, 44]. In fact, we could identify only one relevant institutional initiative offering post-technical courses for nurses led by the Mexican Social Security Institute [17]. In summary, the results demonstrate important differences among physicians and nurses regarding gender and training level when they enter the labor market.

Finally, in terms of indicators of availability of health professionals, if we consider only those physicians and nurses employed in the health sector 20 h or more per week, Mexico has a density of 4.2 per 1000 inhabitants. Only 14 states achieved the threshold suggested in the GSHRH to reach UHC by 2030. If we consider also those who worked in the health sector less than 20 h per week, the density was 4.48 per 1000 inhabitants. The OECD reports a density of 5.33 for the same year but notes that interns and residents are included. In addition, the OECD

report uses data from different sources, so double counting may occur as both physicians and nurses can work in the public and private sectors simultaneously [18]. When we consider qualitative underemployment and unemployment, the density was 5.87 and 7.16 per 1000 inhabitants respectively, when we included those dedicated to household activities on a full-time basis. Some studies argued that these negative indicators were due to the concentration of health workers in the areas of greatest development, which offer better opportunities for professional development and better wages [45]. Hence, it is necessary to develop strategies to incorporate into the labor market professionals that are part of labor wastage.

Although the GSHRH does not mention what proportions of physicians and nurses would be adequate, systematic review informs that collaboration between physicians and nurses can have a positive impact on patient outcomes and a variety of pathologies [46]. Further, they conclude that properly trained nurses are capable of as high-quality care as primary care physicians and achieve equally good results in patients [47].

Our study has some limitations. Our estimation of rates of employment does not consider physicians and nurses who participate in teaching and research activities, so quantitative underemployment may be overestimated. Furthermore, it is not possible to distinguish between those who choose to work less than 20 h and those who have to do so because of market conditions. In addition, the analysis at the state level only considers one trimester, and it is not possible to identify labor mobility that can affect rates and state densities over time. Perhaps, in the future, if we choose another quarter or year, such as 2007 or 2014, when employment was at its highest rates, the national density of HRH would reach the threshold of 4.45 per 1000 for those who worked 20 h or more. Subsequent analyses of the time series could help explain possible seasonal cycles in the behavior of rates.

Conclusion

We provide evidence on the existence of gender gaps among physicians and nurses in the labor markets. The rates of employment were higher in men, and rates of unemployment and labor wastage were higher in women. This indicator pointed the disadvantages of the health labor market in Mexico for women, and this phenomenon particularly affects nurses where most of them are female. In general, if the health workers employed 20 h or more per week are considered, the gap to reach the WHO threshold is small; however, this gap decreases as the labor wastage enters the labor market. Therefore, policies on human resources for health should be oriented towards the incorporation of labor wastage in the labor market and the achievement of gender equity in relation to job responsibilities, promotion, retention, and remuneration [48].

Abbreviations

AAR: Average annual rate; AAGR: Average annual growth rate; CONAPO: National Population Council; ENOE: National Survey of Occupation and Employment; EHWD: Employed health workforce density; GSHRH: Global Strategy on Human Resources for Health; HRH: Human Resources for Health; HW: Health workforce; INEGI: National Institute of Statistics and Geography; LMIC: Low- and middle-income countries; OECD: Organisation for Economic Co-operation and Development; PHWD: Potential health workforce density; PHW: Potential health workforce; SDG: Sustainable Developing Goals; UHC: Universal health coverage; WHO: World Health Organization

Acknowledgements

Not applicable

Authors' contributions

JM: designed the original study, performed the data analysis, drafted the manuscript, and integrated the comments and suggestions of coauthors. JA: Suport in data analysis, drafted the manuscript, integration of comments and suggestions of coauthors. GN: support in data analysis and review all versions of the manuscript. GA: support in data analysis and review the paper. LD: review of all versions and coherence of the final manuscript. The authors read and approved the final manuscript.

Funding

Not applicable

Availability of data and materials

The datasets analyzed during the current study are available in the National Institute of Statistics and Geography repository [https://www.inegi.org.mx/programas/enoe/15ymas/].
All data generated during this study are included in this published article and its supplementary material files.

Ethics approval and consent to participate

The data available on the INEGI website provide information without identifiers. INEGI's code of ethics is available at the following link https://www.inegi.org.mx/contenidos/inegi/acercade/doc/codigo_etica.pdf

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests

Author details

[1]National Institute of Public Health, Avenida Universidad 655, 62100 Col Santa María de Ahuacatitlán, CP, Mexico. [2]National School of Nursing and Obstetrics, National Autonomous University of Mexico, Camino Viejo a Xochimilco y Viaducto Tlalpan, Huipulco, 14370 Mexico City, Mexico. [3]National Autonomous University of Mexico, Av. De Los Barrios 1, Hab. Los Reyes Ixtacala Barrio de los Árboles/Barrio de los Héroes, 54090 Tlalnepantla de Baz, State of Mexico, Mexico. [4]Charité–Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Institut für Allgemeinmedizin, Charitéplatz 1, 10117 Berlin, Germany.

Received: 21 October 2019 Accepted: 19 May 2020
Published online: 29 May 2020

References

1. Mcpake B, Maeda A, Araújo C, Lemiere C, Maghraby E. Why do health labour market forces matter. Bull World Health Organ. 2013;91:841–6. https://doi.org/10.2471/BLT.13.118794.
2. Campbell J, Buchan J, Cometto G, David B, Dussault G, Fogstad H, et al. Human resources for health and universal health coverage: fostering equity and effective coverage. Bull World Health Organ. 2013;91:853–63. https://doi.org/10.2471/BLT.13.118729.
3. Bertone MP, Witter S. The complex remuneration of human resources for health in low-income settings: policy implications and a research agenda for designing effective financial incentives. Human Resources for Health. 2015;13:62. https://doi.org/10.1186/s12960-015-0058-7.

4. World Health Organization. Global strategy on human resources for health: workforce 2030. WHO 2016. Available from: https://www.who.int/hrh/resources/global_strategy_workforce2030_14_print.pdf?ua=1. [cited 2019 Aug 3].
5. World Health Organization. Background document towards a global action plan for healthy lives and well-being for all. WHO, 2018. Available from: http://www.who.int/sdg/global-action-plan/GAP_mapping_doc.pdf. [cited 2019 Aug 15].
6. Mandeville KL, Lagarde M, Hanson K, Mills A. Human resources for health: time to move out of crisis mode. The Lancet. 2016;388(10041):220–2. https://doi.org/10.1016/S0140-6736(16)30952-7.
7. Anand PS, Bärnighausen T. Human resources and health outcomes: cross-country econometric study. Lancet. 2004;364(9445):1603–9. https://doi.org/10.1016/S0140-6736(04)17313-3.
8. Anand S, Bärnighausen T. Health workers and vaccination coverage in developing countries: an econometric analysis. Lancet. 2007;369(9569):1277–85. https://doi.org/10.1016/S0140-6736(07)60599-6.
9. Nkomazana O, Mash R, Shaibu S, Phaladze N. Stakeholders' perceptions on shortage of healthcare workers in primary healthcare in Botswana: focus group discussions. PLoS One. 2015;10(8):e0135846. https://doi.org/10.1371/journal.pone.0135846 eCollection 2015.
10. Scheffler RM, Arnold DR. Projecting shortages and surpluses of doctors and nurses in the OECD: what looms ahead. Health Econ Policy Law. 2019 Apr; 14(2):274–90. https://doi.org/10.1017/S174413311700055X.
11. Global Health Workforce Alliance and World Health Organization. A universal truth: no health without a workforce. Third Global Forum on Human Resources for Health Report. Available from: https://www.who.int/workforcealliance/knowledge/resources/GHWA-a_universal_truth_report.pdf?ua=1. [cited 2019 Sep 15].
12. Shen-Miller D, Smiler AP. Men in female-dominated vocations: a rationale for academic study and introduction to the special issue. Sex Roles: A Journal of Research. 2015;72(7-8):269–76 https://doi.org/10.1007/s11199-015-0471-3.
13. World Health Organization. Global health workforce shortage to reach 12.9 million in coming decades. Media Centre [Internet]. Available from: https://www.who.int/mediacentre/news/releases/2013/health-workforce-shortage/en/ [cited 2019 Sep 15].
14. Alcalde-Rabanal JE, Nigenda G, Barnighausen T, Velasco-Mondragon HE, Darney BG. The gap in human resources to deliver the guaranteed package of prevention and health promotion services at urban and rural primary care facilities in Mexico. Human Resources for Health. 2017;15:49. https://doi.org/10.1186/s12960-017-0220-5.
15. Knaul F, Frenk J, Aguilar AM. The gender composition of the medical profession in Mexico: implications for employment patterns and physician labor supply. J Am Med Womens Assoc. 2000;55(1):32–5 Available from: http://www.ncbi.nlm.nih.gov/pubmed/10680406.
16. Knaul FM, Frenk J, Aguilar M. The gender composition of the medical profession in Mexico: implications for employment patterns and physician labor supply. J Am Med Womens Assoc. 2000;55(1):32–5.
17. Esquivel-Rosales R. Cursos Postécnicos en enfermería, Instituto Mexicano del Seguro Social: una mirada al pasado. Rev Enferm Inst Mex Seguro Soc. 2012; 20(2):105–11 Available from: http://revistaenfermeria.imss.gob.mx/editorial/index.php/revista_enfermeria/article/view/346/386.
18. Organisation for Economic Co-operation and Development (OECD). OECD. Stat [Internet] [cited 2020 Feb 24]. Disponible en: https://stats.oecd.org/.
19. Instituto Nacional de Estadística y Geografía (INEGI). Encuesta Nacional de Ocupación y Empleo 2018 [Internet]. México, 2018. Available from: https://www.inegi.org.mx/programas/enoe/15ymas/ [cited 2018 Oct 24].
20. Dirección General de Información en Salud (DGIS). Cubos dinámicos: Proyecciones CONAPO versión Censo 2010 [Internet]. Secretaría de Salud. 2018. Available from: http://www.dgis.salud.gob.mx/contenidos/basesdedatos/bdc_poblacion_gobmx.html. [cited 2018 Oct 24].
21. Consejo Nacional de Población (CONAPO). Índices de Marginación por Entidad Federativa y Municipio 2010 [Internet]. Secretaría de Gobernación. 2010. Available from: http://www.conapo.gob.mx/es/CONAPO/Indices_de_Marginacion_2010_por_entidad_federativa_y_municipio. [cited 2018 Oct 24].
22. Nigenda G, Ruiz JA, Rosales Y, Bejarano R. Enfermeras con licenciatura en México: Estimación de los niveles de deserción escolar y desperdicio laboral. Salud Publica Mex. 2006;48(1):22–9.
23. Nigenda G, Ruiz JA, Bejarano R. Educational and labor wastage of doctors in Mexico: towards the construction of a common methodology. Human Resources for Health. 2005;3:3. https://doi.org/10.1186/1478-4491-3-3.
24. Rad EH, Ehsani-Chimeh E, Gharebehlagh MN, Kokabisaghi F, Rezaei S, Yaghoubi M. Higher income for male physicians: findings about salary differences between male and female Iranian physicians. Balkan Med J. 2019;36(3):162–8. https://doi.org/10.4274/balkanmedj.galenos.2018.2018.1082.
25. Muench U, Dietrich H. The male-female earnings gap for nurses in Germany: a pooled cross-sectional study of the years 2006 and 2012. Int J Nurs Stud. 2019;89:125–31. https://doi.org/10.1016/j.ijnurstu.2017.07.006.
26. Mechaber HF, Levine RB, Manwell LB, et al. Part-time physicians…prevalent, connected, and satisfied. J Gen Intern Med. 2008;23(3):300–3. https://doi.org/10.1007/s11606-008-0514-3.
27. Gravelle H, Hole AR. The work hours of GPs: survey of English GPs. Br J Gen Pract. 2007;57(535):96–100 PMCID: PMC2034168.
28. Jamieson L, Williams L, Lauder W, Dwyer T. Nurses' motivators to work part-time. Collegian. 2007;14(2):13–9 https://doi.org/10.1016/S1322-7696(08)60550-8.
29. Phillips SP, Austin EB. The feminization of medicine and population health. JAMA. 2009;301(8):863–4. https://doi.org/10.1001/jama.2009.155.
30. Canesqui AM, Spinelli MADS. Family health in Mato Grosso State, Brazil: profile and assessment by physicians and nurses. Cad Saude Publica. 2006; 22(9):1881–92. https://doi.org/10.1590/s0102-311x2006000900019.
31. Tang C, Tang D. The trend and features of physician workforce supply in China: after national medical licensing system reform. Hum Resour Health. 2018;16(1):18. https://doi.org/10.1186/s12960-018-0278-8.
32. Anukriti S, Dasgupta S. Marriage markets in developing countries. In: Averett S, Argys L, Hoffman S, editors. The Oxford Handbook of Women and the Economy; Aug. https://doi.org/10.1093/oxfordhb/9780190628963.013.5.
33. Kwon E. "For passion or for future family?" Exploring factors influencing career and family choices of female medical students and residents. Gender Issues. 2016;34(2):186–200. https://doi.org/10.1007/s12147-016-9168-3.
34. Ferguson E, James D, Madeley L. Factors associated with success in medical school: systematic review of the literature. BMJ. 2002;324(7343):952–7. https://doi.org/10.1136/bmj.324.7343.952.
35. French F, Andrew J, Awramenko M, Coutts H, Leighton-Beck L, Mollison J, et al. Why do work patterns differ between men and women GPs? J Health Organ Manag. 2006;20(2–3):163–72. https://doi.org/10.1108/14777260610661556.
36. Hedden L, Barer ML, Cardiff K, McGrail KM, Law MR, Bourgeault IL. The implications of the feminization of the primary care physician workforce on service supply: a systematic review. Hum Resour Health. 2014;12:32. https://doi.org/10.1186/1478-4491-12-32.
37. Koike S, Matsumoto S, Kodama T, Ide H, Yasunaga H, Imamura T. Estimation of physician supply by specialty and the distribution impact of increasing female physicians in Japan. BMC Health Serv Res. 2009;9(1):180. https://doi.org/10.1186/1472-6963-9-180.
38. Crossley TF, Hurley J, Jeon S-H. Physician labour supply in Canada: a cohort analysis. Health Econ. 2009;18(4):437–56. https://doi.org/10.1002/hec.1378.
39. Kovner CT, Djukic M, Jun J, Fletcher J, Fatehi FK, Brewer CS. Diversity and education of the nursing workforce 2006–2016. Nurs Outlook. 2018;66(2): 160–7. https://doi.org/10.1016/j.outlook.2017.09.002.
40. Meadus RJ. Men in nursing: barriers to recruitment. Nursing Forum. 2000; 35(3):5–12. https://doi.org/10.1111/j.1744-6198.2000.tb00998.x.
41. McMurry TB. The image of male nurses and nursing leadership mobility. Nurs Forum. 2011;46(1):22–8. https://doi.org/10.1111/j.1744-6198.2010.00206.x.
42. Stanley D, Beament T, Falconer D, Haigh M, Saunders R, Stanley K, et al. The male of the species: a profile of men in nursing. J Adv Nurs. 2016;72(5): 1155–68. https://doi.org/10.1111/jan.12905.
43. Estados Unidos Mexicanos- Secretaría de Salud. Diario Oficial de la Federación. NORMA Oficial Mexicana NOM-001-SSA3-2012, Educación en salud. Para la organización y funcionamiento de residencias médicas. Available from: http://www.cifrhs.salud.gob.mx/site1/residencias/docs/rm_NOM_001_SSA3_2012.pdf. [cited 2020 Feb 15].
44. Fajardo-Dolci G, García-Saiso S, González-Martínez JF. La Formación De Médicos Especialistas en México. Documento de Postura. Fajardo-Dolci G, Santacrus-Varela J, Lavalle-Montalvo C, Editores. Academia Nacional de Medicina/México. 2015;pp31–42. ISBN 978-607-443-514-6.Available from: https://www.anmm.org.mx/publicaciones/CAnivANM150/L30_ANM_Medicos_especialistas.pdf.
45. Dussault G, Franceschini C. Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. Hum Resour Health. 2006;4:12. https://doi.org/10.1186/1478-4491-4-12.

46. Matthys E, Remmen R, Van Bogaert P. An overview of systematic reviews on the collaboration between physicians and nurses and the impact on patient outcomes: what can we learn in primary care? BMC Fam Pract. 2017;18(1):110. https://doi.org/10.1186/s12875-017-0698-x.
47. Laurant M, Reeves D, Hermens R, Braspenning J, Grol R, Sibbald B. Substitution of doctors by nurses in primary care. Cochrane Database Syst Rev. 2005;2:CD001271. https://doi.org/10.1002/14651858.CD001271.pub2.
48. Hannawi S, Al SI. Time to address gender inequalities against female physicians. Int J Health Plann Manage. 2018;33(2):532–41. https://doi.org/10.1002/hpm.2476.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

BMC

Rev Saude Publica. 2020;54:58
Artículo Original

RSP Revista de Saúde Pública
http://www.rsp.fsp.usp.br/

Factores socioeconómicos y desigualdad en la distribución de médicos y enfermeras en México

Julio César Montañez-Hernández[I], Jacqueline Alcalde-Rabanal[I], Hortensia Reyes-Morales[I]

[I] Instituto Nacional de Salud Pública. Centro de Investigación en Sistemas de Salud. Cuernavaca, Mor, México

RESUMEN

OBJETIVO: Describir los recursos humanos en salud y analizar la desigualdad en su distribución en México.

MÉTODOS: Estudio transversal basado en la Encuesta Nacional de Ocupación y Empleo del cuarto trimestre de 2018 en México. Se consideraron como recursos humanos en salud médicos y enfermeras con licenciatura, y personal de enfermería auxiliar/técnica con estudios concluidos. Se agrupó a los estados por grado de marginación y se estimó densidades de recursos humanos en salud por 1.000 habitantes, Índices de Disimilitud e Índices de Concentración (IC) como medidas de desigualdad en la distribución.

RESULTADOS: La densidad de recursos humanos en salud fue de 4,6 por 1.000 habitantes; se observó heterogeneidad entre los estados con que van 2,3 hasta 10,5 por 1.000 habitantes. La desigualdad fue mayor en los estados con muy bajo grado de marginación (IC = 0,4) que en los estados de muy alto grado (IC = 0,1), y fue mayor la desigualdad en la distribución de los médicos (IC = 0,5) que en las enfermeras profesionales (IC = 0,3) entre los estados. Para que todos los estados tuvieran una densidad igual a la nacional de 4,6, se tendrían que distribuir alrededor de 12,6% de los recursos humanos en salud entre los estados que estuvieron por debajo de la densidad nacional. Adicionalmente, 17 estados tuvieron una densidad superior al umbral de 4,5 por 1.000 habitantes propuesto en la Estrategia Global en Recursos Humanos para la Salud. Eso implica un déficit de casi 60 mil recursos humanos en salud entre los 15 estados por debajo del umbral.

CONCLUSIONES: En México existe desigualdad en la distribución de recursos humanos en salud, diferenciada en los estados. Mecanismos gubernamentales a través de una política de recursos humanos podrían incentivar el equilibrio en el mercado de laboral de los médicos y enfermeras.

DESCRIPTORES: Distribución de Médicos. Enfermeras y Enfermeros, provisión & distribución. Grupo de Atención al Paciente. Factores Socioeconómicos. Equidad en Salud.

Correspondencia:
Hortensia Reyes Morales
Av. Universidad 655, Santa Maria Ahuacatitlán, Cuernavaca, Mor, México.
E-mail: hortensia.reyes@insp.mx

Recibido: 14 ago 2019
Aprobado: 30 out 2019

Cómo se cita: Montañez-Hernández JC, Alcalde-Rabanal J, Reyes-Morales H. Factores socioeconómicos y desigualdad en la distribución de médicos y enfermeras: México. Rev Saude Publica. 2020;54:58.

Copyright: Este es un artículo de el acceso abierto distribuido bajo la términos de la licencia Atribución Creative Commons, lo que permite el uso ilimitado, distribución y reproducción en cualquier medio, siempre que el autor y la fuente los originales se acreditan.

INTRODUCCIÓN

Los recursos humanos que laboran en las instituciones de salud son considerados uno de los pilares para el adecuado desempeño de los sistemas de salud[1,2]. Anand y Bärnighausen hacen una crítica al marco conceptual de los sistemas de salud propuesto por la Organización Mundial de la Salud (OMS) que considera a los recursos humanos en salud (RHS) como uno de los bloques del sistema[1]. Proponen un marco conceptual en el que los recursos humanos son el centro de los sistemas de salud[3]. El cumplimiento de las metas y la satisfacción de los pacientes dependen de los RHS, dado que son ellos quienes realizan las actividades de provisión de servicios preventivos y curativos, entregan información sobre el diagnóstico, tratamiento y seguimiento, y deciden qué tecnología y/o medicamento utilizar, por lo cual su tamaño, composición y distribución son muy relevantes para asegurar el acceso de la población a los servicios de salud[3].

La disponibilidad de RHS, medida a través de la densidad por número de habitantes, ha sido relacionada con indicadores de cobertura. Se ha encontrado una relación positiva con algunas intervenciones como cobertura de vacunación o cobertura de partos atendidos por personal calificado[4]. En 2004, la Iniciativa Conjunta de Aprendizaje (Joint Learning Iniciative, [JLI]), recomendó una densidad de 2,5 por 1.000 habitantes para alcanzar una cobertura de 80,0% de inmunización contra el sarampión y partos atendidos por personal de salud[5]. En el marco de los Objetivos de Desarrollo del Milenio (ODM), el informe mundial de la OMS de 2006 sugirió un umbral mínimo de 2,3 médicos, enfermeras y parteras por cada mil habitantes para alcanzar un 80,0% de partos atendidos por personal calificado; 57 países no alcanzaban tal indicador[4].

En 2016, en el marco de los Objetivos de Desarrollo Sostenible (ODS)[6], la OMS estableció una densidad de 4,5 médicos, enfermeras y parteras por 1.000 habitantes como umbral mínimo requerido para la implementación de la Estrategia Global sobre Recursos Humanos para la Salud (EGRHS) en el marco de la cobertura universal de salud (CUS)[7]. A diferencia del indicador de 2006, este umbral contempla 12 indicadores relacionados con metas de la CUS y los ODS. Con este indicador, la OMS pronosticó que se necesitarían 18 millones más de trabajadores de la salud en los países de ingreso medio-bajo para alcanzar los ODS[7,8], aunque se hizo enfasis en que este no debe representar una meta para todos los paises dadas sus diferencias en las necesidades de salud[7].

En México, el gobierno federal lanzó en 2003 un seguro público de salud conocido como Seguro Popular de Salud (SPS) para brindar protección financiera a la población excluida de la seguridad social[9], con un logro de afiliación de 53,5 millones de mexicanos hacia finales de 2017[10]. Adicionalmente, en el período 2005–2016, el gasto público en salud per cápita aumentó 31,0% y la densidad de médicos y enfermeras por cada mil habitantes se incrementó en 34,0 y 32,0%, respectivamente. A pesar de estos avances, el sistema público de salud enfrenta problemas de accesibilidad y calidad de atención, que pueden ser explicados por la carencia de una política explícita de recursos humanos en salud[11], y por el desequilibrio entre las necesidades de salud de la población y los recursos humanos y financieros[11,12].

A nivel nacional, la Secretaría del Trabajo y Previsión Social (STPS) realiza estimaciones periódicas del número de médicos y enfermeras con licenciatura que están empleados[13]; no obstante, estas estimaciones no muestran si los profesionales ejercen la profesión médica ni se especifica la duración de la jornada laboral. Otras fuentes de información como la Organización para la Cooperación y el Desarrollo Economicos (OCDE) reportaron para México una densidad de 2,4 y 2,9 médicos y enfermeras, respectivamente, en 2017. Sin embargo, estos datos incluyen a médicos internos (pre-grado) y residentes (en posgrado de especialización), utilizan datos provenientes de distintas fuentes de información y en ellas se reconoce la posibilidad de duplicación[14]. En ambos casos, el indicador de densidad de RHS puede estar sobreestimado y no es posible calcular el déficit de profesionales que son necesarios para alcanzar el umbral de 4,5 recomendado en la EGRHS. Por lo anterior,

el presente estudio tuvo como objetivo describir los RHS y analizar la desigualdad en su distribución en México.

MÉTODOS

Estudio transversal realizado a partir de análisis secundario de datos para describir características del personal médico y de enfermería. Se utilizó la Encuesta Nacional de Ocupación y Empleo (ENOE), realizada por el Instituto Nacional de Estadística y Geografía (INEGI). La ENOE tiene un diseño probabilístico, biétapico, estratificado y por conglomerados, se levanta trimestralmente, tiene cobertura geográfica nacional y estatal, y su objetivo es proporcionar información sobre las características ocupacionales de la población de 15 años y más[15]. Las bases de datos están disponibles públicamente y no contienen información identificable de los individuos.

Se construyeron indicadores de desigualdad con base en la ENOE del cuarto trimestre de 2018 (trimestre IV-2018). Todas las personas con estudios en medicina o enfermería que refirieron haber terminado sus estudios de licenciatura al momento de la encuesta fueron consideradas Recursos Humanos en Salud (RHS) o personal sanitario. También se incluyeron a quienes estudiaron enfermería a nivel técnico (enfermería auxiliar).

Variables[16,17]

Personal empleado/ocupado (Emp): personal sanitario que trabajaba 20 horas o más a la semana realizando funciones de acuerdo a su formación académica en el área de la salud, o realizaba funciones administrativas en el sector salud.

Personal desempleado (Des): personal sanitario que en la semana de referencia de la encuesta buscó trabajo porque no estaba vinculado a una actividad económica.

Personal con subempleo cuantitativo (SubCt): personal sanitario empleado/ocupado menos de 20 horas a la semana y con funciones de acuerdo a su profesión, o bien, que ejercía la profesión sanitaria como un empleo secundario.

Personal con subempleo cualitativo (SubCl): personal sanitario empleado/ocupado pero con funciones o actividades ajenas a su formación académica, independientemente de las horas laborales por semana.

Población Económicamente Activa (PEA): personal sanitario empleado, subempleado y desempleado.

Medidas de Desigualdad

Densidades de Recursos Humanos en Salud por 1.000 habitantes:

a. Densidad de recursos humanos empleados (DRHS): $\frac{Emp}{Población\ total}$ x 1.000.

b. Densidad de recursos humanos PEA: $\frac{Emp + SubCt + SubCl + Des}{Población\ total}$ x 1.000.

En ambos casos, se obtuvo el déficit de RHS respecto al umbral recomendado en la EGRHS de acuerdo con las siguientes fórmulas:

c. Déficit de empleados: $\frac{(4{,}5 - \text{Densidad de recursos humanos empleados}) \times \text{población total}}{1.000}$.

d. Déficit de PEA: $\frac{(4{,}5 - \text{Densidad de recursos humanos PEA}) \times \text{población total}}{1.000}$.

Se analizaron los factores socioecónomicos (edad, escolaridad, localidad de residencia y características de empleo) en ambas profesiones, y se calcularon las densidades de recursos humanos en salud por entidad federativa de 1) personal sanitario empleado por 1.000 habitantes (DRHS), y 2) población económicamente activa (PEA) por 1.000 habitantes. En ambos casos, se compararon las densidades con el umbral de 4,5 por 1.000 recomendado en la EGRHS y se estimó el número de trabajadores de la salud necesarios para alcanzar dicho umbral.

Índice de disimilitud

El índice de disimilitud (ID) es uno de los indicadores usados en el análisis de las desigualdades en salud[18,19]. Su cálculo proviene de la fórmula $\sum_{j=1}^{32} \frac{1}{2} |s_{jh} - s_{jp}|$, donde s_{jh} es la proporción del personal sanitario en el estado *j* respecto al total nacional, y s_{jp} es la proporción de la población en el estado *j* respecto a la población nacional. En este estudio, el ID se interpretó como la proporción (o porcentaje) de trabajadores que tendrían que redistribuirse entre los estados para que todos tuvieran la misma DRHS.

Índice y curva de concentración

Otro índice usado en el análisis de las desigualdades en salud es el índice que proviene de la Curva Concentración (CC)[18,19]. En este estudio, se construyeron las curvas considerando a los estados como unidad de análisis. Se calculó la proporción de RHS en el estado *j* respecto al total nacional (s_{jh}), y se calculó la proporción de los Años de Vida Saludable perdidos por Discapacidad (AVISA) en el estado *j* respecto al total nacional (s_{ja}). La curva de concentración grafica la proporción *acumulada* de AVISA por los estados (empezando con el estado con la menor proporción de AVISA en el eje de las ordenadas, y finalizando con la mayor) con las proporciones *acumuladas* de RHS. Si los trabajadores están igualmente distribuidos entre los estados, de acuerdo con su porcentaje de la carga de la enfermedad nacional, la curva de concentración coincide con la diagonal que une los puntos (0,0) y (1,1), llamada línea de igualdad. El área entre la CC y la línea de igualdad es el Índice de Concentración (IC) y entre mayor sea el valor absoluto del IC más grande es la desigualdad. Se construyó un gráfico de dispersión entre la DRHS por 1.000 habitantes y los AVISA por 100 mil habitantes en cada estado[18]. Adicionalmente, se construyó otro gráfico de dispersión entre la DRHS por 1.000 habitantes y el Producto Interno Bruto (PIB) *per cápita,* y se estimó la correlación de Spearman.

Análisis

Se utilizaron los tres indicadores de desigualdad en la distribución de recursos humanos a nivel nacional y por estados agrupados por grado de marginación: la DRHS por 1.000 habitantes, el ID y el IC. La información del tamaño de la población proviene de las proyecciones de población del Consejo Nacional de Población (CONAPO) disponibles en la página electrónica de la Dirección General de Información en Salud (DGIS) de la Secretaría de Salud[20]. La clasificación y agrupación de los estados según grado de marginación proviene de la clasificación propuesta por CONAPO[21]. Los datos del Producto Interno Bruto (PIB) se obtuvieron de la página electrónica del Instituto Nacional de Estadística y Geografía (INEGI)[22]. La información de los AVISA se obtuvo de las estimaciones de la Carga Global de la Enfermedad realizadas por el Instituto de Métricas y Evaluación de la Salud de 2017 (IHME, en inglés)[23].

Los análisis se realizaron utilizando los factores de expansión de la encuesta y se consideró su diseño complejo utilizando el módulo SVY del paquete STATA MP 13.0. Pruebas Chi-cuadrada de Pearson evalúan las diferencias en la distribución entre el tipo de profesión (medicina o enfermería) y sus factores socioeconómicos considerando $p < 0.05$ para la significancia estadística e intervalos de confianza al 95% (IC95%).

RESULTADOS

En 2018, había 413 mil médicos y 714 mil enfermeras en México, de los cuales 62,9% y 44,4%, respectivamente, estaban empleados 20 horas o más en el sector salud (Tabla 1), equivalente a 260,482 médicos y 317,280 enfermeras (Tabla 2); 24,8% de los médicos

Tabla 1. Factores socioeconómicos del personal médico y de enfermería. Encuesta Nacional de Ocupación y Empleo, ENOE, México, Trimestre IV, 2018.

	Total	Personal médico	Personal de enfermería
N	1.128.668	413.866	714.802
n	4.022	1.443	2.579
%	100%	36,7%	63,3%
		% [IC 95%]	
Grupo de edad (años)			
20-29	21,1 [19,3–23,0]	16,6 [13,8–19,8]	23,7 [21,5–26,0][a]
30-39	24,4 [22,2–26,8]	26,5 [22,3–31,1]	23,2 [20,7–25,9]
40-49	17,5 [15,7–19,4]	14,0 [11,4–17,0]	19,5 [17,2–22,0]
50-59	18,8 [16,8–21,0]	15,8 [12,8–19,3]	20,6 [18,1–23,4]
60-69	13,0 [11,2–15,0]	19,0 [15,5–23,1]	9,5 [7,8–11,4]
70+	5,2 [4,1–6,5]	8,1 [5,9–11]	3,5 [2,6–4,7]
Escolaridad			
Técnico/auxiliar	29,7 [27,4–32,0]		46,8 [44,1–49,6][a]
Licenciatura	60,3 [57,7–62,9]	75,2 [70,7–79,3]	51,7 [48,9–54,5]
Especialidad/posgrado	10,0 [8,4–11,9]	24,8 [20,7–29,3]	1,5 [1,0–2,2]
Estado civil			
Sin pareja[b]	40,6 [38,1–43,1]	40,0 [35,8–44,3]	40,9 [38,0–44,0][a]
Con pareja[c]	59,4 [56,9–61,9]	60,0 [55,7–64,2]	59,1 [56,0–62,0]
Características de empleo			
PEA			
Empleo	51,2 [48,6–53,8]	62,9 [58,8–66,9]	44,4 [41,3–47,5][a]
Subempleo cuantitativo	4,2 [3,3–5,3]	5,7 [4,0–8,0]	3,3 [2,4–4,5]
Subempleo cualitativo	14,3 [12,7–16,2]	8,8 [6,9–11,0]	17,6 [15,3–20,2]
Desempleo	1,7 [1,2–2,4]	1,3 [0,7–2,4]	1,9 [1,2–2,9]
PNEA[d]	28,6 [26,3–31,0]	21,3 [18,1–24,8]	32,8 [29,9–35,9]
Tamaño de localidad			
Rural	6,1 [5,6–6,8]	4,7 [4,3–5,1]	7,0 [6,4–7,7]
Urbano	93,9 [93,2–94,4]	95,3 [94,9–95,7]	93[92,3–93,6]
Grado de marginación[e]			
Muy baja	24,3 [23,0–25,7]	27,3 [24,8–30,0]	22,6 [21,3–24,0][a]
Baja	32,0 [30,8–33,2]	31,1 [29,3–33,1]	32,4 [31,1–33,7]
Media	14,2 [13,6–14,9]	13,6 [12,6–14,6]	14,6 [13,9–15,3]
Alta	21,7 [20,7–22,8]	20,0 [18,9–21,1]	22,7 [21,5–23,9]
Muy alta	7,8 [7,3–8,4]	8,0 [7,3–8,7]	7,7 [7,1–8,3]

ENOE: [Encuesta Nacional de Ocupación y Empleo]; PEA: [Población Económicamente Activa]; PNEA [Población No Económicamente Activa]
[a] $p < 0,000$; [b] Incluye solteros, divorciados y viudos; [c] Incluye unidos y casados; [d] Población No Económicamente Activa: incluye personas que se dedican a actividades del hogar, estudiantes, pensionados y discapacitados. [e] **Grado de marginación**: Ciudad de México ,Coahuila, Baja California, Nuevo León (**Muy bajo**); Aguascalientes, Baja California Sur, Colima, Chihuahua, Jalisco, Estado de México, Tamaulipas (**Bajo**); Durango, Guanajuato, Morelos, Nayarit, Querétaro, Quintana Roo, Sonora, Tlaxcala, Zacatecas (**Medio**); Campeche, Hidalgo, Michoacán, Puebla, San Luis Potosí, Sinaloa, Tabasco, Veracruz, Yucatán (**Alto**); Chiapas, Guerrero, Oaxaca (**Muy alto**).

Tabla 2. Medidas de desigualdad en la distribución del personal médico y de enfermería empleado (DRHS) en estados agrupados por grado de marginación: Densidad por 1.000 habitantes (DRHS), Índice de Disimilitud (ID) e Índice de Concentración (IC). Encuesta Nacional de Ocupación y Empleo, ENOE, Mexico, Trimestre IV, 2018.

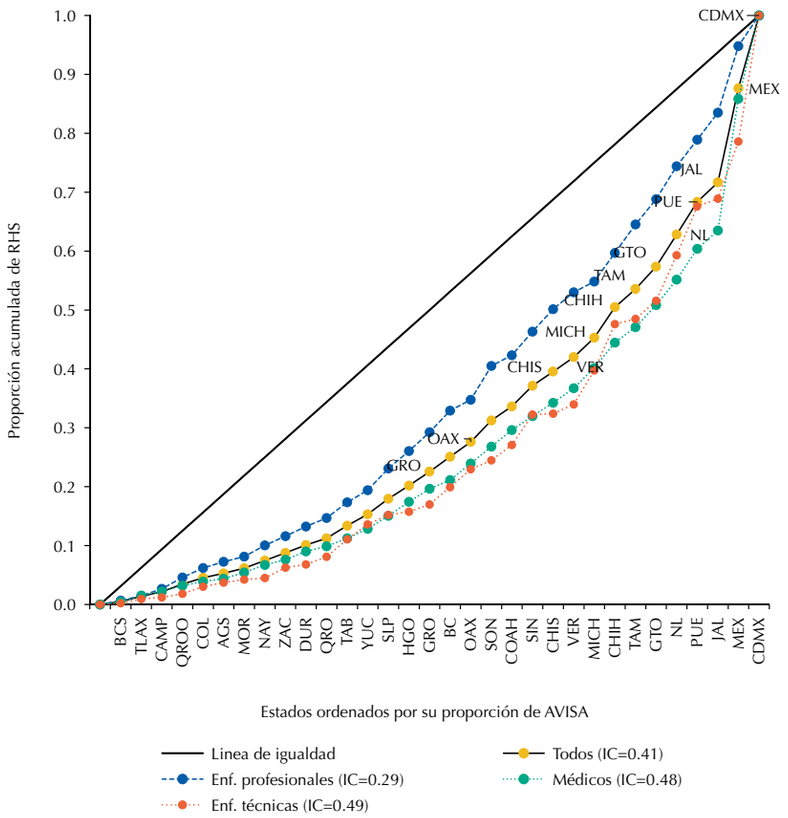
	Nacional (32)	Grado de marginación (número de estados)				
		Muy bajo (4)	Bajo (7)	Medio (9)	Alto (9)	Muy alto (3)
Población (miles)	124.738	20.786	39.261	20.849	30.687	13.155
Total de RHS (medicina y enfermería)	577.762	150.807	173.821	83.027	124.337	45.770
DRHS	4,6	7,3	4,4	4,0	4,0	3,5
ID	12,6	18,9	6,6	7,7	11,5	2,7
IC	0,4	0,4	0,5	0,2	0,2	0,1
Medicina	260.482	80.511	77.279	33.587	49.861	19.244
DRHS	2,1	3,9	2,0	1,6	1,6	1,5
ID	16,3	30,0	6,5	7,1	10,6	5,5
IC	0,5	0,5	0,5	0,3	0,2	0,0
Enfermería técnica	111.856	25.811	46.507	11.562	25.051	2.925
DRHS	0,9	1,2	1,2	0,5	0,8	0,2
ID	25,4	8,6	9,4	13,4	33,6	29,0
IC	0,5	0,3	0,6	0,3	0,2	0,2
Enfermería profesional	205.424	44.485	50.035	37878	49.425	23.601
DRHS	1,6	2,1	1,3	1,8	1,6	1,8
ID	18,2	12,1	26,1	12,4	15,4	6,1
IC	0,3	0,3	0,3	0,2	0,2	0,1

DRHS: Densidad de Recursos Humanos en Salud empleados por 1.000 habitantes. ID: Índice de Disimilitud. IC: Índice de Concentración.

[IC95% 20,7–29,3] y 1.5% de las enfermeras tenían una especialidad/posgrado [IC95% 1,0–2,2]. Por el contrario, 46,8% [IC95% 44,1–49,6] eran enfermeras técnicos/auxiliares. Encontramos diferencias estadísticamente significativas en la distribución por edad y por características de empleo en ambas profesiones. En particular, el subempleo cualitativo fue mayor en el personal de enfermería (17,6%, [IC95% 15,3–20,2]) que en el personal médico (8,8%, [IC95% 6,9–11,0]), al igual que el desempleo (1,9%, [IC95% 1,2–2,9]; y 1,3%, [IC95%: 0,7–2,4], respectivamente) (Tabla 1).

La densidad de profesionales de la salud (DRHS) por 1.000 habitantes fue de 4,6 (2,1 en personal médico, 0,9 y 1,6 en personal de enfermería técnica y profesional, respectivamente), superando el umbral de 4,5 recomendado en la EGRHS (Tabla 2). Sin embargo, la brecha entre la densidad actual y el umbral de 4,5 fue heterogénea entre los estados agrupados por grado de marginación: mientras en los estados de muy bajo grado la densidad es de 7,3 por mil habitantes, en el grupo de muy alta marginación fue de 3,5 por 1.000 habitantes. El ID señaló que, para que en todos los estados exista una densidad de 4,6 por 1.000 habitantes, tendrían que redistribuirse 12,6% del total del personal sanitario, mientras que en el grupo de estados de muy alta marginación se tendrían que distribuir 2,7% para que todos tuvieran una densidad de 3,5 por 1.000 habitantes. Asimismo, el IC nacional (0,4) indicó desigualdad similar a nivel nacional que al interior de los grupos de muy bajo y bajo grado de marginación (0,4 y 0,5, respectivamente), y la desigualdad fue similar en los grupos de grado medio y alto (0,2 y 0,2, respectivamente) aunque menor que en los grupos anteriores.

La mitad de los estados (50,0%) con las menores proporciones de AVISA concentraron menos de 25,0% de toda la fuerza laboral, mientras que cinco de ellos (Nuevo León, Puebla, Jalisco, México y Ciudad de México) concentraron más de 40,0% (CI = 0,4). Este patrón fue originado principalmente por la desigualdad en la distribución del personal médico (CI = 0,5)

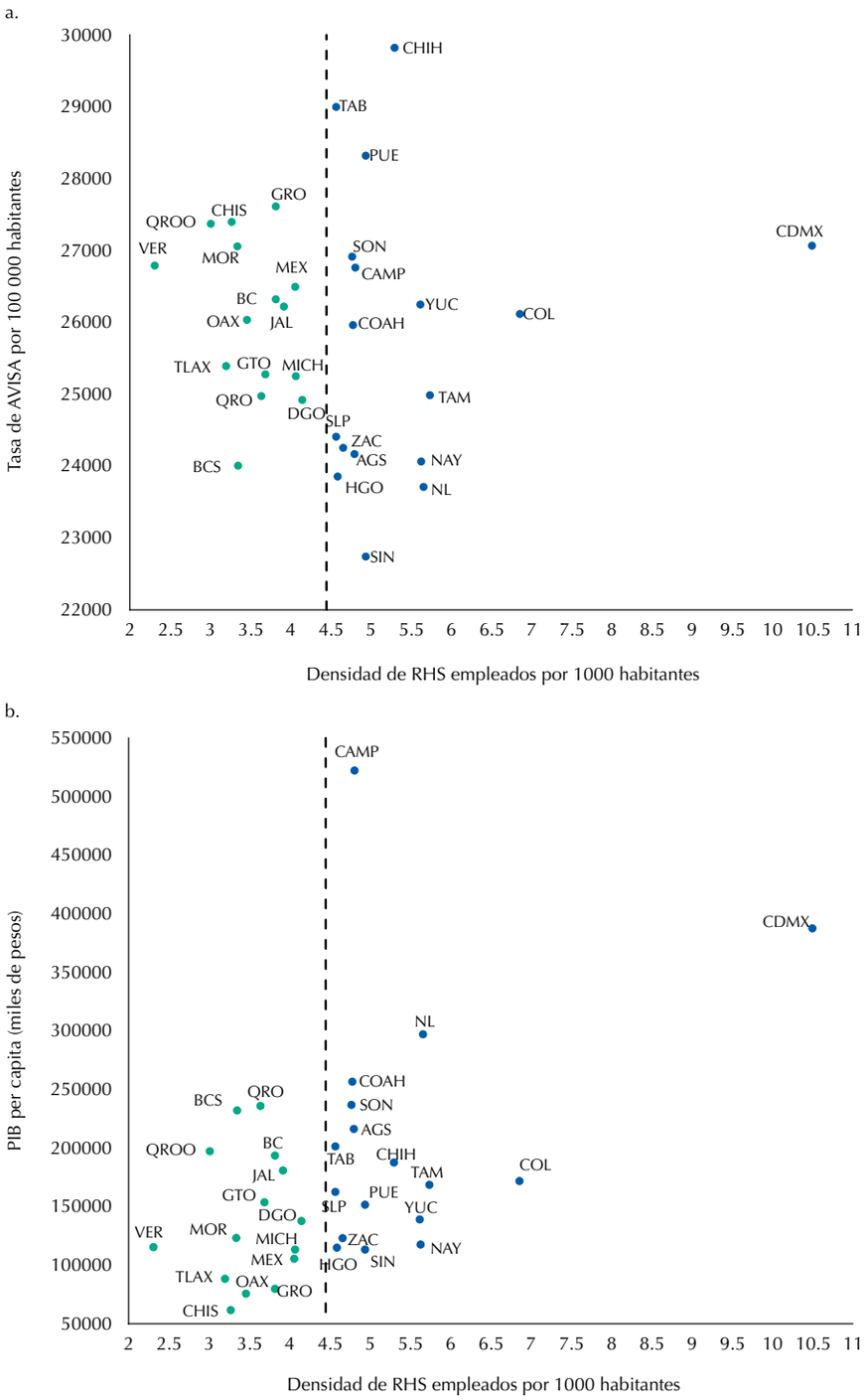


Aguascalientes (AGS), Baja California (BC), Baja California Sur (BCS), Campeche (CAMP), Coahuila (COAH), Colima (COL), Chiapas (CHIS), Chihuahua (CHIH), Ciudad de México (CDMX), Durango (DGO), Guanajuato (GTO), Guerrero (GRO), Hidalgo (HGO), Jalisco (JAL), Estado de México (MEX), Michoacán (MICH), Morelos (MOR), Nayarit (NAY), Nuevo León (NL), Oaxaca (OAX), Puebla (PUE), Querétaro (QRO), Quintana Roo (QROO), San Luis Potosí (SLP), Sinaloa (SIN), Sonora (SON), Tabasco (TAB), Tamaulipas (TAMP), Tlaxcala (TLAX), Veracruz (VER), Yucatán (YUC), Zacatecas (ZAC).

Figura 1. Curva de concentración de los Recursos Humanos en Salud (RHS) empleados entre los estados ordenados de acuerdo a la proporción de Años de Vida Saludable perdidos por Discapacidad, AVISA. Encuesta Nacional de Ocupación y Empleo, ENOE, México, Trimestre IV, 2018.

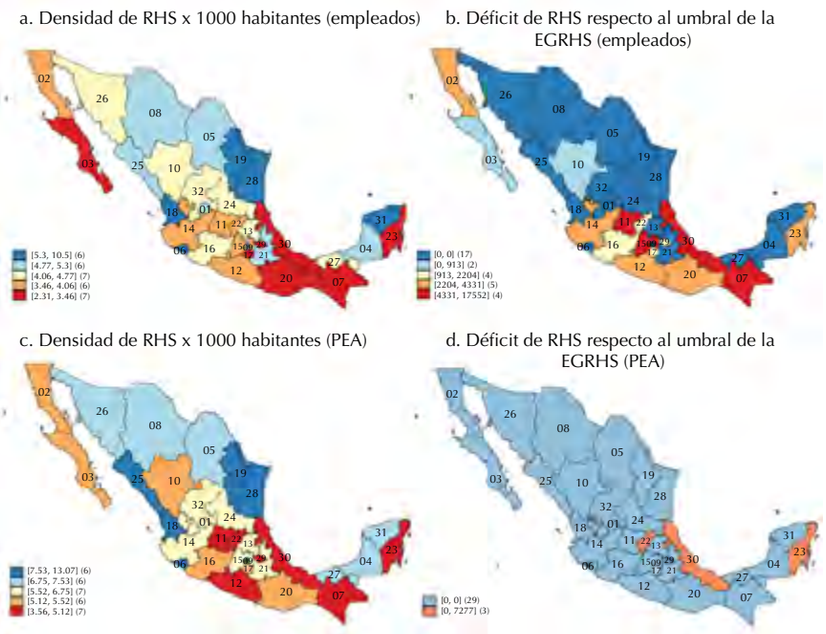
y de enfermería técnica (CI = 0,5), y en menor medida a la distribución de la enfermería profesional (CI = 0,3) (Figura 1). Adicionalmente, no se observó una correspondencia entre la DRHS por 1.000 habitantes en cada estado y su tasa de AVISA por 100 mil habitantes; Veracruz y Ciudad de México tuvieron tasas similares pero mostraron la más baja y más alta densidad DRHS, respectivamente. Por el contrario, Chihuahua y Sinaloa tuvieron densidades DRHS por encima de 4,5 pero mostraron la más alta y más baja tasa de AVISA, respectivamente (Figura 2a). Por otro lado, existió una correlación positiva entre la DRHS por 1.000 habitantes y el Producto Interno Bruto (PIB) *per cápita* (rho = 0,3718, p < 0,05). Esto coincidió con lo descrito anteriomente, según lo cual los grupos de entidades de muy baja y muy alta marginación tenían mayores y menores DRHS, respectivamente (Figura 2b).

Diecisiete entidades alcanzaron una densidad de 4,5 (Figuras 2, 3a y 3b). La estimación de la brecha en número de trabajadores para alcanzar el umbral muestra que se requerirían 59.618 trabajadores empleados 20 horas o más por semana en el sector salud para que los 15 estados restantes alcanzaran dicho umbral. Sin embargo, en solo cuatro de ellos (Guanajuato, Chiapas, Veracruz y Estado de México) la brecha osciló entre 4.332 y 17.552 (Figura 3b). Por otro lado, en el escenario en que toda la población economicamente activa (PEA) de RHS estuviera empleada 20 o más horas en el sector salud, la densidad nacional sería 6,5 aunque todavía tres estados no alcanzarían el umbral (Figuras 3c y 3d).



Aguascalientes (01), Baja California (02), Baja California Sur (03), Campeche (04),Coahuila (05), Colima (06), Chiapas (07), Chihuahua (08), Ciudad de México (09), Durango (10), Guanajuato (11), Guerrero (12), Hidalgo (13), Jalisco (14), Estado de México (15), Michoacán (16), Morelos (17), Nayarit (18), Nuevo León (19), Oaxaca (20),Puebla (21), Querétaro (22), Quintana Roo (23), San Luis Potosí (24), Sinaloa (25), Sonora (26), Tabasco (27), Tamaulipas (28),Tlaxcala (29),Veracruz (30), Yucatán (31), Zacatecas (32).

Figura 2. Dispersión entre la densidad de Recursos Humanos en Salud (RHS) empleados con las tasas de Años de Vida Saludable perdidos por Discapacidad (AVISA) por 100,000 habitantes y con el PIB *per capita*. Encuesta Nacional de Ocupación y Empleo, ENOE, Mexico, Trimestre IV, 2018.



Aguascalientes (01), Baja California (02), Baja California Sur (03), Campeche (04),Coahuila (05), Colima (06), Chiapas (07), Chihuahua (08), Ciudad de México (09), Durango (10), Guanajuato (11), Guerrero (12), Hidalgo (13), Jalisco (14), Estado de México (15), Michoacán (16), Morelos (17), Nayarit (18), Nuevo León (19), Oaxaca (20),Puebla (21), Querétaro (22), Quintana Roo (23), San Luis Potosí (24), Sinaloa (25), Sonora (26), Tabasco (27), Tamaulipas (28),Tlaxcala (29),Veracruz (30), Yucatán (31), Zacatecas (32).

Figura 3. Densidad de Recursos Humanos en Salud (RHS): empleados y Población Económicamente Activa (PEA) por 1.000 habitantes, y sus déficit para alcanzar el umbral de la Estrategia Global de Recursos Humanos en Salud (EGRHS). Encuesta Nacional de Ocupación y Empleo, ENOE, Mexico, Trimestre IV, 2018.

DISCUSIÓN

Nuestro estudio muestra una desventaja de México en la disponibilidad de RHS respecto al promedio de los países pertenecientes a la OCDE[24]. Si bien, de acuerdo a los criterios de la EGRHS, la densidad de trabajadores de la salud podría considerarse aceptable, la desigualdad al interior del país se refleja en la variabilidad entre estados, en particular aquellos con alta marginación que no alcanzan el umbral. Si se reconoce que en los datos de la OCDE se incluye a los médicos internos y residentes, y existe la posibilidad de doble conteo de médicos y enfermeras que trabajan simultáneamente en el sector público y privado, la disponibilidad de RHS para las áreas con menor densidad probablemente quedará por debajo de la demanda actual y con mayor déficit para años futuros. En este sentido, proyecciones de requerimiento de médicos especialistas en México han estimado que las necesidades de salud derivadas del envejecimiento poblacional requerirán mayor número de especialistas en medicina interna y cirugía que en pediatría, lo que implicará un reto creciente para la provisión de servicios[25].

Un hallazgo relevante fue la falta de consistencia en la relación entre la densidad de trabajadores de la salud y las tasas de AVISA. Se esperaría una correlación negativa, como ha sido documentado en otros estudios, que apoyaría la evidencia de contar con una mayor cantidad de profesionales de la salud para disminuir la carga de enfermedad[26]. Dicho resultado pudiera reflejar otras áreas débiles del propio sistema de salud, como insuficiencia en equipamiento o insumos requeridos, deficiencia en la calidad de la atención, así como condiciones propias de la transición demográfica y epidemiológica. Eso resulta en necesidades de salud crónico-degenerativas que derivan en discapacidad para una mayor proporción de la población[27].

En contraste, la relación positiva entre la DRHS y el PIB estatal podría ser explicada por las siguientes razones: 1) el personal médico calificado puede cambiar su residencia a las regiones de México con ciudades identificadas como focos de atracción en la movilidad médica[28], que tienen mayor desarrollo económico y brindan mayores oportunidades laborales y expectativas de mejor ingreso[29]; o bien, 2) la distribución del número de matrículas registradas en las universidades a lo largo del país donde seis estados, de marginación muy baja o baja, concentran al 50 y 35,0% de las matrículas de estudiantes de medicina y enfermería en el ciclo escolar 2017–2018, respectivamente, y tres entidades de muy alta marginación concentran al 15,7% de los estudiantes de enfermería matriculados y 6,5% de los estudiantes de medicina matriculados[30]. Estos desequilibrios en la distribución de los recursos humanos representan un reto para el sistema de salud, ya que la población que vive en las zonas de alto grado de marginación presenta menor posibilidad en el acceso a los servicios de salud.

Son limitaciones de este análisis la dificultad para identificar la movilidad laboral, que puede afectar la estimación de las densidades estatales en el tiempo, y limitaciones provenientes de la ENOE: a) no es posible distinguir entre niveles de atención ni entre esquemas de aseguramiento, lo que impide establecer de manera más precisa desigualdades entre grupos poblacionales o necesidades de salud; b) no se incluyó a las parteras debido a que no es posible identificarlas en la encuesta, y tampoco se incluyeron otras categorías de personal de salud como dentistas, farmacéuticos, técnicos de laboratorio o promotores comunitarios que también son considerados como fuerza laboral en salud[31], pero que no se consideran en la construcción del umbral de 4,5 por 1.000 habitantes; c) la construcción de la tasas de empleo no contempla la posibilidad de que médicos y enfermeras pudieran dedicarse a actividades de docencia e investigación en salud, por lo que es muy posible que existan profesionales que son profesores e investigadores que estén incluidos en la categoría de personal subempleado, y 5) la ENOE es una encuesta representativa a nivel nacional y estatal de toda la población mayor de 15 años; el personal médico y de enfermería representa menos de 2,0% de la población, lo que podría interpretarse como una debilidad de los resultados a nivel estatal. Sin embargo, dado el diseño aleatorio de la ENOE y que los tamaños de muestra son grandes para ambas profesiones, se puede asumir representatividad para este subgrupo.

Los resultados indican desigualdad en la distribución de los RHS a través de los estados, la cual puede estar potencialmente ligada al número de matrículas que se ofertan en las instituciones educativas, la preferencia del personal de salud para insertarse laboralmente en áreas con mejores condiciones de vida, y mayor disponibilidad de fuentes de trabajo en estados con mayor infraestructura en salud. Es prioritario el establecimiento de una nueva política de recursos humanos que, a partir de las necesidades de salud de la población, articule la formación de médicos, enfermeras y otros profesionales de la salud para su incorporación en las instituciones de salud considerando las áreas de mayor demanda. Además, es necesaria la regulación de la práctica profesional, que incentive el equilibrio en el mercado de trabajo público y privado.

REFERENCIAS

1. World Health Organization. Everybody's business: strengthening health systems to improve health outcomes: WHO's framework for action. Geneva: WHO Health Systems and Services (HSS); 2007 [citado 24 ene 2019]. Disponible en: https://www.who.int/healthsystems/strategy/everybodys_business.pdf
2. Campbell J, Buchan J, Cometto G, David B, Dussault G, Fogstad H, et al. Human resources for health and universal health coverage: fostering equity and effective coverage. Bull World Health Organ. 2013;91(11):853-63. https://doi.org/10.2471/BLT.13.118729
3. Anand S, Bärnighausen T. Health workers at the core of the health system: framework and research issues. Health Policy. 2012;105(2-3):185-91. https://doi.org/10.1016/j.healthpol.2011.10.012

4. Organización Mundial de la Salud. El informe sobre la salud en el mundo 2006 – Colaboremos por la salud. Ginebra: OMS; 2006 [citado 3 feb 2019]. Disponible en: https://www.who.int/whr/2006/es/

5. Chen L, Evans T, Anand S, Boufford JY, Brown H, Chowdhury M, et al. Human resources for health: overcoming the crisis. Lancet. 2004;364(9449):1984-90. https://doi.org/10.1016/S0140-6736(04)17482-5

6. United Nations. Sustainable Development Goal 3 -Good Health and Wellbeing. New York: UN; 2019. [citado 18 ene 2019]. Disponible en: https://www.un.org/sustainabledevelopment/health/

7. World Health Organization. Global strategy on human resources for health: Workforce 2030. Geneva: WHO; 2016 [citado 5 feb 2019]. Disponible en: https://www.who.int/hrh/resources/global_strategy_workforce2030_14_print.pdf?ua=1

8. Mandeville KL, Lagarde M, Hanson K, Mills A. Human resources for health: time to move out of crisis mode. Lancet. 2016;388(10041):220-2. https://doi.org/10.1016/S0140-6736(16)30952-7

9. Gómez-Dantés O, Ortiz M. Seguro Popular de Salud: siete perspectivas. Salud Publica Mex. 2004;46(6):585-8. https://doi.org/10.1590/S0036-36342004000600013

10. Secretaría de Salud (MEX), Comisión Nacional de Protección Social en Salud. Sistema de Protección Social en Salud: informe de resultados Enero-Diciembre 2017. México, DF; 2018 [citado 15 feb 2019]. Disponible en: http://www.transparencia.seguro-popular.gob.mx/contenidos/archivos/transparencia/planesprogramaseinformes/informes/2017/InformedeResultadosdelSPSSenero-diciembre 2017.pdf

11. Rivera Dommarco J, Pérez Cuevas R, Reyes Morales H, Lazcano Ponce E, Alpuche Aranda C, Shamah Levy T, et al. Salud pública y atención primaria. Base del acceso efectivo a la salud de los mexicanos. Cuernavaca (MEX): Instituto Nacional de Salud Pública; 2018 [citado 12 feb 2019]. Disponible en: https://www.insp.mx/images/stories/2018/Docs/180919_Salud_atencion_primaria_11septiembre.pdf

12. Rivera Dommarco JA, Colchero Aragonés MA, Fuentes ML, González de Cosío Martínez T, Aguilar Salinas CA; Hernández Licona G, et al. La obesidad en México. Estado de la política pública y recomendaciones para su prevención y control. Cuernavaca (MEX): Instituto Nacional de Salud Pública; 2018 [citado 12 feb 2019]. Disponible en: https://www.insp.mx/produccion-editorial/novedades-editoriales/4971-obesidad-mexico-politica-publica-prevencion-control.html

13. Secretaría del Trabajo y Previsión Social (MEX), Servicio Nacional de Empleo: Observatorio Laboral. México, DF; 2020 [citado 05 abril 2020]. Disponible en: https://www.observatoriolaboral.gob.mx/static/estudios-publicaciones/Biologia.html

14. Organisation for Economic Co-Operation and Development. OECD Statistics: Health: Health Care Resources. Paris: OECD; 2019 [citado 28 jun 2019]. Disponible en: https://stats.oecd.org/

15. Instituto Nacional de Estadística y Geografía. Encuesta Nacional de Ocupación y Empleo-ENOE 2018. Aguascalientes (MEX): INEGI 2018 [citado 23 abr 2018]. Disponible en: https://www.inegi.org.mx/programas/enoe/15ymas/

16. Frenk J, Nigenda DG, Munoz-delRio A, Robledo C, Luis A. Patterns of medical employment: a survey of imbalances in urban México. Am J Public Health. 1991;81(1):23-9. https://doi.org/10.2105/ajph.81.1.23

17. Aguilar AM, Nigenda G, Méndez O, Knaul FM. Desperdicio de recursos en el sistema de salud: el caso de la profesión médica y la enfermería en México. In: Knaul FM, Nigenda G, editores. Caleidoscopio de la Salud: de la investigación a las políticas y de las políticas a la acción. México, DF: Funsalud; 2003 [citado 24 oct 2018]. p.125-34. Disponible en: http://funsalud.org.mx/portal/wp-content/uploads/2013/08/08-DesperdicioDeRecursos.pdf

18. Kjellsson G, Gerdtham UG. On correcting the concentration index for binary variables. J Health Econ. 2013;32(3):659-70. https://doi.org/10.1016/j.jhealeco.2012.10.012

19. Schneider MC, Castillo-Salgado C, Bacallao J, Loyola E, Mujica OJ, Vidaurre M, et al. Métodos de medición de las desigualdades de salud. Rev Panam Salud. 2002;12(6):398-415.

20. Secretaría de Salud (MEX), Dirección General de Información en Salud - DGIS. Cubos dinámicos: proyecciones CONAPO - versión Censo 2010. México, DF; 2018 [citado 24 oct 2018]. Disponible en: http://www.dgis.salud.gob.mx/contenidos/basesdedatos/bdc_poblacion_gobmx.html

21. Secretaría de Gobernación (MEX), Consejo Nacional de Población Índices de Marginación por Entidad Federativa y Municipio 2010. México, DF: CONAPO; 2010 [citado 24 oct 2018]. Disponible en: http://www.conapo.gob.mx/es/CONAPO/Indices_de_Marginacion_2010_por_entidad_federativa_y_municipio

22. Instituto Nacional de Estadística y Geografía. PIB por Entidad Federativa (PIBE): Base 2013. Aguascalientes (MEX): INEGI; 2018 [citado 16 dic 2019]. Disponible en: https://www.inegi.org.mx/programas/pibent/2013/default.html#Documentacion

23. Institute for Health Metrics and Evaluation (IHME). Global Burden of Disease Study 2017 (GBD 2017) results. Seattle, WA: IHME; 2017 [citado 05 abril 2020]. Disponible en: https://vizhub.healthdata.org/gbd-compare/

24. Organisation for Economic Co-operation and Development, OECD Library. Health at a Gance 2017: OECD indicators. Paris: OECD; 2017 [citado 24 oct 2018]. Disponible en: https://read.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2017_health_glance-2017-en#page4

25. Nigenda G, Muños JA. Projections of specialist physicians in Mexico: a key element in planning human resources for health. Hum Resour Health. 2015;13(1):79. https://doi.org/10.1186/s12960-015-0061-z

26. Castillo-Laborde C. Human resources for health and burden of disease: an econometric approach. Hum Resour Health. 2011;9:4. https://doi.org/10.1186/1478-4491-9-4

27. Organisation for Economic Co-operation and Development. OECD reviews of health systems: Mexico 2016. Paris: OECD Publishing; 2016 [citado 18 ene 2019]. Disponible en: https://read.oecd-ilibrary.org/social-issues-migration-health/oecd-reviews-of-health-systems-mexico-2016_9789264230491-en#page1

28. Márquez M, Vazquez D, García C. Movilidad territorial en la formación de médicos en México. Salud Publica Mex. 1996;38(1):20-8.

29. Chen LC. Striking the right balance: health workforce retention in remote and rural areas. Bull World Heal Organ. 2010;88(5):323, A. https://doi.org/10.2471/BLT.10.078477

30. Asociación Nacional de Universidades e Instituciones de Educación Superior. Información estadística de educación superior. México, DF: ANUIES; 2018 [citado 05 abril 2020]. Disponible en: http://www.anuies.mx/informacion-y-servicios/informacion-estadistica-de-educacion-superior

31. Dal Poz MR, Kinfu Y, KunjumenT. Counting health workers: definitions, data, methods and global results. Geneva: World Health Organization; 2007 [citado 05 abril 2020]. Disponible en: https://www.who.int/hrh/documents/counting_health_workers.pdf

Contribución de los Autores: JCMH: diseño y planificación del estudio, análisis e interpretación de datos, preparación y redacción del manuscrito, aprobación final. JAR: preparación y redacción del manuscrito, revisión crítica del manuscrito, aprobación final. HRM: preparación y redacción del manuscrito, revisión crítica del manuscrito, aprobación final.

Conflicto de Intereses: Los autores declaran no tener conflicto de interés.

Gac Sanit. 2017;31(6):459–465

Original

Condiciones de trabajo en consultorios adyacentes a farmacias privadas en Ciudad de México: perspectiva del personal médico

Sandra P. Díaz-Portillo[a], Hortensia Reyes-Morales[b,*], Silvia Magali Cuadra-Hernández[a], Álvaro J. Idrovo[c], Gustavo Nigenda[d] y Anahí Dreser[a]

[a] Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública, Cuernavaca, Morelos, México
[b] Hospital Infantil de México Federico Gómez, Ciudad de México, México
[c] Departamento de Salud Pública, Escuela de Medicina, Universidad Industrial de Santander, Bucaramanga, Santander, Colombia
[d] Universidad Autónoma del Estado de Morelos, Cuernavaca, Morelos, México

INFORMACIÓN DEL ARTÍCULO

Historia del artículo:
Recibido el 17 de junio de 2016
Aceptado el 24 de octubre de 2016
On-line el 1 de mayo de 2017

Palabras clave:
Farmacias
Consultorios médicos
Empleo
Prescripciones de medicamentos
Conflicto de intereses
México

RESUMEN

Objetivo: Analizar, desde la perspectiva del personal médico, las condiciones laborales de los consultorios adyacentes a farmacias privadas (CAF), así como sus elementos organizativos.
Método: Estudio cualitativo exploratorio consistente en entrevistas semiestructuradas a 32 médicos/as de los CAF en Ciudad de México. Se utilizó la técnica de análisis de contenido dirigido basado en códigos previamente construidos y emergentes, relacionados con la experiencia vivida de los sujetos en su campo laboral.
Resultados: El personal médico percibió que trabajar en los CAF no cumple con sus expectativas profesionales por la baja remuneración, la informalidad en la contratación y la ausencia de garantías laborales establecidas en la ley. Esto les impide disfrutar de los beneficios asociados con el empleo formal y sustenta el deseo de laborar en los CAF solo de manera temporal. Consideraron que los incentivos económicos por número de consultas, procedimientos y ventas alcanzadas por la farmacia les permiten aumentar su ingreso sin influir en su conducta prescriptiva. Señalaron que los sistemas de supervisión y presión en los CAF buscan afectar su autonomía para activar la venta de medicamentos en la farmacia.
Conclusiones: El personal médico que labora en CAF enfrenta una difícil situación laboral. Los elementos gerenciales usados para inducir la prescripción y activar las ventas de las farmacias conforman un entorno laboral que genera retos en materia de regulación, y subraya la necesidad de monitorear la calidad de los servicios brindados en estos consultorios y los posibles riesgos a los usuarios.

© 2017 SESPAS. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Working conditions in outpatient clinics adjacent to private pharmacies in Mexico City: perspective of physicians

Keywords:
Pharmacies
Physicians' offices
Employment
Drug prescriptions
Conflict of interest
Mexico

ABSTRACT

Objective: To analyse the working conditions of physicians in outpatient clinics adjacent to pharmacies (CAFs) and their organizational elements from their own perspective.
Methods: We carried out an exploratory qualitative study. Semi-structured interviews were conducted with 32 CAF physicians in Mexico City. A directed content analysis technique was used based on previously built and emerging codes which were related to the experience of the subjects in their work.
Results: Respondents perceive that work in CAFs does not meet professional expectations due to low pay, informality in the recruitment process and the absence of minimum labour guarantees. This prevents them from enjoying the benefits associated with formal employment, and sustains their desire to work in CAF only temporarily. They believe that economic incentives related to number of consultations, procedures and sales attained by the pharmacy allow them to increase their income without influencing their prescriptive behaviour. They express that the monitoring systems and pressure exerted on CAFs seek to affect their autonomy, pushing them to enhance the sales of medicines in the pharmacy.
Conclusions: Physicians working in CAFs face a difficult employment situation. The managerial elements used to induce prescription and enhance pharmacy sales create a work environment that generates challenges for regulation and underlines the need to monitor the services provided at these clinics and the possible risk for users.

© 2017 SESPAS. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

* Autora para correspondencia.
Correo electrónico: hortensiareyes0406@gmail.com (H. Reyes-Morales).

http://dx.doi.org/10.1016/j.gaceta.2016.10.016
0213-9111/© 2017 SESPAS. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Díaz-Portillo S, Reyes-Morales H, Cuadra-Hernández SM, Idrovo A, Nigenda G, Dreser A. Condiciones de trabajo en consultorios adyacentes a farmacias privadas en Ciudad de México: perspectiva del personal médico. Gac Sanit. 2017;31(6):443-542. https://doi.org/10.1016/j.gaceta.2016.10.016

Introducción

En México, los consultorios adyacentes a farmacias (CAF) forman parte de las organizaciones del sector privado que brindan servicios médicos ambulatorios, principalmente para padecimientos agudos[1]. Los primeros CAF en México se establecen a finales de la década de 1990[2], en un momento coyuntural para el sistema de salud en que se implementan reformas dirigidas a incrementar el acceso a los servicios de salud para personas sin seguridad social; en 2003, con las modificaciones a la ley de salud se funda el Sistema de Protección Social en Salud y su brazo financiero, el Seguro Popular de Salud[3]. No obstante los logros de estas reformas, el surtido incompleto de medicamentos y los largos tiempos de espera en los servicios públicos permanecen como quejas comunes de los usuarios, lo que orienta la demanda de la población hacia el uso de servicios privados, incluida la compra de medicamentos[4].

Los CAF son una alternativa para la población, independientemente de su condición de aseguramiento en salud[1]. El modelo CAF, incorporado en México en 1997 por una cadena de farmacia local bajo la estrategia empresarial de ofrecer medicamentos sin patente (genéricos) y atención médica a la población de ingresos bajos, se expandió rápidamente por México y América Latina[5]. El éxito de esta organización llevó a que otras farmacias incursionaran en este modelo[4]. Con el cumplimiento en 2010 de la regulación para la venta de antibióticos solo con receta médica[6], los CAF se fortalecieron para facilitar la prescripción de antibióticos y evitar pérdidas de ventas en las farmacias. Entre 2010 y 2014, el número de CAF aumentó en un 340%[7] hasta llegar a 15.000 farmacias de grandes cadenas o independientes. Así, cerca de la mitad de las farmacias privadas mexicanas cuentan con un CAF, donde laboran alrededor de 32.500 médicos/as[7].

Estudios previos han documentado los factores que influyen en la práctica médica[8] y determinan la calidad y la cantidad de servicios brindados a los/las usuarios/as[9], como los culturales, políticos, sociales, profesionales y organizativos[10]. Entre estos últimos se incluyen las condiciones de trabajo, el ambiente laboral, la modalidad de contratación, la antigüedad en el trabajo[11], la oportunidad de capacitación[12], la seguridad laboral y los sistemas de remuneración, como el salario y los incentivos[13,14]. Asimismo, se ha reportado el gran peso de los esquemas administrativos sobre las decisiones médicas y las consecuentes tensiones y desacuerdos entre el personal de salud[15]. Respecto a los aspectos laborales en los CAF, son las farmacias las que asumen la organización del consultorio y establecen las condiciones de trabajo[4], como la existencia de contrato, el horario y el tipo de ingreso, ya sea fijo o variable, en ocasiones vinculado a incentivos por medicamentos prescritos y ventas de la farmacia[2,16], lo que sugiere una precarización del empleo del personal médico que ahí labora[17].

Dado que la aparición de los CAF en México es un fenómeno relativamente reciente y representa un cambio en la provisión de servicios de salud con potencial influencia sobre la práctica médica, el objetivo del presente estudio fue analizar las experiencias que sobre sus condiciones de trabajo tiene el personal médico que labora en estos consultorios, así como los elementos organizativos que los caracterizan.

Material y métodos

Se realizó un estudio cualitativo exploratorio entre 2014 y 2016 en Ciudad de México, que destaca la experiencia vivida[18] por el personal médico que labora en CAF sobre su situación laboral y los elementos organizativos de estos consultorios.

Se identificaron seis zonas de nivel socioeconómico medio del centro y el sur de Ciudad de México, donde se realizó la búsqueda de las farmacias mediante geolocalización. Se seleccionaron establecimientos que, de acuerdo con la Comisión Federal para la Protección contra Riesgos Sanitarios (COFEPRIS - Órgano regulador de la Secretaría de Salud para el control y vigilancia de los establecimientos de salud), corresponden a las mayores cadenas de farmacia en el país. También se seleccionaron farmacias independientes localizadas mediante la guía telefónica. Se incluyó personal médico que se encontrara laborando en dichos consultorios y que aceptara participar en el estudio, hasta lograr la saturación de las categorías de interés[19], mediante invitación directa en los CAF y con apoyo del Instituto Nacional de Educación Médica Continua, que brinda capacitación a médicos generales en México.

Se realizaron entrevistas semiestructuradas con una duración entre 25 y 90 minutos, previa cita, mediante una guía que se elaboró tomando como referente la literatura sobre aspectos laborales y organizativos en la práctica médica. Todos/as los/las participantes dieron su consentimiento verbal y aceptaron que las entrevistas, que fueron realizadas por dos personas con experiencia en investigación cualitativa en espacios que garantizaran la confidencialidad, fueran audiograbadas.

Las entrevistas se transcribieron y para garantizar el anonimato de los/las informantes se utilizaron etiquetas. Se codificó mediante la técnica de análisis de contenido dirigido[20], que consiste en un proceso estructurado con base en las categorías, subcategorías y códigos construidos previamente (tabla 1), y que se relacionaron con la experiencia vivida en su campo laboral. Se revisaron los testimonios, se seleccionaron en el texto los códigos predeterminados y se identificaron los códigos emergentes relacionados con las categorías o subcategorías establecidas.

El estudio fue aprobado por los Comités de Investigación y Ética del Instituto Nacional de Salud Pública de México.

Resultados

Se entrevistaron 32 personas (20 mujeres y 12 hombres) de 24 a 67 años de edad, con 1 a 40 años de experiencia en la práctica médica y entre 1 mes y 10 años laborando en CAF. Toda la población de estudio, excepto una persona, había egresado de universidades públicas, seis contaban con especialidad y 13 se habían certificado en algún momento (una persona manifestó tener el título médico en trámite). Diez no aceptaron participar argumentando escasez de tiempo o poco interés en el estudio. Los/las informantes reportaron la modalidad de contratación, la temporalidad y la remuneración (véase tabla I en el Apéndice *online*).

Situación laboral del personal médico

De acuerdo con los/las informantes, los CAF tienen tres modalidades de contratación: el comodato, que consiste en brindar un consultorio equipado para trabajar, el contrato escrito y el acuerdo verbal sin contrato. En el comodato, el personal médico se responsabiliza del cuidado del consultorio y de sus aditamentos, con la tarifa y el horario de atención establecidos por la farmacia. No existe un vínculo laboral, dado que la relación con la farmacia gira en torno a la cesión del consultorio. Su ingreso económico varía, pues está sujeto al valor de la consulta que pagan los/las usuarios/as, y no cuenta con prestaciones laborales como servicio médico ni plan de ahorro para la jubilación (tabla 2, cita M5). En la modalidad de acuerdo verbal, sin contrato escrito, los/las entrevistados/as señalaron no contar con prestaciones laborales. El ingreso que perciben puede ser fijo o recibir el valor de las consultas médicas pagadas por los usuarios (tabla 2, M16-M22-M23). En el contrato escrito se cuenta con un salario base, situación que quienes se encuentran en ella consideran más favorable, aunque cuestionan la ausencia de prestaciones laborales (tabla 2, cita M26-M27).

Tabla 1
Categorías utilizadas para la recolección y el análisis de datos verbales

Categorías	Subcategorías	Códigos predeterminados	Códigos emergentes
Características del personal médico	Formación académica	Cursar especialidades Procesos de certificación y capacitación y otros estudios Aspiraciones profesionales	
	Trayectoria laboral	Trabajos previos Otros trabajos Experiencia en la búsqueda de empleo	
Situación laboral del personal médico de CAF	Condiciones de trabajo del personal médico	Modalidades de contratación y posibilidad de contar con prestaciones laborales Esquemas de remuneración Incentivos económicos por procedimientos y prescripción de medicamentos Acceso a capacitación	Presión por personal o dueño de farmacia para prescribir Actividades de supervisión
	Responsabilidades del personal médico	Conocer y prescribir los medicamentos de la farmacia Funciones del personal médico y elementos de la relación y la comunicación con la farmacia	Activar la venta de medicamentos
Significados asociados al desarrollo profesional	Expectativas emocionales frente al empleo en CAF	Motivaciones para buscar el empleo en CAF Deseo de permanencia Seguridad laboral	Sentimientos asociados con el ejercicio médico y la presencia de los CAF Fragilidad para el ejercicio de la profesión
	Expectativas económicas y profesionales	Percepción sobre su ingreso Crecimiento profesional Percepción sobre los servicios que brinda al usuario	

CAF: consultorios adyacentes a farmacias privadas.

Tabla 2
Condiciones de trabajo y responsabilidades del personal médico

Códigos	Cita
Modalidades de contratación y remuneración y posibilidad de contar con prestaciones laborales	M5: «[En] el contrato de comodato no tienes ninguna prestación ante la ley del Seguro Social [. . .], no tienes fondo de ahorro nada [. . .]. Te prestan el local ahí y a trabajar [. . .].» *Comodato, hombre, 29 años.* M16: «Es verbal, en mi caso fue verbal, pero casi siempre [el contrato] es escrito y obviamente en donde se te dice que no tienes ningún tipo de prestación.» *Verbal, hombre, 52 años.* M22: «[. . .] Hay otros lugares como aquí que solo te llevas tu consulta diaria, una ayuda de 750 pesos (36 €) a la quincena [. . .] y ese sueldo tienes que estar rogando para que te lo den.» *Verbal, mujer, 38 años.* M23: «Yo renuncié en los dos últimos lugares porque no me gustó cómo me trataron; porque desgraciadamente en este tipo de farmacias [. . .] nos contratan sin prestaciones, sin seguro, fuera de la ley, todo está fuera de la ley. Sin contrato, sin nada.» *Verbal, hombre, 67 años.* M26: «[. . .] El pro es el sueldo fijo, [. . .] el contra es que el contrato, no es como un trabajador normal, no tienes ninguna prestación, no tienes derechos laborales.» *Escrito, hombre, 28 años.* M27: «¡Mal! Por supuesto que me parece malo. Porque al final del día. . . igual que todo trabajador, busca sus prestaciones.» *Escrito, mujer, 31 años.*
Incentivos económicos por procedimientos y prescripción de medicamentos	M8: «[. . .] A mí me dan un salario, pero se incrementa si incrementa la consulta.» *Escrito, mujer, 67 años.* M9: «[. . .] Asimilado el salario, no tienes ningún tipo de prestación, tienes un sueldo base muy muy chiquito y una comisión por cada servicio que das, ya sea consulta, inyecciones; lo que sea de los servicios que se dé.» *Comodato, hombre, 35 años.* M13: «Sí, [. . .] tienen una meta de venta ellos (el personal de farmacia); si esa meta de venta se cumple en cierto tiempo, a mí también me dan un bono especial por eso.» *Escrito, hombre, 33 años.* M7: «[. . .] Pues se supone que hay una comisión de acuerdo a una meta alcanzada por venta de medicamentos y eso corresponde a medicamentos propios de la farmacia.» *Comodato, hombre, 26 años.* M1: «De las consultas, se cobra 30 pesos (1,43 €) por consulta y eso es totalmente para mí, más aparte el sueldo quincenal que me da el dueño de la farmacia y hay una modalidad de comisiones sobre medicamentos [. . .] En ciertos medicamentos, son alrededor de 2 pesos. . . 3 pesos (0,10 € a 0,15 €) por cada vez que yo receto un medicamento de esos.» *Escrito, hombre, 37 años.* M23: «La comisión que me prometieron creo que es un 5 o 10 por ciento del "producto premio".» *Verbal, hombre, 67 años.*
Acceso a capacitación	M21: «No, definitivamente no, en ningún lado; que yo le diga a la farmacia, por ejemplo, '¿me das permiso para un curso?' No.» *Comodato, hombre, 57 años.* M30: «[. . .] Entonces para mí era únicamente publicidad de sus medicamentos con pinta de capacitación del personal, entonces yo cuando fui dije ¡esto está terrible! No me gusta.» *Comodato, hombre, 26 años.*
Conocer y prescribir los medicamentos de la farmacia	M11: «Se maneja una lista de los medicamentos que hay en existencia en la farmacia y me informan de medicamentos próximos a caducar [. . .].». *Escrito, mujer, 44 años.* M21: «[. . .] Yo tengo que saber qué es lo que ellos (la farmacia) no tienen [. . .] Ellos me avisan de medicamentos próximos a caducar [. . .] Eso debo saberlo yo para ayudarles con la prescripción [. . .].» *Comodato, hombre, 57 años.* M16: «[. . .] Deja todo a criterio del médico, pero sí tienes que mandar una cierta cantidad de recetas con medicamentos genéricos o de similares (de la farmacia).» *Verbal, hombre, 52 años.* M20: «[. . .] Aquí nada más se puede vender lo que la farmacia ofrece.» *Verbal, mujer, 50 años.*

Un grupo de entrevistados/as manifestó recibir incentivos económicos otorgados por las farmacias. Estos se conceden por el volumen de consultas (al lograr un tope de consultas diarias) y de procedimientos realizados (tabla 2, cita M8-M9), por el nivel de ventas mensual alcanzado por la farmacia o como porcentaje sobre los medicamentos prescritos que el usuario compra en la farmacia. El monto pagado puede variar según la presentación del medicamento (tabla 2, cita M13-M7-M1-M23). Quienes reciben incentivos perciben que ello les permite aumentar su ingreso sin afectar su conducta prescriptiva; tienen claro que el interés de quien los

Tabla 3
Citas textuales en torno a los códigos emergentes

Códigos	Cita
Presión por personal/dueño de farmacia para prescribir	M17: «A mí me decían 'es que es consultorio anexo a la farmacia y usted tiene que dar la receta aunque sea por el antibiótico', y yo 'no, no, porque es mi responsabilidad'.» *Escrito, mujer, 28 años.* M8: «[. . .] Nadie va a tener buen contacto, porque lo que ellos (el personal de farmacia) quisieran es que tú (el paciente) salgas y les compres 800 pesos (38 €); 'doctora, es que sus pacientes se van' (y no compran), ¿y qué puedo hacer?» *Escrito, mujer, 67 años.*
Activar la venta de medicamentos	M1: «Porque de hecho a mí me ha tocado, cuando ve (el dueño de la farmacia) que las ventas están bajas, obviamente están sobre uno, o activa uno la venta [. . .]. Incluso me ha llegado a (decir) 'receta tal suplemento, aunque no lo necesite el paciente [. . .]'. Yo creo que no debería de ser así; finalmente el que tiene la responsabilidad con el paciente es uno.» *Escrito, hombre, 37 años.* M16: «[. . .]. Si se están caducando un grupo de medicamentos y me piden apoyo [. . .] si puedo lo saco, si no, no. No me siento presionado [. . .] Si a mí me dicen 'doctor, mande 10 antibióticos, 10 cajas de antibióticos', pues [. . .] con uno sí, dos, bueno [. . .] sí lo hago, pero ya más no lo hago.» *Verbal, hombre, 52 años.* M18: «[. . .] En ocasiones sí, más cuando tienen los próximos a caducar ya sea que les falte 6, 8 meses o hasta un año [. . .] porque [. . .] ellos (el personal de farmacia) lo pagan si se les caduca.» *Escrito, mujer, 31 años.*
Actividades de supervisión	M8: «[. . .] No, lo más, que me toquen y me estén tocando (la pared que separa el consultorio de la farmacia porque se está demorando con un paciente). Si me tocan me tiene sin cuidado; o le digo (al paciente) . . . Hay algunos que son muy accesibles: 'La próxima págueme dos consultas y le dice que va a tardarse media hora y ya'.» *Escrito, mujer, 67 años.* M4: «[El] responsable de operaciones comerciales [. . .] es el que supervisa a los médicos [. . .]. No tienen idea de lo que estamos haciendo nosotros pero lo que él nos exige, es lo que ellos le llaman indicadores [. . .] pues su negocio es vender el medicamento, entonces, ¿cuántas consultas damos?, ¿cuántas recetas damos?, ¿qué medicamentos recetamos? Eso es lo que él supervisa básicamente.» *Escrito, mujer, 41 años.*
Sentimientos asociados con la profesión médica y su ejercicio en CAF	M7: «Para la profesión médica y dado el tiempo que te pasas estudiando y todo lo que tienes que pasar es algo realmente muy barato y de alguna manera hasta cierto punto podría denigrar el medio.» *Comodato, hombre, 26 años.* M1: «No sé, yo creo que han crecido mucho por eso, por explotar mucho la profesión médica y obviamente no prestar prestaciones que deberían de dar.» *Escrito, hombre, 37 años.* M16: «Que es como lo ven, vender medicamento por vender medicamento, sin ningún apoyo para los médicos. . . Es horrible, porque entonces la medicina está devaluada, la medicina y el médico, los dos nos sentimos devaluados, nos sentimos usados y el paciente también, igual.» *Verbal, hombre, 52 años.* M28: «Sí, pero la organización no nos valora, el paciente nada más viene a beneficiarse y mucho menos hacer conciencia.» *Comodato, mujer, 42 años.*
Fragilidad para el ejercicio de la profesión	M14: «Les repito, tanto de la responsabilidad compartida de la organización con el médico, como la respuesta que muchas veces tiene el médico del personal de farmacia, de los supervisores, de las personas responsables que prácticamente *te dejan morir solo.*» *Comodato, mujer, 44 años.* M4: «Pues siento que es un negocio, o sea, de cierta forma es entendible, porque ellos se dedican a eso [. . .]. Yo siento eso, *que somos el mal necesario*, o sea, nada más somos la cédula [. . .].» *Escrito, mujer, 41 años.* M21: «Pues la verdad es que en todas partes esta infrahumano, la mera realidad [. . .] ahorita trabajo como veinte turnos al día y no me alcanza para vivir.» *Escrito, hombre, 37 años.* M16: «Mal, porque tendría que tener el apoyo del dueño o de la gente de la cadena o de la organización que estás perteneciendo, no hay un seguro médico, no tienes nada. . .» *Verbal, hombre, 52 años.*

CAF: consultorios adyacentes a farmacias privadas.

contrata es incrementar las ventas de medicamentos y se muestran de acuerdo con ese beneficio para la farmacia. Los/las informantes que no contaban con incentivos en su esquema de remuneración consideraron injusta la ausencia de mejoría laboral y cuestionaron que toda la ganancia sea para la farmacia.

Los/las entrevistados/as manifestaron la dificultad para acceder a algún tipo de capacitación para actualización. Las opciones que ofrecen los CAF son conferencias sobre padecimientos, a veces *online*, que perciben con carácter más comercial que académico. En este sentido, buscan por cuenta propia asistir a diplomados y jornadas de educación médica, aunque las exigencias del horario, la gran cantidad de trabajo y el descuento por no laborar o no tener ingreso económico de los días no laborados imposibilitan tal propósito (tabla 2, cita M21-M30).

Una parte de la población de estudio afirmó que además de brindar servicios de consulta médica funge como responsable ante la autoridad sanitaria. Otros/as relataron que una de sus funciones es conocer y prescribir los medicamentos almacenados en la farmacia (tabla 2, cita M11-M21-M16-M20), sobre todo si están próximos a caducar. La persona dueña o encargada de la farmacia constantemente sugiere, y en algunos casos presiona, la activación de las ventas de medicamentos (tabla 3, cita M17-M8-M1-M16-M18).

Los horarios y los tiempos de consulta son supervisados (tabla 3, cita M8) y se revisan el número de población atendida y las recetas prescritas para conceder bonos por productividad e incentivos por prescripción. Existen también indicadores que señalan si el volumen de usuarios/as se refleja en las ventas de la farmacia (tabla 3, cita M4).

Los/las informantes manifestaron brindar una adecuada atención a la población usuaria, aunque algunos/as indicaron que las condiciones físicas de los CAF, como falta de espacio y de ventilación, ausencia de insumos, saturación de la consulta e ingreso condicionado a la productividad de las consultas y a los procedimientos, van en detrimento de la calidad de la atención que brindan.

Significados asociados al desarrollo profesional

Los motivos para laborar en los CAF fueron diversos: dificultad para ingresar a instituciones de salud, necesidad de devengar un ingreso, para obtener experiencia (tabla 4, cita M9-M13-M31), y otros. Sin embargo, fue recurrente el deseo de permanecer en el CAF de manera transitoria (tabla 4, cita M4-M26).

Otra percepción fue que trabajar en un CAF no cumple las expectativas laborales y profesionales, dado que no recompensa los años de estudio; algunos/as calificaron de «incorrecto» e «injusto» devengar un salario bajo (tabla 4, cita M8- M20). Asimismo, se mostraron inconformes ante la falta de crecimiento profesional (tabla 4, cita M17-M5-M21). Consideraron que a la farmacia solo le importa incrementar las ventas y cuestionaron la imposibilidad de contar con un empleo digno (tabla 4, cita M23-M30-M26).

Para la población de estudio, el cobro de una consulta barata es sinónimo de desprestigio y consideran que los CAF «denigran» y «explotan» al profesional al no equipararse al de una consulta en un consultorio privado (tabla 4, cita M7-M1). Señalaron que la organización no los/las valora, y se sienten aislados/as y sin apoyo (tabla 4, cita M16-M28). Percibieron que los CAF y su organización

Tabla 4
Expectativas económicas y profesionales, y expectativas emocionales frente al empleo, en consultorios adyacentes a farmacias privadas

Códigos	Cita
Motivaciones para la búsqueda de empleo en CAF	M9: «[. . .] Es por la misma necesidad; eres médico recién egresado, es difícil encontrar un trabajo en un hospital privado y de no ganar nada [. . .] pues le entras mientras consigues otra cosa. Pero yo creo que muchos no están por gusto, están porque no te queda otra y porque poner un consultorio es caro.» *Comodato, hombre, 35 años.* M13: «[. . .] Es entrarle a eso. Para nosotros como médicos es algo muy malo, o sea, al final de cuentas la realidad es que sí, nos quitan mucho mercado de trabajo (porque no puede competir un consultorio privado con la tarifa manejada en el CAF).» *Escrito, hombre, 33 años.* M31: «Realmente me pareció un abuso lo que me estaban ofreciendo, pero necesitaba el dinero para el trámite de titulación [. . .].» *Verbal, hombre, 24 años.*
Deseo de permanencia	M4: «Pero nadie lo toma como algo definitivo porque ahí no hay un crecimiento, no hay evolución, no hay nada. Nada más, así como una tablita de salvación mientras busco otra cosa.» *Escrito, mujer, 41 años.* M26: «No, esto es solo temporal, y yo creo que así es. . . No he conocido un solo médico que diga sí, quiero quedarme aquí, para ya, así.» *Escrito, hombre, 28 años.*
Percepción sobre su ingreso	M8: «La verdad es bajo, bajísimo; compara el salario de un médico del Seguro Social, que anda en 35 o 37 mil pesos (1.673 € a 1.767 €). ¿Te parece muy bien 7 mil (335 €) por medio tiempo?» *Escrito, mujer, 67 años.* M20: «Pésimo, nada más tú dime si crees correcto que una consulta. . . de verdad, yo digo, ¿por qué no se ponen de acuerdo todos los médicos y ya trabajamos para que suba la consulta?» *Verbal, mujer, 50 años.*
Crecimiento profesional	M17: «Pues yo creo que me decepcionó un poco, yo pensé que iba a crecer más.» *Escrito, mujer, 28 años.* M5: «No, para nada, aquí es absorbente, incluso aquí no tienes vacaciones, aquí los días festivos no te los dan, no te dicen si tienes alguna posibilidad de estudiar otra cosa [. . .]. A veces siento que el interés que ellos tienen es más económico.» *Comodato, hombre, 29 años.* M21: «No, yo creo que no [. . .] no se cumple la meta, a nivel de que a uno le permitan estudiar [. . .] uno no tiene manera de crecimiento.» *Comodato, hombre, 57 años.*
Seguridad laboral	M23: «Malísimos, no. . . Deberíamos de firmar un contrato, no estamos protegidos [. . .].» *Verbal, hombre, 67 años.* M30: «Incluso así tuve que ir, con el yeso y atendiendo a los pacientes, claro, entonces me parece que no son las condiciones óptimas laborales, es una carga fuerte la que te llevas ahí con muchísimos riesgos personales y profesionales, sin ningún resguardo, sin ninguna seguridad social, entonces es un poco triste la situación laboral ahí.» *Comodato, hombre, 26 años.* M26: «Pues es triste, es deplorable y es decepcionante que, o sea, yo se los comente, pero ni modo, cómo es posible que tú siendo médico no vas a recibir atención de salud.» *Escrito, hombre, 28 años.*

CAF: consultorios adyacentes a farmacias privadas.

van en detrimento de la profesión médica (tabla 4, cita M14-M4-M28).

Discusión

Los resultados de este estudio muestran el perfil variable del personal médico de los CAF en edad y temporalidad laboral. Es interesante el predominio de quienes fueron egresados/as de universidades públicas, donde la formación técnica posiblemente se acompañe de expectativas de trabajo en las instituciones públicas, complementado con la práctica privada como modalidad empresarial. Sin embargo, este aspecto ha perdido vigencia[21,22] y el presente trabajo muestra a los CAF como una opción laboral importante para médicos/as con distintos niveles de formación y tiempo en búsqueda de opciones laborales**.** Estos/as médicos/as se vinculan al mercado como empleados/as de las farmacéuticas que operan a los CAF, pero las condiciones de trabajo no cumplen sus expectativas en relación al salario y al tipo de beneficios que ofrecen, hallazgos que han sido reportados por otros autores[17]. En este sentido, no cuentan con un vínculo laboral formal ni se perciben como pequeños/as empresarios/as, dado que su remuneración es prerrogativa absoluta de la farmacia, pues incluso en la modalidad del comodato la farmacia es la que determina el valor de la consulta y los horarios de atención.

Así, el colectivo médico entrevistado refirió una alta insatisfacción laboral. La ausencia de un contrato escrito y de prestaciones laborales, y la imposibilidad de contar con días de descanso, vacaciones y acceso a capacitación, dan cuenta además de una informalidad laboral en los CAF contraria a lo establecido por la Ley Federal de Trabajo en México[23]. Esta situación brinda un claro ejemplo de trabajo precario que priva al personal médico de los beneficios laborales del empleo formal[24]. A pesar de las expectativas del personal médico de permanecer en el CAF temporalmente, el mercado no parece ofrecer otras opciones dada la dificultad del sector público para incrementar plazas y brindarles opciones de trabajo[25]. La ruta original del médico/a empleado/a y empresario/a ha dejado de ser una opción para las generaciones más jóvenes que no logran ingresar a una institución pública de salud y no tienen el capital para fundar su propio consultorio, lo que facilita el ingreso en los CAF.

Los incentivos económicos vinculados a la prescripción de medicamentos ofertados en la farmacia evidencian una práctica médica en los CAF que podría dar lugar a patrones de prescripción irracionales. Aunque los profesionales expresaron que tal situación no afecta su conducta prescriptiva, la experiencia en otros países ha demostrado que los incentivos económicos asociados al volumen de medicamentos dispensados son suficientes para cambiar la conducta prescriptiva, generando costos altos para el sistema de salud y para los/las usuarios/as[26–29].

Es posible argumentar que el funcionamiento de estos consultorios incrementa el acceso de la población a los servicios médicos y a los medicamentos, así como los espacios laborales para los/las profesionales. No obstante, a diferencia de otros servicios públicos y privados de salud, el origen de los CAF y su impulso estuvieron estrechamente relacionados con la venta de medicamentos[1,4]. Aunque el acto médico de curar enfermedades ha estado habitualmente vinculado con la industria farmacéutica[30], en el caso de los CAF la relación se estrecha con la presión y la supervisión que buscan inducir la prescripción, y que son percibidas por el personal médico como un intento para afectar su autonomía técnica. Así, la supervisión, que en el campo de los servicios públicos es considerada una herramienta administrativa[31] para monitorear las actividades del personal de salud y garantizar la calidad de la atención a los usuarios[32], en los CAF adquiere un sentido de vigilancia dirigido a intereses comerciales, no a la calidad del servicio. Esta tensión entre lo administrativo y lo profesional se ha documentado en instituciones privadas que buscan maximizar la rentabilidad financiera, racionalizando los recursos disponibles para la atención[15].

Así, en la práctica, el personal médico debe afrontar un dilema ético al tener que responder a las necesidades del paciente, pero también a los lineamientos organizativos de los CAF y sus

intereses económicos. En estas formas emergentes de organización de los servicios de salud privados, la inducción para la prescripción y el consumo de medicamentos se convierten en un reto para los sistemas regulatorios. En México, la Ley General de Salud sanciona a médicos/as y organizaciones que acuerden beneficios económicos a cambio de sugerir a las personas usuarias servicios, análisis clínicos y consumo de medicamentos[33]. De la misma forma, la COFEPRIS emprendió, desde el año 2013, la «Estrategia para el fortalecimiento de la regulación en farmacias con consultorio», y difundió una guía para las buenas prácticas sanitarias en farmacias y consultorios[34] que resume la normativa vigente. Desde entonces se ha verificado que los CAF cumplan los requerimientos mínimos de infraestructura, equipamiento e instrumental, aviso de funcionamiento, responsable sanitario, expediente clínico y limitación de la comunicación física entre la farmacia y el consultorio. Sin embargo, los lineamientos regulatorios no consideran los conflictos derivados de la relación laboral entre la farmacia y los/las médicos/as que vinculan las prácticas de prescripción y dispensación, distanciados de las necesidades de la población usuaria. Sin duda, el problema radica más en los elementos organizativos y administrativos que utilizan los CAF con fines de activar la venta de medicamentos que en la cercanía física entre la farmacia y el consultorio. Lo anterior pone en duda la calidad de los servicios brindados en estos consultorios. Aunque el análisis del desempeño médico va más allá de los alcances de este estudio y requiere ser indagado en futuros análisis sobre los CAF, es interesante hacer notar la percepción del personal médico respecto a la buena calidad que otorgan y al mismo tiempo su dificultad para acceder a la capacitación continua.

Es importante reconocer las limitaciones del estudio. Dado el carácter exploratorio, no se contempló la triangulación de métodos o teorías, que podrá incorporarse en nuevos abordajes que profundicen sobre los hallazgos aquí referidos. Asimismo, debe considerarse que, al tratar temas referentes a conflictos ético-morales, es posible que los participantes evitaran aspectos sensibles en sus relatos. Por otro lado, una fortaleza del estudio es el acercamiento al personal médico de manera directa, lo que permitió conocer testimonios desde la perspectiva del mismo actor social, sin intermediación de quien les emplea.

En conclusión, el personal médico que labora en los CAF en México enfrenta una difícil situación laboral evidenciada por la ausencia de garantías laborales y la percepción de insatisfacción e incertidumbre que manifestaron en sus relatos. Los elementos gerenciales usados para inducir la prescripción y activar las ventas de la farmacia se configuran como nuevos componentes del entorno laboral, situación que señala desafíos en materia de regulación y en la necesidad de monitorear los servicios allí brindados. Asimismo, se requerirán estudios que analicen el riesgo de una sobremedicalización en los CAF, así como los posibles efectos en la práctica médica y en la calidad de la atención brindada a la población; estos abordajes deberán incluir comparaciones entre los distintos modelos de CAF y con consultorios privados e instituciones públicas. Finalmente, es importante señalar que una escasa regulación en los CAF puede aumentar las desigualdades en salud para la población, tanto en el ámbito de una deficiente calidad de la atención como en los costos de procedimientos y tratamientos innecesarios, y para el personal médico por las precarias condiciones laborales que este estudio ha documentado. Estos aspectos evidencian la necesidad de mejorar la planeación del colectivo médico buscando el ajuste entre formación y necesidades de salud de la población. El sistema de salud podría contribuir con estrategias encaminadas a fortalecer la atención primaria generando e incentivando espacios laborales que garanticen las condiciones mínimas, con estímulos al desempeño para la retención de los profesionales de la salud y para garantizar una provisión apropiada de los servicios que otorgan.

¿Qué se sabe sobre el tema?

En México, los consultorios adyacentes a farmacias privadas (CAF) son una alternativa de atención privada a bajo precio que goza de aceptación en el público y que emplea a un importante número de médicos/as. Hay escasa información sobre las condiciones de trabajo del personal médico que allí labora y sobre cómo estas pueden influir en su práctica.

¿Qué añade el estudio realizado a la literatura?

Se expone la percepción del personal médico sobre su situación laboral en los CAF. La ausencia de garantías laborales y de incentivos por productividad, y la presión y supervisión del personal de farmacia, complejizan el entorno laboral del personal médico con posibles implicaciones en su práctica. Se sugiere fortalecer el marco regulatorio que aplica a los CAF. Se requieren estudios que analicen las posibles implicaciones del vínculo observado en los CAF entre ingreso y prescripción médica sobre la calidad de la atención brindada.

Editora responsable del artículo

Mercedes Carrasco Portiño.

Declaración de transparencia

La autora principal (garante responsable del manuscrito) afirma que este manuscrito es un reporte honesto, preciso y transparente del estudio que se remite a Gaceta Sanitaria, que no se han omitido aspectos importantes del estudio, y que las discrepancias del estudio según lo previsto (y, si son relevantes, registradas) se han explicado.

Contribuciones de autoría

S.P. Díaz-Portillo contribuyó en el diseño del estudio, la recolección de datos y su análisis, y participó en la elaboración del manuscrito y la versión final. H. Reyes-Morales contribuyó en el diseño del estudio, el análisis de los datos, la elaboración del manuscrito y la discusión de los resultados. A. Dreser contribuyó en el diseño del estudio, la elaboración del primer borrador y la discusión de los resultados. S.M. Cuadra-Hernández contribuyó en el análisis de los datos, la elaboración del primer borrador y la discusión de los resultados. A.J. Idrovo y G. Nigenda contribuyeron en la elaboración del primer borrador y en la discusión de los resultados. Todas las personas firmantes participaron en la revisión crítica del manuscrito y aprobaron la versión final para su publicación.

Financiación

La información obtenida formó parte del proyecto «Análisis de la calidad de la atención en consultorios médicos anexos a farmacias privadas», realizado por el Instituto Nacional de Salud Pública de México (No. Proyecto 1219), en colaboración con la Fundación Mexicana para la Salud y el Banco Interamericano de Desarrollo (Cooperación Técnica No. ATN/JF-11949-ME). La autora principal es becaria del Consejo Nacional de Ciencia y Tecnología de México (No. 376863). Para la conducción de las entrevistas, que forman parte de su tesis doctoral, se obtuvo financiamiento parcial, sin restricciones ni condiciones, por parte del Consejo Farmacéutico Mexicano.

Conflictos de intereses

Ninguno.

Agradecimientos

Los/las autores/as agradecen a la Mtra. Mariana Barraza y a la Dra. Veronika J. Wirtz su apoyo en el diseño del instrumento y en la logística del trabajo de campo; al personal médico que de manera desinteresada aceptó participar en este estudio y a los/las funcionarios/as del Instituto Nacional de Educación Médica Continua (INEMEC) por su apoyo en la difusión del estudio y por establecer el contacto con algunos/as médicos/as interesados/as en participar.

Anexo. Material adicional

Se puede consultar material adicional a este artículo en su versión electrónica disponible en doi:10.1016/j.gaceta.2016.10.016.

Bibliografía

1. Pérez-Cuevas R, Doubova SV, Wirtz VJ, et al. Effects of the expansion of doctors' offices adjacent to private pharmacies in Mexico: secondary data analysis of a national survey. BMJ. 2014 (Consultado el 27/8/2016.) Disponible en: http://bmjopen.bmj.com/content/4/5/e004669.full
2. Funsalud. Estudio sobre la práctica de la atención médica en consultorios médicos adyacentes a farmacias privadas. México: Ciudad de México; 2014. (Consultado el 26/9/2016.) Disponible en: http://funsalud.org.mx/portal/wp-content/uploads/2015/07/Informe-final-CAF-v300615-e-book.pdf
3. Frenk J, González-Pier E, Gómez-Dantés O, et al. Reforma integral para mejorar el desempeño del sistema de salud en México. Salud Pública de México. 2007;49:23–36. (Consultado el 15/9/2016.) Disponible en: http://bvs.insp.mx/rsp/_files/File/2007/supl%201/6-REFORMA.pdf
4. Chu M, García-Cuellar R. Farmacias Similares private and public health care for the base of the pyramid in Mexico. Harvard Business School. 2007;N2:307–92.
5. Hayden C. A generic solution? Pharmaceuticals and the politics of the Similar in Mexico. Current Anthropology. 2007;48:475–95.
6. Dreser A, Vázquez-Vélez E, Treviño S, et al. Regulation of antibiotic sales in Mexico: an analysis of printed media coverage and stakeholder participation. BMJ. 2012. (Consultado el 18/9/2016.) Disponible en: http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-12-1051
7. Comisión Federal para la Protección contra Riesgos Sanitarios: Estrategia del Gobierno de la República para la prevención y el combate de servicios médicos ilegales. México: Secretaría de Salud; 2015. (Consultado el 22/8/2016.) Disponible en: http://www.cofepris.gob.mx/Documents/NotasPrincipales/12022015.pdf
8. Rowe AK, de Savigny D, Lanata CF, et al. How can we achieve and maintain high-quality performance of health workers in low-resource settings? Lancet. 2005. (Consultado el 5/9/2016.) Disponible en: http://wwwthelancetcom/journals/lancet/article/PIIS0140-6736(05)67028-6/Abstract
9. Russell G, Dahrouge S, Tuna M, et al. Getting it all done. Organizational factors linked with comprehensive primary care. Fam Pract. 2010;27:535–41.
10. Berendes S, Heywood P, Oliver S, et al. Quality of private and public ambulatory health care in low and middle income countries: systematic review of comparative studies. PLoS Med. 2011. (Consultado el 28/9/2016.) Disponible en: http://journals.plos.org/plosmedicine/article/asset?id=10.1371/journal.pmed.1000433.PDF
11. Acevedo G, Farias A, Sánchez J, et al. Condiciones de trabajo del equipo de salud en centros de atención primaria desde la perspectiva del trabajo decente. Rev Argent Salud Pública. 2012;3:15–22.
12. Lundstrom T, Pugliese G, Bartley J, et al. Organizational and environmental factors that affect worker health and safety and patient outcomes. Am J Infect Control. 2002;30:93–106.
13. Chaix-Couturier C, Durand-Zaleski I, Jolly D, et al. Effects of financial incentives on medical practice: results from a systematic review of the literature and methodological issues. Int J Qual Health Care. 2000;12:133–42.
14. Serumaga B, Ross-Degnan D, Avery AJ, et al. Effect of pay for performance on the management and outcomes of hypertension in the United Kingdom: interrupted time series study. BMJ. 2011 (Consultado el 28/9/2016.) Disponible en: http://www.bmj.com/content/bmj/342/bmj.d108.full.pdf
15. Molina-Marín G, Vargas-Jaramillo J, Muñoz-Echeverri IF, et al. Dilemas en las decisiones en la atención en salud. Ética, derechos y deberes constitucionales frente a la rentabilidad financiera en el sistema de salud colombiano. Revista Gerencia y Políticas de Salud. 2010;9:103–17.
16. Díaz-Portillo SP, Idrovo AJ, Dreser A, et al. Consultorios adyacentes a farmacias privadas en México: infraestructura y características del personal médico y su remuneración. Salud Pública de México. 2015;57:320–8.
17. Leyva-Piña MA, Pichardo-Palacios S. Los médicos de las farmacias similares: ¿degradación de la profesión médica? Polis: Investigación y Análisis Sociopolítico y Psicosocial. 2012. (Consultado el 26/8/2016.) Disponible en: http://www.redalyc.org/articulo.oa?id=72623424006
18. Morse JM. Asuntos críticos en los métodos de investigación cualitativa. Medellín: Editorial Universidad de Antioquia; 2003. p. 477.
19. Patton MQ. Qualitative research and evaluation methods. 3 rd ed. Thousand Oaks, California: Sage Publications, Inc; 2002. p. 598.
20. Hsieh H-F, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res. 2005;15:1277–88.
21. Nigenda G, Muños JA. Projections of specialist physicians in Mexico: a key element in planning human resources for health. Hum Resour Health. 2015. (Consultado el 30/9/2016.) Disponible en: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4578266/pdf/12960_2015_Article_61.pdf
22. Nigenda G, Ruiz JA, Bejarano R. Educational and labor wastage of doctors in Mexico: towards the construction of a common methodology. Hum Resour Health. 2005. (Consultado el 23/8/2016.) Disponible en: http://download.springer.com/static/pdf/471/art%253A10.1186%252F1478-4491-3-3.pdf?originUrl=http%3A%2F%2Fhuman-resources-health.biomedcentral.com%2Farticle%2F10.1186%2F1478-4491-3-3&token2=exp=1471805132~acl=%2Fstatic%2Fpdf%2F471%2Fart%25253A10.1186%25252F1478-4491-3-3.pdf*~hmac=2c69507934f6f75207d33fd2350a5354e2c1d1521f3ab0762f36babe0e6f5c61
23. Ley Federal del Trabajo. Última Reforma. Diario Oficial de la Federación (12 junio 2015). (Consultado el 22/9/2016.) Disponible en: http://www.diputados.gob.mx/LeyesBiblio/pdf/125_120615.pdf
24. Organización Internacional del Trabajo. Políticas y regulaciones para luchar contra el empleo precario. Informe para el simposio regulaciones y políticas para combatir el trabajo precario. Ginebra: OIT; 2011. (Consultado el 26/8/2016.) Disponible en: http://www.ilo.org/wcmsp5/groups/public/—ed_dialogue/—actrav/documents/meetingdocument/wcms_164288.pdf
25. Nigenda G, Aguilar EM, Ruiz J. Capítulo VI: Médicos. En: Nigenda G, Ruiz JA, editores. Formación, empleo y regulación de los recursos humanos para la salud, bases para su planeación estratégica. Cuernavaca: Instituto Nacional de Salud Pública y Centro de Proyectos para el Desarrollo; 2010. p. 179–221.
26. Kwon S. Pharmaceutical reform and physician strikes in Korea: separation of drug prescribing and dispensing. Soc Sci Med. 2003;57:529–38.
27. Park S, Soumerai SB, Adams AS, et al. Antibiotic use following a Korean national policy to prohibit medication dispensing by physicians. Health Policy Plan. 2005;20:302–9.
28. Trap B, Hansen EH, Hogerzeil HV. Prescription habits of dispensing and non-dispensing doctors in Zimbabwe. Health Policy Plan. 2002;17:288–95.
29. Shafie AA, Hassali MA, Azhar S, et al. Separation of prescribing and dispensing in Malaysia: a summary of arguments. Res Social Adm Pharm. 2012;8:258–62.
30. Wazana A. Physicians and the pharmaceutical industry: is a gift ever just a gift? JAMA. 2000;283:373–80.
31. Guadalajara J, Durante I, Ortigoza J, et al. Evaluación y supervisión en educación médica. Seminario: El ejercicio actual de la medicina. Facultad de Medicina. Universidad Nacional Autónoma de México; 2006. (Consultado el 24/8/2016.) Disponible en: http://www.facmed.unam.mx/sms/seam2k1/2006/sep_02_ponencia.html
32. Bosch-Capblanch X, Liaqat S, Garner P. Managerial supervision to improve primary health care in low- and middle-income countries. Cochrane Database Syst Rev. 2011. (Consultado el 19/9/2016.) Disponible en: http://onlinelibrary.wiley.com/wol1/doi/10.1002/14651858.CD006413.pub2/full
33. Ley General de Salud. Decreto por el que se reforman los artículos 419, 420, 421 y 422; y se adiciona un artículo 421-bis (18 enero 2007). (Consultado el 15/9/2016.) Disponible en: http://www.diputados.gob.mx/LeyesBiblio/ref/lgs/LGS_ref29_18ene07.pdf
34. Comisión Federal para la Protección contra Riesgos Sanitarios. Guía para las buenas prácticas sanitarias en farmacias y consultorios. México: Secretaría de Salud; 2013. (Consultado el 23/9/2016.) Disponible en: http://s-salud.hidalgo.gob.mx/wp-content/Documentos/guia.pdf

Capítulo 5.
Medicamentos en salud púbica: acceso, utilización y políticas

Los medicamentos y otras tecnologías sanitarias se consideran uno de los seis elementos constitutivos de los sistemas de salud. Más allá de su relevancia terapéutica y su potencial para mejorar la salud de las personas, garantizar el acceso y el uso adecuado de medicamentos seguros, eficaces y asequibles es fundamental para el buen desempeño de los sistemas de salud. No obstante, la distribución de medicamentos no funciona de manera aislada dentro del sistema de salud, sino que dependen de múltiples actores y procesos. Por ello, es necesario un enfoque sistémico y de políticas públicas que abarque la interacción entre el sector farmacéutico y todos los componentes de los sistemas de salud.

En 2007, se creó en el INSP la línea de investigación por misión "Medicamentos en Salud Pública" con el objetivo de generar evidencia sobre los retos y avances en el acceso y uso adecuado de medicamentos, así como para analizar las políticas y respuestas de los sistemas salud ante estos retos. El contexto nacional e internacional en los años subsecuentes llevó a orientar la investigación a temas específicos, entre los que destacan: los factores asociados al gasto y la utilización de medicamentos y el efecto del recién implementado Seguro Popular; la prescripción de medicamentos para VIH y las negociaciones de precios y compras de antirretrovirales, así como la utilización de antibióticos y la regulación de su venta en América Latina, frente a la amenaza de la creciente resistencia antimicrobiana.

Los artículos que seleccionamos para este capítulo dan cuenta del amplio abanico de investigación sobre medicamentos realizado en los últimos 15 años en el CISS. El artículo de Dreser y cols. aborda los retos y avances en la implementación de programas para optimizar el uso de antibióticos en hospitales de México, y señala diferencias importantes entre el sector público y el privado. Gómez-Dantés y cols. hacen un recuento de las políticas de adquisición de medicamentos en México. Se contrastan las políticas implementadas antes y después de 2018 y sus implicaciones para el acceso a medicamentos en el país, además destacan lecciones para la toma de decisiones.

En el artículo de Mino-León y cols., se documentan los problemas de prescripción de medicamentos potencialmente inadecuada para adultos mayores en servicios de salud ambulatorios de México y la necesidad de desarrollar intervenciones para mejorarla. Serván-Mori y cols. describen los retos en el acceso a medicamentos en servicios de salud para beneficiarios del Seguro Popular, y resaltan la persistencia del gasto de bolsillo. Finalmente, el artículo de Santa-Ana Tellez y cols. analiza el impacto de la regulación de venta de antibióticos sólo con receta médica en México y Brasil; se destaca la disminución en el consumo de algunos grupos de antibióticos en México, y la relevancia de abordar la calidad de la prescripción médica.

Journal of Global Antimicrobial Resistance 43 (2025) 40–50

Contents lists available at ScienceDirect

Journal of Global Antimicrobial Resistance

journal homepage: www.elsevier.com/locate/jgar

Progress and challenges in the implementation of antimicrobial stewardship programs in 50 hospitals in Mexico

Anahí Dreser[a], Jennifer Hegewisch-Taylor[a,*], María Alejandra Cortés-Ortiz[b], Gabriel Levy-Hara[c]

[a] Center for Health Systems Research, National Institute of Public Health, Av. Universidad 655, Cuernavaca, Morelos, Mexico
[b] Independent researcher, Cuernavaca, Morelos, Mexico
[c] Unit of Infectious Diseases, Hospital Carlos G Durand, Av. Díaz Vélez 5044, Buenos Aires, Argentina

ARTICLE INFO

Article history:
Received 10 October 2024
Revised 6 February 2025
Accepted 25 February 2025
Available online 10 March 2025

Editor in chief: Professor Athanasios Tsakris

Keywords:
Drug resistance, microbial
Antimicrobial stewardship
Program development
Hospitals
Mexico
COVID-19

ABSTRACT

Objectives: Antimicrobial stewardship programs (ASP) aim to improve the quality of medical prescribing and contain antimicrobial resistance (AMR). There is little information on the implementation of ASP in hospitals in Mexico. This study aimed to characterize ASP in a sample of hospitals in Mexico and to identify the facilitators and barriers perceived in their implementation, including the COVID-19 pandemic.
Methods: A self-assessment electronic survey was adapted from the CDC and WHO ASP's core elements, considering ASP organization, structure, education, guidelines, interventions, surveillance, monitoring, and reporting processes. The survey was addressed to ASP team leaders in a sample of public and private hospitals carrying out regular antimicrobial stewardship activities in Mexico in 2021 and 2022.
Results: Fifty hospitals participated: 32 (64%) public and 18 (36%) private. Fifty-two percent of hospitals had an official ASP document, 12% allocated protected time for ASP professionals, and 34% had an annual plan. Most hospitals had an ASP committee (68%); only 14% allocated funding. Most interventions were restrictive (68%); 61% of hospitals prepared cumulative antibiograms periodically, 54% monitored antimicrobial consumption (DDD/DOT), 44% monitored adherence to guidelines, and 24% monitored the implementation of interventions. The main barriers identified were work overload, insufficient human resources, and hospital reconversion due to COVID-19 (particularly in public hospitals), while the support of hospital authorities was the most important facilitator.
Conclusions: This diagnosis provides a baseline for strengthening ASP implementation in the country's hospitals. National and institutional policies should prioritize targeting ASP planning, monitoring, and human resources allocation.

© 2025 The Authors. Published by Elsevier Ltd on behalf of International Society for Antimicrobial Chemotherapy. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)

1. Introduction

The inappropriate and excessive use of antimicrobials, particularly antibiotics, hampers the quality of care and promotes the selection of resistant pathogens, leading to antimicrobial resistance (AMR) [1]. In response, antimicrobial stewardship programs (ASP) have been widely recommended. ASPs are sustained efforts by healthcare institutions to improve antimicrobial prescribing including drug selection, dosing, route, and duration of treatment. They aim to improve patient outcomes, minimize the adverse effects of antimicrobial use –including AMR– and ensure cost-effective treatments [2,3]. Their positive impact has been demonstrated in diverse reviews [4,5].

The implementation of ASP has been endorsed by the World Health Organization (WHO) in the Global Action Plan on AMR [1], and by national action plans. Although ASP may vary according to the hospitalś available resources and priority issues, several core or basic ASP elements have been identified. Checklists have been developed to assess these elements in hospital facilities and identify areas needing improvement. These include having a formal ASP infrastructure, implementing interventions to improve prescribing, providing education and guidelines, and conducting surveillance, monitoring, and reporting [6–9].

* Corresponding author. Mailing address: Center for Health Systems Research, National Institute of Public Health, Av. Universidad 655, Cuernavaca, Morelos, 62100 Mexico.
E-mail addresses: anahi.dreser@insp.mx (A. Dreser), jennifer.hegewisch@insp.mx (J. Hegewisch-Taylor).

https://doi.org/10.1016/j.jgar.2025.02.018
2213-7165/© 2025 The Authors. Published by Elsevier Ltd on behalf of International Society for Antimicrobial Chemotherapy. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)

Successful antimicrobial stewardship (AMS) initiatives and programs have been developed in hospitals in Latin America and the Caribbean [10,11], where human resources and infrastructure are often lacking [11,12]. For example, a study in 2022 [13] evaluated the impact of ASP in 77 adult intensive care units in 9 Latin American countries, finding that they had effectively improved adherence to clinical guidelines and decreased antimicrobial consumption and Multi-Drug-Resistant Organisms causing Healthcare-Associated Infections (MDRO–HAIs). Regarding the core ASP elements, a recent study [12] in 5 Latin American countries found that ASP development in profit and non-for-profit hospitals was mostly intermediate (50%) or inadequate/basic (35%); hospitals scored poorly concerning ASP human resources allocation, education, guidelines, and process monitoring. Of note, no Mexican hospitals participated in the previously cited multi-country studies.

In Mexico, studies conducted in hospitals have documented the inadequate use of antibiotics –including over-prescription of broad-spectrum antibiotics– insufficient adherence to clinical practice guidelines, and growing AMR to some antibiotics [14–16]. Several hospitals in the country have implemented and individually reported the results of their ASP [17–21]. However, there is little evidence of these programs' design, implementation and monitoring processes, and challenges for their development. This knowledge is needed to follow the AMR National Action Plan which establishes the implementation of ASP in all public and private, second-and third-level care hospitals [22].

Mexico is a middle-income country with a highly fragmented health system. Around 30% of 4,341 hospitals are public, including those belonging to the Mexican Social Security Institute (IMSS), the Institute of Social Security of State Workers (ISSSTE), and other minor social institutes; as well as hospitals of the Ministry of Health (MoH). On the other hand, Mexico has a large private healthcare sector composed of individual and corporate providers [23]. Strengthening the implementation of ASPs in the country may benefit from evidence regarding current progress and gaps in the core elements, as well as an understanding of the factors that influence the implementation of these programs. This study aimed to characterize ASP in a sample of private and public hospitals in Mexico; and to describe the perceived barriers and facilitators in their implementation, including the COVID-19 pandemic.

2. Material and methods

2.1. Study population

A purposive sample of 75 public and private hospitals that regularly perform AMS interventions were invited to participate in this study. The sample comprised general or second-level care hospitals (which offer medical specialties such as surgery, internal medicine, paediatrics, and gynaecology/obstetrics and provide emergency services); as well as third-level care hospitals, which provide highly specialized medical care (e.g., cancer treatments), and receive patients referred from second-level hospitals.

2.2. Survey design

The instrument consisted of 200 variables and was adapted from the hospital ASP core elements checklists developed by the WHO [6] and the Centers for Disease Control and Prevention (CDC) [8]. Firstly, general hospital characteristics were recorded. The core elements were organized into the following sections: I) leadership, accountability, and responsibilities; II. infrastructure; III. guidelines; IV. education and training; V. stewardship interventions or actions to optimize antimicrobial use; VI. surveillance; VII. monitoring; and VIII. reporting and feedback. Additionally, perceived barriers and facilitators in the operation of ASP, and the impact of COVID-19 on the hospital's implementation of ASP activities were explored using categories deriving from the literature and the knowledge of experts.

2.3. Participants

Focal points of each of the 75 hospitals (generally ASP team leaders) were invited by email or WhatsApp™, followed by a brief study presentation and a link to the self-assessment electronic survey. The ASP team focal point was asked to invite professionals from the hospital pharmacy and microbiology laboratory areas to answer a subset of questions related to their areas of work (Supplementary data A). Informed consent with a digital signature was requested from all participants.

2.4. Data collection

A pilot study was conducted in 5 hospitals. A total of 40 hospitals completed the online survey in 2021. To increase the sample size, given the lower-than-expected response rate due to hospitals being overwhelmed during the early phase of the COVID-19 pandemic, non-respondent hospitals were re-contacted in 2022, obtaining 10 additional responses. Data was collected using the REDCap platform [24] hosted by the INSP server, where data cleaning and quality control were performed.

2.5. Data analysis

Descriptive statistics were performed, estimating proportions and averages by total sample and by hospital sector (public and private). Most questions explored whether the hospital had each ASP core element, with the possibility of answering 'Yes,' 'No,' or 'In process.' The "In process" option was re-categorized for the analysis as 'No.' Categorical variables presented as percentages were compared between the public and private sectors using the chi-square test. A P-value < 0.05 was considered statistically significant. Analysis was undertaken for each core element section. Additionally, a section average of selected variables was used to gain knowledge on the overall ASP completeness and was compared between sectors (Supplementary data B). All analyses were performed using Stata (StataCorp. *Stata Statistical Software: Release 14*. College Station, TX).

3. Results

3.1. Characteristics of the hospitals

Fifty hospitals in 17 out of 32 Mexican states participated in the survey. Nineteen hospitals (38% of the total) were in the capital, Mexico City (details in Supplementary data C).

The participating hospitals were 64% public ($n = 32$): 23 from the MoH; 6 from the IMSS; and three from the ISSSTE; and 36% private ($n = 18$). Of the total, 36% ($n = 18$) were in the second level of care, while 64% ($n = 32$) were in the third.

Most hospitals (54%) were medium-sized (100–249 beds), particularly public ones, followed by small/medium-sized (<100 beds) hospitals (32%); only seven hospitals (five public) had 250 beds or more. Also, most hospitals reported having 1 to 3 (46%) and four or more (32%) infectious disease (ID) specialists. Notably, 22% of public and private hospitals had no ID specialists. Regarding the number of pharmacists, most hospitals (54%) had between 1 and 4 pharmacists; three public sector hospitals had no pharmacists (general characteristics of the participating hospitals can be found in Supplementary data D).

Table 1
ASP Core elements: Leadership, accountability, responsibilities, and infrastructure.

ASP element	ASP Sub-component	Indicator	Total ($n = 50$)	Public Hospitals ($n = 32$)	Private Hospitals ($n = 18$)	*P*-value
I. LEADERSHIP, ACCOUNTABILITY, AND RESPONSIBILITIES	Planning and strategic organization	Official hospital ASP document	26 (52%)	16 (50%)	10 (56%)	0.706
		Describes functions of the ASP committee or team	24 (48%)	16 (50%)	8 (44%)	0.706
		Allocates protected time to staff to conduct ASP activities	6 (12%)	2 (6%)	4 (22%)	0.095
		Establishes collaboration between ASP and IPC	25 (50%)	15 (47%)	10 (56%)	0.556
		Hospital action plan describes ASP activities and annual goals	17 (34%)	9 (28%)	8 (44%)	0.242
		Financial support dedicated to ASP activities	7 (14%)	1 (3%)	6 (33%)	0.003*
		Matrix of indicators used to monitor ASP processes and outcomes	20 (40%)	11 (34%)	9 (50%)	0.279
		Situational diagnosis of ASP resources and antimicrobial use problems to prioritize ASP objectives	33 (66%)	20 (63%)	13 (72%)	0.486
	Leadership and committee	ASP committee or team to plan and coordinate activities in the hospital	34 (68%)	24 (75%)	10 (56%)	0.157
		ASP committee reports to a high level within the institution	28 (56%)	18 (56%)	10 (56%)	0.738
	Accountability and responsibilities	Periodic meetings with service leaders and hospital management to report and discuss ASP activities and results	19 (38%)	13 (41%)	6 (33%)	0.610
		Results of ASP evaluation used to provide feedback to program planning or decision making in the hospital	21 (42%)	13 (41%)	8 (44%)	0.793
		ASP activities and results are reported to a national institution (For example, Ministry of Health, IMSS or ISSSTE).	12 (24%)	8 (25%)	4 (22%)	0.825
II. INFRASTRUCTURE	Physical space and equipment	Hospital provides physical space for ASP coordination	13 (26%)	5 (16%)	8 (44%)	0.026*
		Hospital provides computers or tablets +Internet	37 (74%)	22 (69%)	15 (83%)	0.259
	Technological platforms	Instant messaging apps to allow communication between prescribers and ASP experts (Mobile messaging app, email)	34 (68%)	24 (75%)	10 (56%)	0.157
		Mobile phone apps with treatment guidelines and AMR data	10 (20%)	6 (19%)	4 (22%)	0.768
		Access to electronic health records	26 (52%)	19 (59%)	7 (39%)	0.164
		Software to quantify antimicrobial consumption	21 (42%)	13 (41%)	8 (44%)	0.793
	Microbiology laboratory^	Microbiology laboratory located within the hospital	46 (94%)	30 (94%)	16 (89%)	0.403
		The laboratory works 7 days a week (sample collection)	36 (73%)	22 (69%)	14 (82%)	0.293
		Laboratory has automatized detection systems (automated microbiological diagnostic/susceptibility devices, multiplex PCR systems, spectrophotometry, etc.)	37 (76%)	23 (72%)	14 (82%)	0.495
		Access to rapid diagnostics tests (CRP or procalcitonin)	45 (92%)	29 (91%)	16 (94%)	0.840

^ $n = 49$ (private hospitals $n = 17$).
* The chi-square statistic is significant at the 0.05 level.
Abbreviations: AMR: Antimicrobial resistance; ASP: Antimicrobial Stewardship Program; CRP: C-Reactive Protein; IPC: Infection and Prevention Control; IMSS: Mexican Social Security Institute; ISSSTE: Institute of Security and Social Services for State workers; PCR: Polymerase Chain Reaction.
Examples used in the survey: Mobile messaging app: WhatsApp™; microbiological diagnostic/susceptibility devices: Vitek™; multiplex PCR systems: *FilmArray*™; spectrophotometry: *MALDI-TOF*™.

3.2. ASP core elements

The following is a description of the progress reported by the hospitals regarding the different core elements of ASP.

Table 1 describes the core elements concerning ASP's leadership, accountability, responsibilities, and infrastructure. Fifty-two percent of the hospitals reported having an official program document, and only 12% allocated protected time for personnel to conduct ASP activities. This official allocation was less frequently reported in public hospitals, although the difference was not statistically significant. A third had an annual plan with ASP activities and goals, and only 7 (14%) had specific funding for ASP. Financial support for the program differed significantly between public and private hospitals (3% vs. 33%; $P = 0.003$).

Most facilities (68%), especially public ones (75%), reported having a specific committee (often called 'antimicrobial subcommittee') or a team to plan and coordinate ASP activities. Committees typically include microbiologists (85%), infectious disease (ID) specialists (82%), and pharmacists (79%). When asked about the leaders of the ASP team, ID specialists (82%) and epidemiologists

Table 2
ASP core elements: Guidelines, education, and training.

ASP element	ASP Sub-component	Indicator	Total (n = 50)	Public Hospitals (n = 32)	Private Hospitals (n = 18)	P-value
III. GUIDELINES	Local Guidelines	The AWaRe classification is used to categorize antibiotics	17 (34%)	10 (31%)	7 (39%)	0.584
		Sample collection instructions	34 (68%)	19 (59%)	15 (83%)	0.081
		The hospital has developed its own surgical prophylaxis guidelines	27 (54%)	14 (44%)	13 (72%)	0.053
		The hospital has developed its own treatment guidelines for ID/antimicrobial therapy	21 (42%)	15 (47%)	6 (33%)	0.352
		CPG include information on the hospitalś antimicrobial susceptibility and resistance patterns	21 (42%)	12 (38%)	9 (50%)	0.086
	Use of external guidelines	Institutional guidelines (e.g., IMSS)	6 (12%)	6 (19%)	0 (0%)	0.050*,a
		MoH National treatment and prophylaxis quality guidelines (CENETEC)	17 (34%)	14 (44%)	3 (17%)	0.052
		Medical associations guidelines (National & international)	37 (74%)	26 (81%)	11 (61%)	0.119
		Pharmaceutical company guidelines	1 (2%)	0 (0%)	1 (6%)	0.178
		No external guidelines	6 (12%)	2 (6%)	4 (22%)	0.095
IV. EDUCATION AND TRAINING	Education and training	At least one of the ASP professionals has received education on ASP design, implementation, evaluation, etc.	30 (60%)	17 (53%)	13 (72%)	0.186
		Basic training for health professionals regarding optimal antimicrobial use and AMR	20 (40%)	16 (50%)	4 (22%)	0.156
		The hospital distributes educational materials (e.g., posters, brochures, or infographics in print or electronic format) to health professionals	13 (26%)	7 (22%)	6 (33%)	0.375
		The hospital organizes continuous medical education activities (e.g., symposiums, webinars) related to optimal antimicrobial use	17 (34%)	11 (34%)	6 (33%)	0.941
		Training for pharmacy personnel concerning AMC measurement^	21 (43%)	10 (31%)	11 (65%)	0.033*,a
		Training for laboratory personnel on microbiological diagnosis and susceptibility tests^	17 (35%)	14 (44%)	3 (18%)	0.052

^ n = 49 (private hospitals n = 17).
* The chi-square statistic is significant at the 0.05 level.
[a] Low cell count; results should be interpreted carefully.
Abbreviations: AMC: Antimicrobial consumption; AMR: Antimicrobial resistance; ASP: Antimicrobial Stewardship Program; CENETEC: National Centre of Technological Excellence in Health; CPG: Clinical Practice Guidelines; ID: Infectious Diseases; IMSS: Mexican Social Security Institute.

(44%) were most commonly identified, followed by hospital directors (29%) (details of the ASP committee in Supplementary Material E).

Regarding accountability, 56% of the hospitals communicated program activities and results to a high level of hospital management, and 40% had a matrix of indicators to monitor ASP processes and results (Table 1). Thirty-eight percent of hospitals had periodic meetings with hospital service leaders and authorities to report and discuss ASP activities and results, and only 24% reported their ASP to a national health institution.

Physical space for program coordination was available in 26% of facilities (16% public vs. 44% private hospitals; P = 0.026). Sixty-eight percent used various technological platforms to facilitate communication between prescribers and ASP experts, and 20% had mobile phone apps with clinical practice guidelines (CPG) and AMR data.

Most microbiology laboratories were located within the hospital (94%) (i.e., they were not external or subcontracted) and operated seven days a week for sample collection (73%). Automated detection systems for pathogen identification and antibiotic susceptibility testing were available in 76% of the hospitals, and 92% had access to rapid diagnostic tests to monitor bacterial infection/sepsis.

Table 2 describes the components related to the guidelines used in the hospitals to optimize the use of antimicrobials and the education and training activities related to the program. Most hospitals used CPG. Forty-two percent of hospitals developed their own treatment guidelines; 54% developed guidelines for surgical prophylaxis, more frequently in private hospitals (72%). Forty-two percent stated that their CPG included information on the hospitalś antimicrobial susceptibility and resistance patterns. Additionally, hospitals reported using external guidelines, mainly those developed by medical associations (74%), particularly in the public sector.

Regarding ASP team training, in 60% of the institutions, at least one team member had received training on designing, implementing, or evaluating these programs. In 40%, basic training was provided to healthcare professionals regarding optimal antimicrobial use and AMR, and a third of hospitals organized continuous medical education activities on AMS. In 43% of hospitals, pharmacy staff received training to measure antimicrobial consumption (public 31%, private 65%; P = 0.033); and 35% of laboratory personnel received essential microbiological diagnosis and susceptibility testing training.

Table 3 describes implemented AMS interventions. Preauthorization for restricted antimicrobials was used by 68% of institutions (public 78%, private 50%; P-value = 0.041), mainly to prescribe linezolid, colistin, carbapenems, vancomycin, and tigecycline. Other antimicrobials, such as amphotericin and caspofungin, were less frequently restricted. Authorization could be requested during morning shifts in all hospitals, but only for 22% of hospitals, it was available 24/7. Persuasive and feedback interventions were reported in around a third of all institutions –more frequently in private hospitals– being revision after 48 h of treatment the most common. Automatic alerts in electronic medical records to prevent duplication of therapy or to signal end-of-treatment duration were present in only 10% of facilities.

Finally, on average, one-third of hospitals reported optimization actions led by hospital pharmacists significantly more often in private hospitals– particularly detecting and issuing alerts concerning inappropriate treatments (53%, e.g., double anaerobic coverage or drug interactions) and dose adjustment based on renal or hepatic function (41%).

Table 3
ASP core elements: Antimicrobial stewardship interventions.

ASP element	ASP Sub-component	Indicator	Total (n = 50)	Public Hospitals (n = 32)	Private Hospitals (n = 18)	P-value
V. AMS INTERVENTIONS	Broad	Written policy for documenting the indication of prescribed antimicrobials in medical records.	17 (34%)	11 (34%)	6 (33%)	0.941
		Automatic alerts in medical records to avoid duplicate therapy or automatic stop	5 (10%)	3 (9%)	2 (11%)	0.098
	Restrictive	Pre-authorization for restricted antimicrobials	34 (68%)	25 (78%)	9 (50%)	0.041*
	Persuasive and feedback	Periodic retrospective audit and feedback of antimicrobial prescription	19 (38%)	10 (31%)	9 (50%)	0.190
		Prospective audit and feedback during ward rounds	11 (22%)	6 (19%)	5 (28%)	0.459
		Advice and feedback from ASP team is available to all prescribers 24/7	11 (22%)	7 (22%)	5 (28%)	0.977
		Review of diagnosis and antimicrobial prescriptions after 48 h of hospital admission, allowing for readjustment and de-escalation	27 (54%)	16 (50%)	11 (61%)	0.449
	Pharmacy-driven^	Switch of antimicrobial therapy from intravenous to oral route	10 (20%)	4 (13%)	6 (35%)	0.077
		Optimization of antimicrobial dosage (PK/PD) to maximize the organ and body tissue penetration, activity against MDRO and other pharmacokinetic interventions	7 (14%)	2 (6%)	5 (29%)	0.035*,[a]
		Detection and alert emission in inappropriate treatments	26 (53%)	12 (38%)	14 (82%)	0.006*
		Dose adjustment based on renal or hepatic function	20 (41%)	7 (22%)	13 (76%)	0.000*

^ n = 49 (private hospitals n = 17).
* The chi-square statistic is significant at the 0.05 level.
[a] Low cell count; results should be interpreted carefully.
Abbreviations: AMS: Antimicrobial Stewardship; ASP: Antimicrobial Stewardship Program; CRP: C-Reactive Protein, MDRO: Multi-Drug Resistant Organisms, PK/PD: pharmacokinetic/pharmacodynamic.

One of the main activities of an ASP is surveillance of antimicrobial consumption (AMC) and use, as well as patterns of AMR, to identify priority problems, guide program actions, and evaluate their impact. As shown in Table 4, half of the hospitals had conducted point prevalence surveys (PPS) to assess the appropriateness of antimicrobial use. Regarding measuring AMC, private hospitals (72%) used standardized DDD or DOT consumption metrics more frequently than public hospitals (44%). Regarding AMR surveillance, 61% of hospitals performed and periodically updated cumulative antibiograms, significantly more frequently in private hospitals than in public ones (82% vs. 50%; P = 0.036). Sixty-one percent of hospitals monitored all pathogens in the ESKAPE group,[1]

Concerning monitoring and evaluation of the program, while most hospitals monitored compliance with one or more ASP interventions, only 24% monitored all. Twelve percent of hospitals (all private) had ASP external evaluations, mainly as part of an international accreditation process. Most institutions used some process indicators to evaluate their ASP, such as adherence to treatment guidelines (36%), surgical prophylaxis (34%), or the rate of adjusted or de-escalated treatment according to laboratory results (34%); the latter was significantly higher in private hospitals (94%).

Regarding ASP impact, most hospitals used at least one outcome or result measure, especially AMC in DDD or DOT per 100 or 1,000 patient-days (59%) and the rate of MDRO–HAIs (52%). Twenty- four percent reported the impact of ASP on antimicrobial drug spending, and 10% monitored AMC according to the AWaRe classification.

Finally, concerning communication within the hospital about ASP activities, 38% of the hospitals gave feedback to physicians on the quality of antimicrobial prescribing, and only eight participating hospitals made the ASP and its results visible through periodic printed reports or on websites.

[1] *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter species*.

The overall assessment of the different ASP subcomponents is described in Fig. 1.

3.3. Perceived barriers and facilitators for the implementation of hospital ASP

As shown in Fig. 2, work overload (70%), insufficient human resources (68%), and hospital reconversion by COVID-19 (64%) were the main barriers identified, which were significantly more frequently reported in the public sector. Lack of material resources and drug shortages were barriers reported exclusively in the public sector (63% and 59%). Deficient ASP monitoring was reported significantly more often by public hospitals, while insufficient financing, and difficulty in measuring prescription quality were barriers that, although not significantly different, predominated in the public sector as well. In the private sector, hospital staff resistance to new procedures (72%) and poor communication between the ASP team and prescribers (39%) stood out.

The support and interest of the hospital authorities (62%) were identified as the most important facilitator for all the participating hospitals. In addition, in the public sector, the leadership and commitment of the ASP team (56%) was a key facilitator. Notably, the hospital certification process was identified as the most crucial facilitator in the private sector (72%, significantly different from 19% in the public sector). Of relevance, support from national health authorities was seldom reported as a facilitator (14%) (Fig. 3).

3.4. ASP modifications experienced during the COVID-19 pandemic

The COVID-19 pandemic affected the ASP functioning in different ways (Fig. 4). As reported by the ASP teams, 60% of the hospitals temporarily suspended activities performed by the ASP team to prioritize the care of patients with COVID-19, while 28% reported an increased workload, given the increased antimicrobial prescription for COVID-19 patients; in both cases, this occurred more frequently in public hospitals. Other hospitals reported that ASP activities continued and were relevant to facing the crisis: in

Table 4
ASP core elements: Surveillance, monitoring, and feedback.

ASP element	ASP Sub-component	Indicator	Total (n = 50)	Public Hospitals (n = 32)	Private Hospitals (n = 18)	P-value
VI. SURVEILLANCE	Antimicrobial use	Point prevalence surveys (PPS) have been developed to assess appropriateness of antimicrobial use	25 (50%)	17 (53%	8 (44%)	0.556
	Antimicrobial consumption (AMC)^	AMC is quantified using DDD or DOT metrics	27 (54%)	14 (44%)	13 (72%)	0.053
		AMC is quantified using number of containers and vials	29 (59%)	23 (72%)	6 (35%)	0.008*
	AMR surveillance^	Elaboration and periodic updating of cumulative antibiograms	30 (61%)	16 (50%)	14 (82%)	0.036*,a
		Surveillance of (all) ESKAPE pathogens surveillance	30 (61%)	21 (66%)	9 (53%)	0.279
		The laboratory has a rapid communication mechanism in case of detection of infections by antibiotic-resistant microorganisms	36 (73%)	23 (72%)	13 (76%)	0.381
VII. MONITORING	Monitoring of the ASṔs implementation	The AMS team monitors compliance with one or more of the ASP interventions	43 (86%)	28 (88%)	15 (83%)	0.978
		All interventions are monitored	12 (24%)	8 (25%)	4 (22%)	0.077
		The ASP has been evaluated in its entirety by external stakeholders on a regular basis, e.g. as part of the accreditation process	6 (12%)	0 (0%)	6 (33%)	0.000*,a
		The ASP has been evaluated using a SWOT analysis	8 (16%)	5 (16%)	3 (17%)	0.923
	Process indicators	At least one *process measure* is used to assess progress in ASP interventions	39 (78%)	24 (75%)	15 (83%)	0.495
		Patients receiving empirical treatment with antimicrobials according to treatment guidelines for certain pathologies	18 (36%)	11 (34%)	7 (39%)	0.750
		Patients receiving surgical prophylaxis with antibiotics according to guidelines	17 (34%)	6 (19%)	11 (61%)	0.584
		Treatments adjusted or de-escalated according to laboratory results	17 (34%)	10 (31%)	17 (94%)	0.002*
	Result indicators	At least one *outcome measure* is used to assess ASP impact	37 (74%)	26 (81%)	11 (61%)	0.119
		Rate of healthcare-associated infections caused by MDRO	26 (52%)	14 (44%)	12 (67%)	0.119
		Rate of healthcare-associated C. difficile infections	21 (42%)	12 (38%)	9 (50%)	0.390
		Antimicrobial consumption in DDD per 100 or 1000 patient-days (OR DOT)	29 (59%)	18 (56%)	11 (65%)	0.738
		Hospital expenses on antimicrobial medications	12 (24%)	9 (28%)	3 (17%)	0.362
		Antibiotic consumption according to the AWaRe classification	5 (10%)	2 (6%)	3 (17%)	0.239
VIII. REPORTING AND FEEDBACK	Reporting and Feedback	Quality of antimicrobial use is reviewed and key findings are shared with prescribers	19 (38%)	10 (31%)	9 (50%)	0.190
		ASP and its results made visible in the hospital through periodic (descriptive) reports such as newsletters, websites or informative posters	8 (16%)	5 (16%)	3 (17%)	0.923
		ASP reports can be consulted by all healthcare professionals in the hospital	21 (42%)	13 (41%)	8 (44%)	0.793

^ n = 49 (private hospitals n = 17).
* The chi-square statistic is significant at the 0.05 level.
[a] Low cell count; results should be interpreted carefully.
Abbreviations: AMC: Antimicrobial consumption; AMR: Antimicrobial resistance; AMS: Antimicrobial stewardship; ASP: Antimicrobial Stewardship Program (s), AWaRe: Access, Watch and Reserve, DDD: Defined Daily Dose; DOT: Days Of Therapy; ESKAPE: (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and Enterobacter species); MDRO: Multi-Drug-Resistant Organisms; SWOT: Strengths, Weaknesses, Opportunities, Threats.

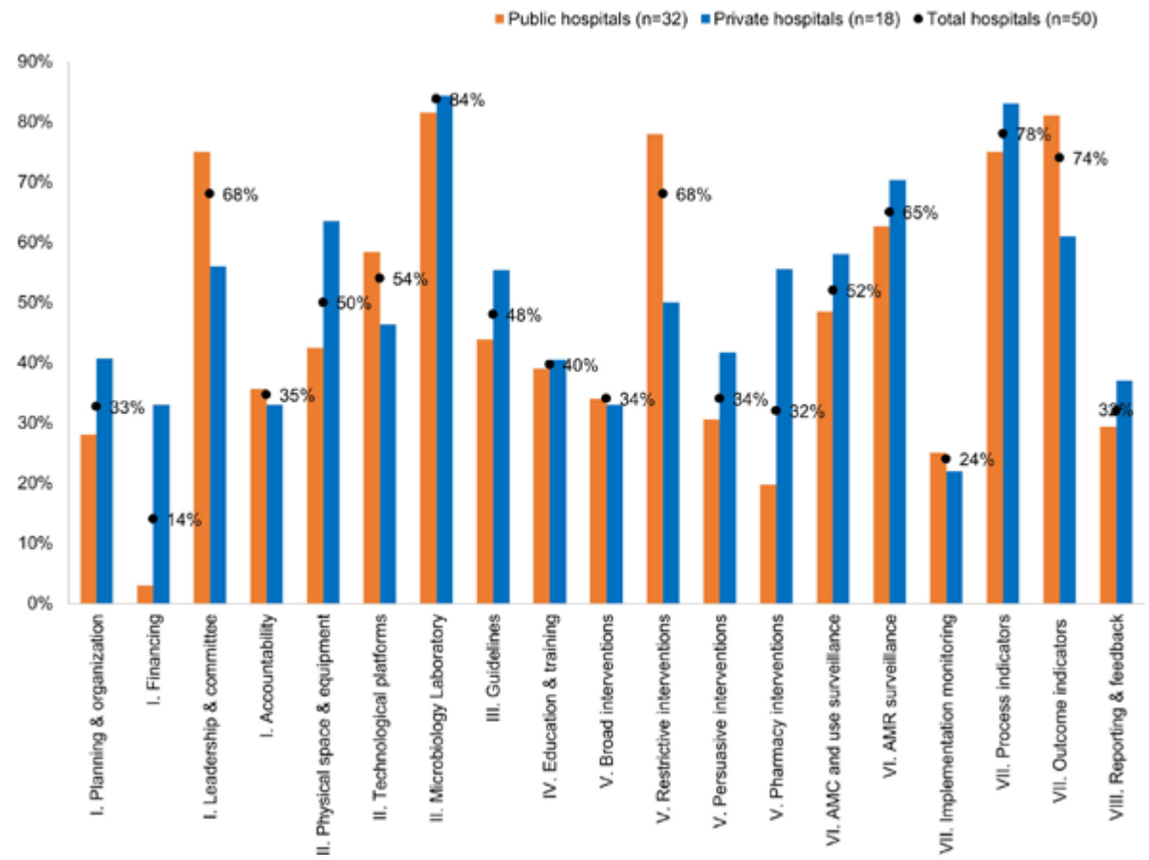


Fig. 1. ASP overall subcomponent completeness. The Y-axis displays the % of average subcomponents in each setting. Selected subcomponents are described in Supplementary data B. Black dots represent the results for the total of hospitals, while orange bars stand for public hospitals and blue bars for private hospitals. Roman numerals represent different ASP components: I. Leadership, accountability, and responsibilities; II. Infrastructure; III. Guidelines; IV. Education and training; V. Antimicrobial stewardship interventions; VI. Surveillance; VII. ASP Monitoring; VIII. Reporting and feedback. Abbreviations: AMC: Antimicrobial consumption; AMR: Antimicrobial resistance; ASP: Antimicrobial Stewardship Program.

14%, the ASP team became involved in the education and supervision of health personnel in the appropriate use of antimicrobials for COVID-19, while in 10%, the ASP team became involved in the development of COVID-19 treatment guidelines. Nevertheless, 14% of the hospitals did not report facing changes in their ASP activities, which was significantly greater in private hospitals (28%) vs. public hospitals (6%).

4. Discussion

This study provides the first baseline overview of ASP core elements in Mexican hospitals, including differences between public and private hospitals and the perceived barriers and facilitators in their implementation, identifying opportunity areas to strengthen the design and implementation of ASPs in the country and other similar contexts.

4.1. ASP progress and challenges

In low and middle-income countries (LMIC), ASP implementation in hospitals is hindered by diverse systemic and organizational factors, including scarce governmental support, unreliable drug supply, insufficient infrastructure, financing, and human resources, as well as health worker's limited training and expertise to conduct ASP [7,25–28]. Nevertheless, guidelines have been developed to consider these challenges [6,9], and the report of ASP in these contexts is increasing, including in Latin America [12,29–32].

This study found that some core ASP elements were present in most hospitals studied, particularly multidisciplinary ASP teams or committees, access to microbiology laboratories, and AMR surveillance. In contrast, ASP-specific strategic organization, reporting, and feedback were only found in a third of hospitals. Financing was the least prevalent ASP element, while monitoring the ASPś implementation displayed the second-lowest score, underscoring key areas for improvement in this sample of Mexican hospitals.

The study's results reaffirm that, as observed in other studies in Latin America [12], ASP committees have been evolving but still are not universally present, and they are frequently affected by limited budgets and resources (e.g., a fifth of hospitals reported not having ID specialists). Their functioning could be strengthened with strategic organizational components, such as planning for activities and human resources allocation with protected time (which was only identified in 12% of the hospitals in our study). This is a crucial factor in improving implementation in Mexico, as work overload and insufficient personnel were the main barriers identified by ASP teams.

While a lack of microbiology laboratory support has been identified as a key barrier to ASP implementation in many LMIC [27,33], this was not observed in our study. Regular access to microbiology laboratories and prevalent AMR surveillance could be related to longstanding efforts aimed at preventing HAI in the

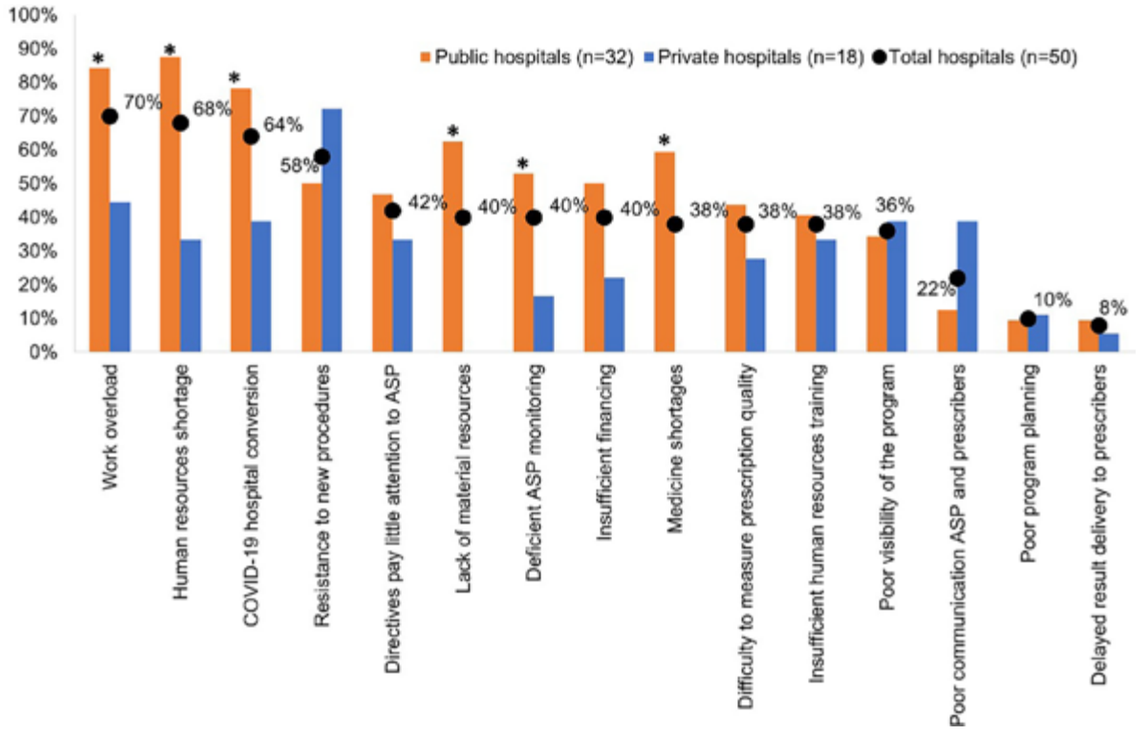


Fig. 2. Perceived barriers to the operation of ASP. The Y-axis displays the % of perceived barriers for ASP operation. Black dots represent the results for the total of hospitals, while orange bars stand for public hospitals and blue bars for private hospitals. *: The chi-square statistic is significant at the 0.05 level. Abbreviations: ASP: Antimicrobial Stewardship Program.

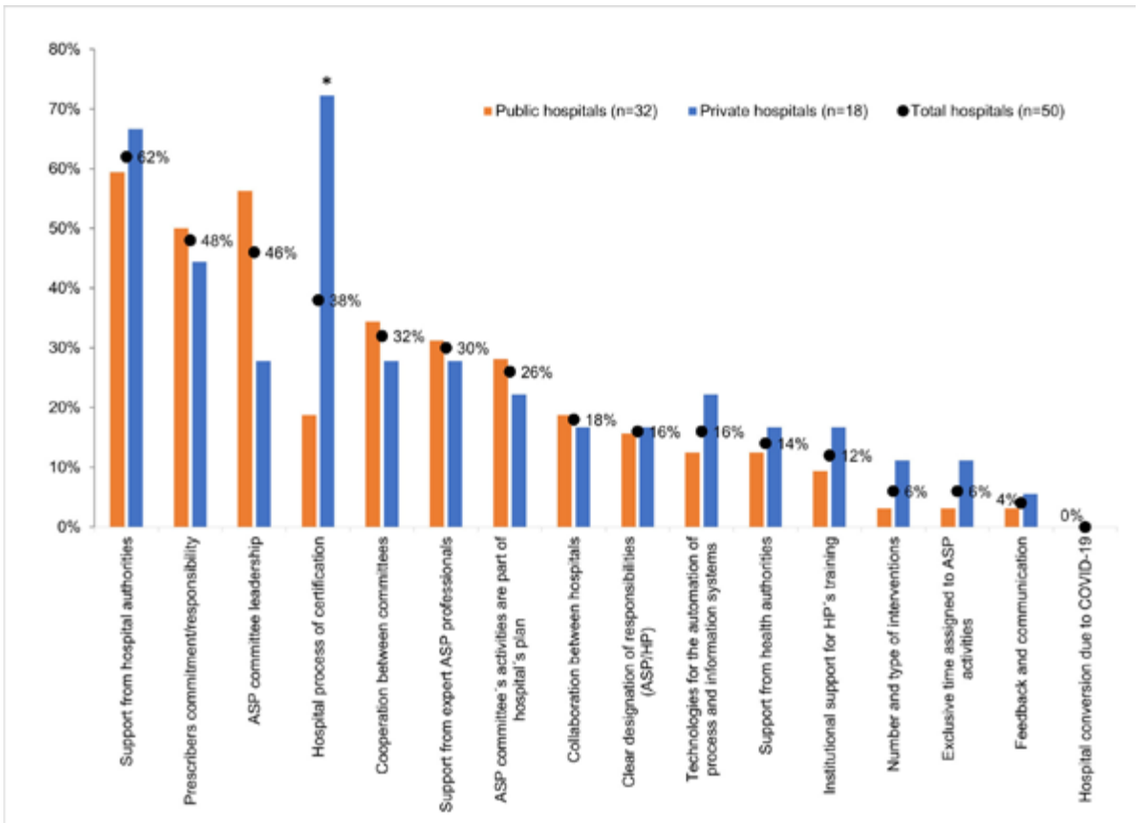


Fig. 3. Perceived facilitators of the operation of ASP. The Y-axis displays the % of perceived facilitators for ASP operation. Black dots represent the results for the total of hospitals, while orange bars stand for public hospitals and blue bars for private hospitals. *: The chi-square statistic is significant at the 0.05 level. Abbreviations: ASP: Antimicrobial Stewardship Program; HP: Health professionals.

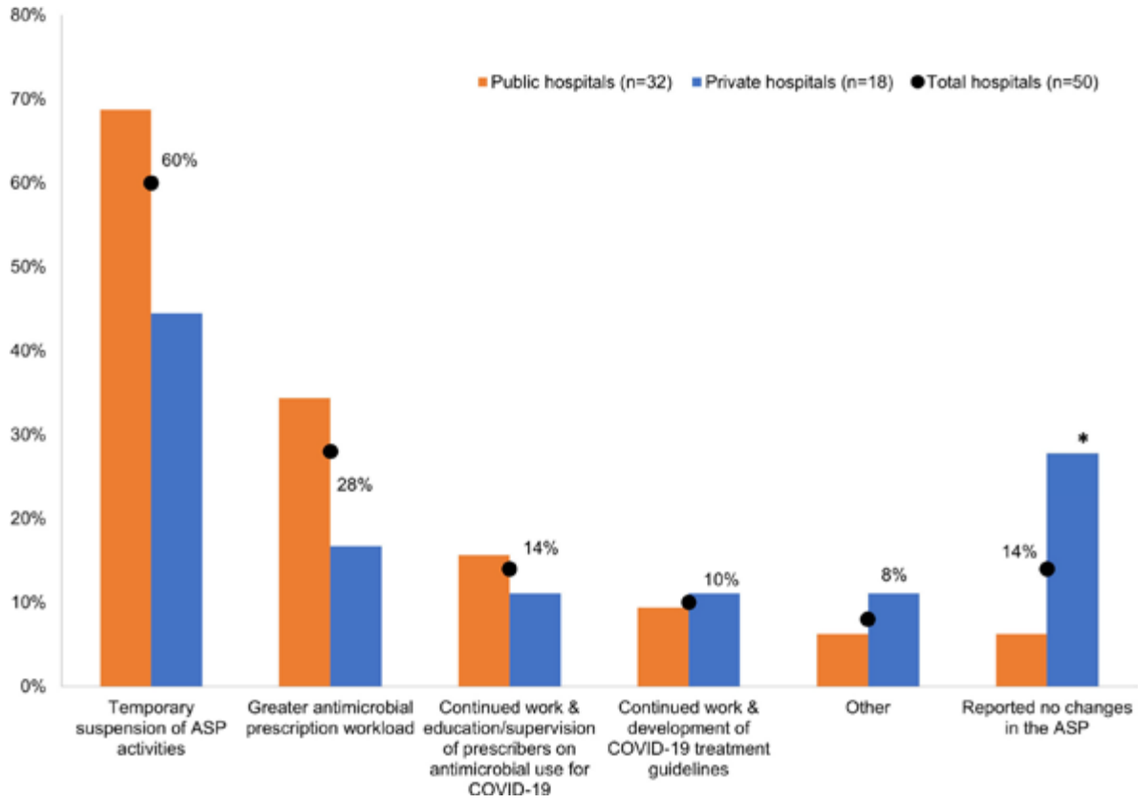


Fig. 4. ASP activities affected by the COVID-19 pandemic. The Y-axis displays the % of hospitals reporting different reasons for affecting their ASP for ASP operation. The line represents the results for the total of hospitals, while orange bars stand for public hospitals and blue bars for private hospitals. *: The chi-square statistic is significant at the 0.05 level. Abbreviations: ASP: Antimicrobial Stewardship Program.

country. However, developing CPG based on local ID and AMR epidemiology remained an area of opportunity for most participating hospitals.

A significant gap identified is that only one-fourth of the hospitals reported monitoring all ASP interventions, and very few communicated ASP progress through reports. This is a critical area of opportunity reported in other Latin American hospitals [12,29–31]. The scarcity of ASP reporting and feedback was also highlighted in a recent multi-centre study involving a network of private hospitals in Mexico [32]. Although some key process and outcome indicators are already in use, it is essential to enhance the use of indicators related to prescription quality, particularly adherence to clinical guidelines. Additionally, economic impact indicators should be strengthened to demonstrate the savings generated by optimizing antimicrobial use, thereby gaining support from hospital administration. These and other indicators could be incorporated into formal ASP plans, which only a third of hospitals currently have.

Both financing and effective monitoring are crucial for the advancement and sustainability of an ASP. The lack of funding can lead to the desertion of team members, as they often need to take on other paid tasks. Moreover, it creates significant challenges to incorporate new human and material resources. On the other hand, inadequate monitoring of activities prevents accurate assessment of intervention impacts and the identification of necessary adjustments. This lack of measured results, in turn, reduces the chances of obtaining funding for the program from authorities.

In our study, only a quarter of hospitals report their program to a national institution or authority. Noteworthy, despite the first AMR National Action Plan being published in 2018, it was not accompanied by specific guidelines to develop ASP. It was only in 2023 that the MOH issued a ministerial agreement [34] requiring all hospitals to formally establish an antimicrobial committee and to report their AMS activities. Unsurprisingly, in this study, support from national authorities was not perceived as an important facilitator for operating ASP. Instead, support from hospital directors was perceived as a key facilitator. Other studies in LMIC have underlined the need to support and encourage individual hospital initiatives from 'top-down' by strengthening national, sub-national, and institutional governance, creating national ASP indicators and standards, and allocating resources to the programs [11,27,33].

Our results indicate that most hospitals still rely on restrictive interventions, as previously reported in Latin America [12,29]. Preauthorization is resource-intensive, often leads to rejection, and may increase the prescription of other antimicrobials. These interventions require a team member available 24/7 to avoid delays in treatment initiation. In Latin America, however, this is often not possible due to the limited time of ASP team members. Therefore, guidelines [6,35] recommend that the pharmacy dispense the antimicrobials during the first 48 h until the ASP team reviews the prescription. This strategy also helps in ongoing training to prescribers through these frequent interactions. Implementing multimodal strategies tailored to each hospital's context is preferable, including prospective audit and feedback interventions that have already been proven cost-effective in hospitals in Colombia, Brazil, and Costa Rica [11,29,36]. Our study highlights the need to expand pharmacy-driven interventions, especially in public hospitals. Regional studies emphasize the importance of incorporating clinical pharmacists as active ASP members [12,29], which could also enhance the use of DDD and DOT metrics, an area needing improvement in Mexico and other Latin American countries [11].

4.2. Lessons learned for ASP in the public and private sectors

In an assessment of ASP in Latin American countries, for-profit hospitals scored higher than not-for-profit hospitals [12]. In our study, we found heterogeneity in the elements of the ASP between hospitals in both sectors, which should be considered in national policies.

In the public sector, ASP committees were common, but there was less progress in strategic planning, financing, monitoring, and allocating dedicated human resources for ASP. The latter was a critical barrier identified in other LMIC [27], which was exacerbated during the COVID-19 pandemic, as was found in our study and others as well [28,37], but was largely unexplored in the Latin American region. Additionally, we found that factors outside the program (i.e., shortages of antimicrobial drugs and supplies) posed important challenges to the operation of public ASP and should be considered. Notably, external evaluations were utterly lacking in public hospitals. One strength of public hospitals was their frequent involvement in educational activities aimed at hospital personnel, which could greatly support strengthening the ASP.

In the private sector, hospitals reported greater access to protected time for ASP human resources and financing; probably for this reason, the negative impact of COVID-19 on the ASP operation was less frequently reported. These facilities more often developed cumulative antibiograms and measured antimicrobial consumption using standard metrics. Additionally, they favoured persuasive and pharmacy-driven interventions over restrictive ones. However, resistance and communication difficulties with prescribers were significant barriers, reflecting the broader conditions of private practice in Mexico and other LMIC, where hospitals are often not willing to interfere with private physicians' decisions [12,33]. A major driver for ASP in these hospitals is the requirement for hospital accreditation from international agencies, such as the Joint Commission [38], which also appeared as a facilitator in other private hospitals in the region [12]. The National Action Plan states that, eventually, the accreditation of public and private hospitals by national organizations will consider the operation of ASP. However, it is necessary to accompany this requirement with the necessary resources for the effective functioning of the ASP to prevent these programs and committees from becoming mere simulations to meet mandatory accreditation requirements, as reported in other contexts [33].

This study has some limitations. Urban tertiary hospitals with established ASP are overrepresented in our sample. Although ASP development scores are valuable tools used in recent studies [12,30,32], they were not included in this study due to our emphasis on providing a detailed baseline description of each ASP component and the incompatibility between our survey design and standardized scoring methodologies. While this study provides valuable findings on ASP in diverse types of hospitals in Mexico, it also calls for future research using a more extensive, random sample stratified by health system and institution type and including independent verification of ASP elements to validate self-reports. Additionally, future implementation research should assess ASP outcomes and their determinants.

5. Conclusions

This research provides a baseline for strengthening ASP implementation in Mexican hospitals and contributes to a better understanding of the progress and challenges in LMIC and the region. Addressing identified areas of opportunity requires a multidimensional approach, including the allocation and training of human resources in AMS and improving governance, planning, and organizational processes. Providing operational guidelines on ASP, along with systematic monitoring and reporting of these programs, is essential. The commitment of hospital authorities, supported by national and institutional health authorities, will be crucial in overcoming existing barriers and facilitating the successful implementation of ASP.

Acknowledgements: We extend our heartfelt thanks to the participating hospitals and professionals for their valuable time and data contributions to this study. We are grateful to Jesús Silva Sánchez, Elvira Garza González, and Julián Romero for their insightful input during the protocol design. Additionally, we appreciate the invaluable assistance provided by Julián Romero, Eric Piña, and Jorge Quiroz in data collection for this project. Finally, we express our gratitude to Ángel Mejía, Adán Ondi Ahman, and Saúl Lara from the INSP Data Science Unit for their collaboration in database cleaning and quality control.

Funding: This project received an unrestricted grant from MSD Mexico for Research Purposes.

Declaration of competing interests: The first author received an unrestricted grant from MSD Mexico to develop this study.

Ethical approval: The research protocol was approved by the Research and Ethics Commission of the National Institute of Public Health (INSP) (#1717, 2021).

AI-assisted technologies statement: While preparing this work, the authors used the AI-assisted tool Grammarly™ to improve readability and language. The authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Data availability statement: Data is available upon reasonable request to the author.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jgar.2025.02.018.

References

[1] World Health Organization (WHO) Global action plan on antimicrobial resistance. Geneva: World Health Organization; 2015.
[2] Rodríguez-Baño J, Paño-Pardo JR, Alvarez-Rocha L, Asensio Á, Calbo E, Cercenado E, et al. [Programs for optimizing the use of antibiotics (PROA) in Spanish hospitals: GEIH-SEIMC, SEFH and SEMPSPH consensus document]. Enferm Infecc Microbiol Clin 2012;30:22.e1–22.e23. doi:10.1016/j.eimc.2011.09.018.
[3] WHO policy guidance on integrated antimicrobial stewardship activities. Geneva: World Health Organization; 2021.
[4] Davey P, Marwick CA, Scott CL, Charani E, McNeil K, Brown E, et al. Interventions to improve antibiotic prescribing practices for hospital inpatients. Cochrane Database Syst Rev 2017;2:CD003543. doi:10.1002/14651858.
[5] Donà D, Barbieri E, Daverio M, Lundin R, Giaquinto C, Zaoutis T, et al. Implementation and impact of pediatric antimicrobial stewardship programs: a systematic scoping review. Antimicrob Resist Infect Control 2020;9:3. doi:10.1186/s13756-020-00720-x.
[6] World Health Organization (WHO) Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries: a practical toolkit. Geneva: World Health Organization; 2019.
[7] Cox JA, Vlieghe E, Mendelson M, Wertheim H, Ndegwa L, Villegas MV, et al. Antibiotic stewardship in low- and middle-income countries: the same but different? Clin Microbiol Infect 2017;23:812–18. doi:10.1016/j.cmi.2017.07.010.
[8] Centers for Disease and Control Prevention (CDC) Core Elements of Hospital Antibiotic Stewardship Programs, Atlanta, GA: US Department of Health and Human Services; CDC, 2019. Accessed on April 2025 from https://www.cdc.gov/antibiotic-use/healthcare/pdfs/hospital-core-elements-H.pdf.
[9] Pulcini C, Binda F, Lamkang A, Trett A, Charani E, Goff D, et al. Developing core elements and checklist items for global hospital antimicrobial stewardship programmes: a consensus approach. Clin Microbiol Infect 2019;25:20–5. doi:10.1016/j.cmi.2018.03.033.
[10] Hegewisch-Taylor J, Dreser-Mansilla A, Romero-Mónico J, Levy-Hara G. Antimicrobial stewardship in hospitals in Latin America and the Caribbean: a scoping review. Pan Am J Public Health 2020;44:1. doi:10.26633/RPSP.2020.68.
[11] Fabre V, Cosgrove SE, Secaira C, Torrez JCT, Lessa FC, Patel TS, et al. Antimicrobial stewardship in Latin America: past, present, and future. Antimicrob Steward Healthc Epidemiol ASHE 2022;2:e68. doi:10.1017/ash.2022.47.
[12] Fabre V, Secaira C, Cosgrove SE, Lessa FC, Patel TS, Alvarez AA, et al. Deep dive into gaps and barriers to implementation of antimicrobial stewardship programs in hospitals in Latin America. Clin Infect Dis 2023;77:S53–61. doi:10.1093/cid/ciad184.

[13] Quirós RE, Bardossy AC, Angeleri P, Zurita J, Aleman Espinoza WR, Carneiro M, et al. Antimicrobial stewardship programs in adult intensive care units in Latin America: implementation, assessments, and impact on outcomes. Infect Control Hosp Epidemiol 2022;43:181–90. doi:10.1017/ice.2021.80.
[14] Zumaya-Estrada FA, Ponce-de-León-Garduño A, Ortiz-Brizuela E, Tinoco-Favila JC, Cornejo-Juárez P, Vilar-Compte D, et al. Point prevalence survey of antimicrobial use in four tertiary care hospitals in Mexico. Infect Drug Resist 2021;14:4553–66. doi:10.2147/IDR.S327721.
[15] Garza-González E, Morfín-Otero R, Mendoza-Olazarán S, Bocanegra-Ibarias P, Flores-Treviño S, Rodríguez-Noriega E, et al. A snapshot of antimicrobial resistance in Mexico. Results from 47 centers from 20 states during a six-month period. PLoS ONE 2019;14:1–13. doi:10.1371/journal.pone.0209865.
[16] Levy Hara G, Rojas-Cortés R, Molina León H, Dreser Mansilla A, Alfonso Orta I, Rizo-Amezquita J, et al. Latin American Point Prevalent Survey Study Group. Point prevalence survey of antibiotic use in hospitals in Latin American countries. J Antimicrob Chemother 2022;77:807–15. doi:10.1093/jac/dkac120.17.
[17] Torres Erazo DS, Judith Nuñez Caamal N, Berenice Carrillo Basulto M, Cicero Ancona M, Armando Cuevas Sosa L, Meropenem E. Impact of an antimicrobial stewardship program on the healthcare-associated infections in a third-level hospital in Yucatán, México. Open Forum Infect Dis 2019;6:S687. doi:10.1093/ofid/ofz360.1722.
[18] Villanueva-Reza M, Lanz-Zubiria L, Rojas de Ita I, Castañeda Méndez P, Alemán-Aguilar E, Aguilar-Zapata D, et al. Impact of local antimicrobial stewardship guidelines through a cellphone app to lower hospital-acquired MDR infections in a private hospital in Mexico City. Open Forum Infect Dis 2019;6:S678. doi:10.1093/ofid/ofz360.1700.
[19] Diaz-Romero A, Ortiz-Alvarez A, Ramirez-Hinojosa JP, Vera-Olguin S, Medrano-Ahumada S, Lopez-Vejar CE, et al. Implementation of new strategy for real-time antimicrobial stewardship (ASP) in a Secondary Healthcare hospital. Open Forum Infect Dis 2018;5:S505. doi:10.1093/ofid/ofy210.1439.
[20] Sosa-Hernández O, Vázquez-Zamora C, Gutiérrez-Muñoz VH, Lugo-Zamudio GE, Cureño-Díaz MA. [Results of the Program for the Rational Use of Antimicrobials in a Mexican hospital, 2013-2018]. Rev Panam Salud Publica Pan Am J Public Health 2020;44:e45. doi:10.26633/RPSP.2020.45.
[21] Molina-Jaimes A, del Carmen Gonzalez-Sanchez M, Molina M. 918. Influence of a hospital-based antimicrobial stewardship program on clinical and economic outcomes. The experience from a referral center in Mexico. Open Forum Infect Dis 2022;9 ofac492.763. doi:10.1093/ofid/ofac492.763.
[22] Diario Oficial de la Federación. ACUERDO que modifica el Anexo Único del diverso por el que se declara la obligatoriedad de la Estrategia Nacional de Acción contra la Resistencia a los Antimicrobianos, 2022. Accessed on December 2022 from: https://www.dof.gob.mx/nota_detalle.php?codigo=5670896&fecha=09/11/2022#gsc.tab=0
[23] González Block MÁ, Reyes Morales H, Hurtado LC, Balandrán A, Méndez E. Mexico: Health system review. Health Syst Transit 2020;22:1–222.
[24] Harris P, Taylor R, Thielke R, Payne J, Gonzalez N, Conde J. Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inf 2009;42:377–81. doi:10.1016/j.jbi.2008.08.010.
[25] Setiawan E, Abdul-Aziz M, Roberts J, Cotta M. Hospital-based antimicrobial stewardship programs used in low- and middle-income countries: a scoping review. Microb Drug Resist 2022;28:566–84. doi:10.1089/mdr.2021.0363.
[26] Howard P, Pulcini C, Levy Hara G, West RM, Gould IM, Harbarth S, et al. An international cross-sectional survey of antimicrobial stewardship programmes in hospitals. J Antimicrob Chemother 2014;70:1245–55. doi:10.1093/jac/dku497.
[27] Harun MGD, Sumon SA, Hasan I, Akther FM, Anwar MMU. Barriers, facilitators, perceptions and impact of interventions in implementing antimicrobial stewardship programs in hospitals of low-middle and middle countries: a scoping review. Antimicrob Resist Infect Control 2024;13:8. doi:10.1186/s13756-024-01369-6.
[28] Lazure P, Augustyniak M, Goff DA, Villegas MV, Apisarnthanarak A, Péloquin S. Gaps and barriers in the implementation and functioning of antimicrobial stewardship programmes: results from an educational and behavioural mixed methods needs assessment in France, the United States, Mexico and India. JAC-Antimicrob Resist. octubre de 2022;4:dlac094. doi:10.1093/jacamr/dlad082.
[29] Restrepo-Arbeláez N, Garcia-Betancur JC, Pallares CJ, Villegas MV. Antimicrobial stewardship Programs in Latin America and the Caribbean: a story of perseverance, challenges, and goals. Antibiot Basel Switz 2023;12:1342. doi:10.3390/antibiotics12081342.30.
[30] Pallares CJ, Porras J, De La, Cadena E, García-Betancur JC, Restrepo-Arbeláez N, Viveros SMC, et al. Antimicrobial stewardship programs in seven Latin American countries: facing the challenges. BMC Infect Dis 2023;23:463. doi:10.1186/s12879-023-08398-3.
[31] Hinrichsen SL, de Lemos MC, Bernardino JM, Lima JA, Carrazone G, Vilella T, et al. Assessing antimicrobial stewardship governance in northeast Brazilian hospitals: a survey-based analysis. JAC-antimicrob resist 2024;6:dlae116. doi:10.1093/jacamr/dlae116.32.
[32] Bejarano JIC, Ondarza DLL, Galindo JOG, et al. Antimicrobial stewardship programs in a Mexican private healthcare system: a self-assessment of core elements. BMC Infect Dis 2024:1254. doi:10.1186/s12879-024-09601-9.
[33] Limato R, Broom A, Nelwan EJ, Hamers RL. A qualitative study of barriers to antimicrobial stewardship in Indonesian hospitals: governance, competing interests, cost, and structural vulnerability. Antimicrob Resist Infect Control 2022;11:85. doi:10.1186/s13756-022-01126-7.
[34] Consejo Nacional de Salud para el Bienestar. Acuerdo 03/I/CONASABI/2023. Garantizar la operación de los comités hospitalarios de antimicrobianos que validen, verifiquen y cuantifiquen el uso adecuado de antimicrobianos en las unidades de atención médica 2023. Accessed on May 2024 from: https://www.ssch.gob.mx/rendicionCuentas/archivos/CONASABI%201er.%20trim%202024_vff.docx
[35] Pan American Health Organization (PAHO Florida international university. recommendations for implementing antimicrobial stewardship programs in latin america and the caribbean: manual for public health decision-makers. Washington, DC: PAHO, FIU; 2018.
[36] Díaz-Madriz JP, Zavaleta-Monestel E, Villalobos-Madriz JA, Rojas-Chinchilla C, Castrillo-Portillo P, Meléndez-Alfaro A, et al. Impact of the five-year intervention of an antimicrobial stewardship program on the optimal selection of surgical prophylaxis in a hospital without antibiotic prescription restrictions in Costa Rica: a retrospective study. Antibiotics 2023;12:1572. doi:10.3390/antibiotics12111572.
[37] Hara GL, Antik A, Aguirre S, Giuliano C, García D, Ochiuzzi ME, et al. The effect of the COVID-19 pandemic on the incidence and resistance of gram-negative bacilli and antimicrobial consumption in the intensive care units of a referral hospital in Buenos Aires. Int J Antimicrob Agents 2024;64:107203. doi:10.1016/j.ijantimicag.2024.107203.38.
[38] Joint Commission. Joint Commission International Accreditation Standards for Hospitals Including Standards for Academic Medical Center Hospitals. 7th ed. Oak Brook, IL: Joint Commission Resources; 2020.



Health Systems & Reform

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/khsr20

Challenges of Guaranteeing Access to Medicines in Mexico: Lessons from Recent Changes in Pharmaceuticals Procurement

Octavio Gómez-Dantés, Anahi Dreser, Veronika J. Wirtz & Michael R. Reich

To cite this article: Octavio Gómez-Dantés, Anahi Dreser, Veronika J. Wirtz & Michael R. Reich (2022) Challenges of Guaranteeing Access to Medicines in Mexico: Lessons from Recent Changes in Pharmaceuticals Procurement, Health Systems & Reform, 8:1, 2084221, DOI: 10.1080/23288604.2022.2084221

To link to this article: https://doi.org/10.1080/23288604.2022.2084221

© 2022 The Author(s). Published with license by Taylor & Francis Group, LLC.

Published online: 20 Jun 2022.

Submit your article to this journal

Article views: 3631

View related articles

View Crossmark data

Citing articles: 1 View citing articles

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=khsr20

HEALTH SYSTEMS & REFORM
2022, VOL. 8, NO. 1, e2084221 (10 pages)
https://doi.org/10.1080/23288604.2022.2084221

Taylor & Francis
Taylor & Francis Group

OPEN ACCESS Check for updates

Challenges of Guaranteeing Access to Medicines in Mexico: Lessons from Recent Changes in Pharmaceuticals Procurement

Octavio Gómez-Dantés[a], Anahi Dreser[b], Veronika J. Wirtz[c], and Michael R. Reich[d]

[a]Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública, Morelos, México; [b]Instituto Nacional de Salud Pública, Cuernavaca, Mexico; [c]Boston University School of Public Health, Boston, Massachusetts, US; [d]Harvard T.H. Chan School of Public Health, Boston, Massachusetts, US

ABSTRACT

During the last two decades, Mexico adopted policies intended to increase the efficiency and effectiveness of medicines procurement in its nationally fragmented health system. In this policy report, we review Mexico's efforts to guarantee access to medicines during three national administrations (from 2000 to 2018), and then examine major health system changes introduced by the current government (2018–2024), which have created significant setbacks in guaranteeing access to medicines in Mexico. These recent changes are having important consequences in the levels of satisfaction of health care users and citizens, household expenditure on health, and health conditions. We suggest key lessons for Mexico and other countries seeking to improve pharmaceutical procurement as part of guaranteeing access to medicines.

ARTICLE HISTORY
Received 23 February 2022
Revised 5 May 2022
Accepted 26 May 2022.

KEYWORDS
Essential medicines; health system reform; Mexico; procurement of medicines

Introduction

Access to medicines in health systems has gained increasing attention in the past decade, illustrated by the inclusion of universal health coverage (UHC) as a target (3.8) of Sustainable Development Goal (SDG)3 (Good Health and Wellbeing).[1] The SDG definition of UHC includes "access to safe, effective, quality and affordable medicines and vaccines for all."

Public procurement of pharmaceuticals is a key component of the public commitment to guarantee access to medicines.[2] The ongoing COVID-19 pandemic has highlighted the critical importance of effective public procurement of medicines in health systems as a mechanism for assuring access, efficiency and quality, as well as moving toward the ultimate system goals of improving health status, citizen satisfaction, and financial risk protection.[3] The public procurement of medicines is an essential component of national pharmaceutical policies, closely connected to the three related processes of financing, selection, and distribution.

Public procurement is part of the broader health system subfunction of "strategic purchasing," which, in turn, is part of the financing function and seeks to obtain more value out of money spent on health through the purchase of services and inputs such as medicines.[4] National rules that govern public procurement aim to ensure transparent and ethical transactions (and control corruption), whereby the buyer (often a public payer such as a government or an agency) receives the requested product, and the seller (medicines manufacturer, distributor or wholesaler) receives timely payment.[2] Public procurement offices require trained human resources, adequate investments and budgets, and appropriate procedures in order to achieve the public goals set by national policy. There are various ways to organize public procurement at a national level, with important health system consequences.[3]

Over the past several decades, Mexico has sought to guarantee better access to medicines through various public policies. The implementation in 2004 of *Seguro Popular* (SP), a public insurance program targeting the population without social security (around 60 million people), guaranteed access to a specific set of health care interventions, including pharmaceuticals.[5] SP increased the budget for health and assured sustainable financing for medicines. About 30% of SP financing transferred to states was recommended for use in the procurement of medicines, although the actual amounts spent varied by state.[5]

In two national administrations, in 2007–2012 and 2013–2018, Mexico adopted several strategies to support wider health sector reforms to increase the efficiency and effectiveness of medicines procurement in its nationally

CONTACT Octavio Gómez-Dantés ocogomez@yahoo.com Instituto Nacional de Salud Pública Investigador en Ciencias Médicas, Avenida Universidad 655 Colonia Santa María Ahuacatitlán, Cuernavaca, Morelos 62100, México

© 2022 The Author(s). Published with license by Taylor & Francis Group, LLC.
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

fragmented health system. In this policy report, we review Mexico's policy efforts to guarantee access to medicines during three previous national administrations, and examine major health system changes introduced by the current government of President Andrés Manuel López Obrador (known as AMLO) (2018–2024), which have created significant setbacks in access to medicines. These recent changes, we argue, are having important consequences in the levels of satisfaction of health care users and citizens, household expenditure on health, and important health conditions. We suggest key lessons for Mexico and other countries seeking to improve pharmaceutical procurement.

Procurement of Medicines in Mexico 2000-2018

Mexico implemented several institutional changes, during three national administrations (from 2000 to 2018), to improve the strategic purchase of medicines throughout the national health system, especially with regard to the purchase of single-sourced medicines, a system for the consolidated procurement of multi-source, non-patented medicines, and efforts to improve transparency in public sector procurement of medicines.

Selection: Mexico has a Basic List of Health Inputs (*Cuadro Básico y Catálogo de Insumos para la Salud* or CBCI) that has provided a reference point for many selection decisions by public health institutions since 1983. The institutional list of medicines for the Mexican Institute for Social Security (IMSS) (*Cuadro Básico institutional*) was a driving force supporting improvements on how inclusion decisions were made since the late 2000s. An important reform in 2011 strengthened the use of health technology assessment in decisions about what to include in CBCI (see: *Reglamento Interior de la Comisión Interinstitucional del CBCI,* DOF 22/06/2011); however, many problems remained with CBCI processes and in priority-setting across the health sector.[6] In addition, each public subsystem used its own process of medicines selection for inclusion in its benefit package and respective treatment protocols that guided the use of the covered medicines, creating problems of inconsistency, lack of coordination, and duplication of analyses. For instance, SP included two lists of services and medicines: first, a set of 294 essential services for conditions of high incidence and relatively low cost, with services delivered in outpatient clinics and general hospitals (known as CAUSES, or *Catálogo Universal de Servicios de Salud*); and second, a package of 66 high-cost interventions for conditions with potentially catastrophic financial consequences for families delivered in accredited specialty units and financed by a special fund (FPGC or *Fondo de Protección contra Gastos Catastróficos*).[5]

Single-source medicines procurement: In 2008, the national government created the Coordinating Commission for Negotiating the Price of Medicines and Other Inputs (CCNPM) for the purchase of single-source medicines (typically high price products) involving the two major social security systems and Mexico's national Ministry of Health.[7] The new commission operated through a technical secretary and three advisory groups: clinical, economic and intellectual property advisory committees.[8] This commission used collaboration among several public health institutions to negotiate lower prices for patented medicines, which resulted in substantial savings in public pharmaceutical expenditure. According to the annual reports of the CCNPM, the reported savings for the period 2008–2011 of negotiations amounted to $355 million USD in procurements due to lower prices.[7] A recent analysis calculated a total savings from 2014 to 2019 of $236.5 billion[a] USD from reduced prices by CCNPM.[9]

Multi-source medicines procurement and distribution: Since 2006, the Mexican Institute for Social Security (IMSS)—the main social security agency in Mexico and the largest buyer of medical supplies in Latin America—began to consolidate the purchases of multi-source medicines for its own state delegations and high specialty medical units around the country, setting maximum reference prices for public procurement. Later on, other social security health institutions joined IMSS consolidated purchases. Despite significant savings, problems arose with noncompliance of providers, and bid rigging or collusion in purchases. Consequently, IMSS procurement practices were revised in 2011 to align with OECD guidelines against collusion.[10]

In 2013, the Mexican government established a system for the pooled procurement of non-patented medicines in the public sector. This new system was coordinated by IMSS to purchase medicines and other health inputs on behalf of all other social security institutions, the national Ministry of Health and most state ministries of health. The purposes of this system (known as *Compra consolidada-IMSS*) were: to select trustworthy manufacturers with high-quality products; to purchase the most cost-effective medicines in the right amounts; and to include distribution in the purchase negotiations in order to assure consistent and timely deliveries throughout Mexico.[11] This system for purchase of multi-source medicines used the consolidated market power of the various health subsystems to obtain

better prices and produce savings in medicine purchases. A recent analysis calculated a total savings from 2014 to 2019 of $1,219 billion USD from reduced prices negotiated by IMSS.[9] The majority of purchases in this system were concentrated on ten distributors, with 70% focused on only three. This concentration was criticized as corruption and driving up costs and was used by the AMLO government to justify the 2019 reforms.

Transparency: Mexico established an electronic system known as *CompraNet* for managing public tenders for goods and services in 1996. *CompraNet* includes medicines purchases, and registers all tenders, awarded manufacturers and distributors, product prices and volumes.[12] In addition, IMSS created a website (http://compras.imss.gob.mx) to provide information on IMSS purchases and assure its accountability, and this website was expanded to include data for *Compra consolidada-IMSS*. The website contains information on purchases from 2011 onward, and from 2012–2018 it contained information on purchases by other institutions through the consolidated purchases system. The information currently available online, however, is no longer fully updated on medicines and health inputs purchased by IMSS, significantly reducing transparency in procurement.

These various efforts helped improve Mexico's procurement processes for medicines from 2000 to 2018 through strategies such as development of a skilled workforce in procurement and strengthening centralized procurement information and dashboards, although various problems remained.[10,13] There were signs of collusion in the bidding procedures among providers, and a high though decreasing proportion of pharmaceuticals were purchased through direct awards. The changes in the procurement system, however, gradually increased the availability of medicines in public institutions (although gaps still remained, reflected in high levels of out-of-pocket spending for medicines).[9,14]

Procurement of Medicines in Mexico after 2018

After the presidential elections of December 2018, the new administration (under AMLO, who campaigned strongly against corruption) moved to eliminate SP. In November 2019 the Mexican Congress (with a majority of seats held by AMLO's party) voted to remove SP from the General Health Law and establish the Health Institute for Welfare (INSABI), in order to create a new "system of universal and free access to health services and associated medicines for the population that lacks social security."[15,16] INSABI then began to negotiate agreements with Mexico's 32 states to provide these services through the program of "Health Care and Free Medicines," although eight states refused to sign agreements to join INSABI (as of February 2020).[17] The creation of INSABI was accompanied by major changes in the selection, procurement and distribution of medicines.

Selection: The decree to eliminate SP and establish INSABI explained the "what and the why" of the reform for free medicines, but it omitted the "how" this reform would be achieved. With regard to medicines selection, in contrast to SP, INSABI did not include a specific benefit package, thereby creating ambiguity about which medicines would be provided by the government as part of the right to health and free medicines. There was an effort to revise and update the CBCI, but it was not linked to a revision of treatment protocols, nor to an explicit list of medicines at each level of healthcare.

Procurement: Between 2019 and 2022, the institutional responsibility for public procurement of medicines changed three times:

First, the Ministry of Financing (MoF): The Federal Administration Law, passed by the Mexican Congress in December of 2018, stated that only the MoF could be in charge of all pooled procurement in the public sector at the federal level, in order to improve public benefits and savings.[18]In May 2019, the MoF announced that the new model for pooled procurement of medicines would be launched in the second half of 2019 with the purchase of various groups of pharmaceuticals.[19] The new procurement procedure, however, did not work as expected, and no offers for 62% of the tendered pharmaceutical codes were received.[20]

Second, the Administrative Office of the MoF: In October 2019, the government published an agreement that transferred the responsibility for the pooled purchasing of medicines in the public sector to the Administrative Office of the MoF (*Oficialía Mayor*) and later announced the beginning of the pooled procurement of medicines and other health inputs for 2020.[21] On November 29, 2020, the CCNPM was dismantled.[22] The MoF, however, lacked the expertise and experience needed for the purchase of medicines, and their first public call for the pooled procurement of medicines for 2020 was delayed.[23] In the initial months of 2020, major shortages of all types of medicines were detected in the health facilities of all public health agencies throughout the country, confronting families with major challenges in obtaining and financing their health care.[24]

Due to this failure in public procurement of medicines and the emergence of the Covid-19 pandemic, the legal framework underwent additional modifications. In order to facilitate the purchase of the vaccines and medicines needed to meet the demands of the pandemic, the Law of Acquisitions, Leases and Services in the Public Sector was amended so that the procurement of medicines would be exempt

from the bidding process.[25] Then, the regulatory framework was revised to allow the purchase and import of pharmaceutical products not registered with the Mexican regulatory agency (COFEPRIS) if the products were approved by certain foreign regulatory agencies (such as the Swiss or US FDA) or received prequalification by the World Health Organization, in order to facilitate the purchase of pharmaceuticals in the global market and resolve shortages in Mexico.[26]

Third, the United Nations Office of Project Services (UNOPS): On July 31, 2020, Mexico's president announced the transfer of the full responsibility for pooled procurement of medicines in the public sector from the MoF to the United Nations Office for Project Services (UNOPS).[27,28] INSABI would sign a contract with UNOPS in the amount of $6.8 billion USD for the purchase of medicines for the period 2021–2024. The initial results of this new procurement model were not encouraging. The call for pooled procurement, originally planned for October, was delayed until December 2020.[29] UNOPS declared that the procurement process would conclude in May 2021 and that public health agencies would have to turn to emergency procurements through direct awards to meet the medicines demand for the first half of 2021. In June 2021, UNOPS declared that 55% of the requested pharmaceutical codes had been declared empty, with no tenders received.[30] UNOPS had managed only two previous projects for the public purchase of medicines on a much smaller scale (in Guatemala and Honduras), and even in those two cases UNOPS was unable to fill about 35% of the drug codes requested.[28] In the final days of November, INSABI announced its intention of organizing two independent tenders of medicines for 2022 using the Mexican public procurement system of *CompraNet* for various health agencies.[31]

Distribution: In March 2019, through a presidential decree, the three most important private companies responsible for about 70% of the distribution of health inputs in Mexico were banned from participating in the procurement and distribution of medicines.[32] The government argued that these companies were abusing the public purse, a charge of corruption that was never proved.[14] This decision to ban the three companies triggered an acute shortage of prescription medicines, particularly cancer drugs.[33] The government then sought to reorganize the distribution of medicines in public health agencies to address these shortages. (IMSS later resumed purchases from one of these big distributors, Maypo. In 2020, IMSS purchased $55.8 billion USD worth of medicines, with 97% through direct-award contracts.[34])

Distribution via Birmex: On July 31, 2020, with the purpose of dismantling what the federal authorities called the "distribution oligopoly," the government decided to hand over this responsibility to BIRMEX, a public corporation previously in charge of the production of vaccines but with no experience in the distribution of pharmaceuticals.[35] This new distribution system was unable to resolve the serious problems with access to medicines, since BIRMEX declared that the new system would not be in place until the second half of 2022.[36]

Distribution via the military: On November 11, 2021, the President of Mexico publicly complained about the lack of medicines in public institutions and ordered an immediate solution to this problem.[37] Ten days later he stated that, if necessary, the military would take over the responsibility for the national distribution of medicines in public institutions.[38] In the same presentation, he reiterated his goal of guaranteeing the right to free medicines and health services, using the examples of Sweden, Norway, and Denmark. A few days later, a general in retirement was appointed head of BIRMEX.[39] It has not been clear, however, what role the military took in the distribution of medicines or what percentage of medicines for public facilities would be distributed by them.

Transparency: An audit, implemented by the Ministry of Public Function in 2021, determined that INSABI had no defined procedures to do market research or processes to plan, program and supervise the safety of pharmaceuticals and their delivery to state ministries of health. In December 2021, legislators in the Mexican Congress demanded more transparency in the processes and contracts negotiated by UNOPS, which reached approximately $6 billion USD from 2021–2024.[40] UNOPS promised on its website to "help maximize the efficiency, transparency, and effectiveness of the procurement of medicines in Mexico,"[41] but the agency has so far not publicly presented unit prices or quantities of different medicines purchased.

Effects of the Changes in the Procurement of Medicines in Mexico

The major institutional changes in Mexico's procurement of medicines from 2019 to 2022 have had significant consequences in the availability of medicines in public institutions, the cost of pharmaceuticals, the satisfaction of health care users, private expenditure on health, and health conditions.

Availability of medicines in public institutions: Information gathered by several NGOs in Mexico indicates that the availability of many types of medicines (cancer drugs, insulin, non-Covid vaccines) has

decreased significantly in the past two years. . The number of monthly unfulfilled prescriptions at IMSS, for example, grew from less than 300 thousand in January of 2017 to over a million and a half in May of 2021.[42] But the problem of unfulfilled prescriptions is not limited to IMSS; it is reported to affect all states, all public institutions and all levels of care (Figure 1).[12,43]

Cost of pharmaceuticals: The lack of medicines in public institutions due to problems in the pooled procurement of pharmaceuticals has increased the number of emergency procurements through direct awards (not through competitive bidding), which are associated with higher purchase prices and higher corruption risks. Public funds used in direct purchase contracts of pharmaceuticals increased from an annual average of $1,075 billion USD in the period 2013–2018 to $1,558 billion USD in 2019.[19] In addition, there emerged in 2019 a new category of purchases, "other procurements (*otras contrataciones*)," which represented 80% of the government's consolidated procurement of medicines in 2020 (Figure 2).[19] It is not clear whether these purchases involved competitive bidding or direct awards.

Satisfaction of healthcare users: Patients' complaints about the lack of medicines in public health care facilities and public demonstrations to demand an immediate solution to medicine stock-outs have surged. According to the NGO Zero Shortage, complaints about medicines shortages in public facilities have increased dramatically in the past two years. These

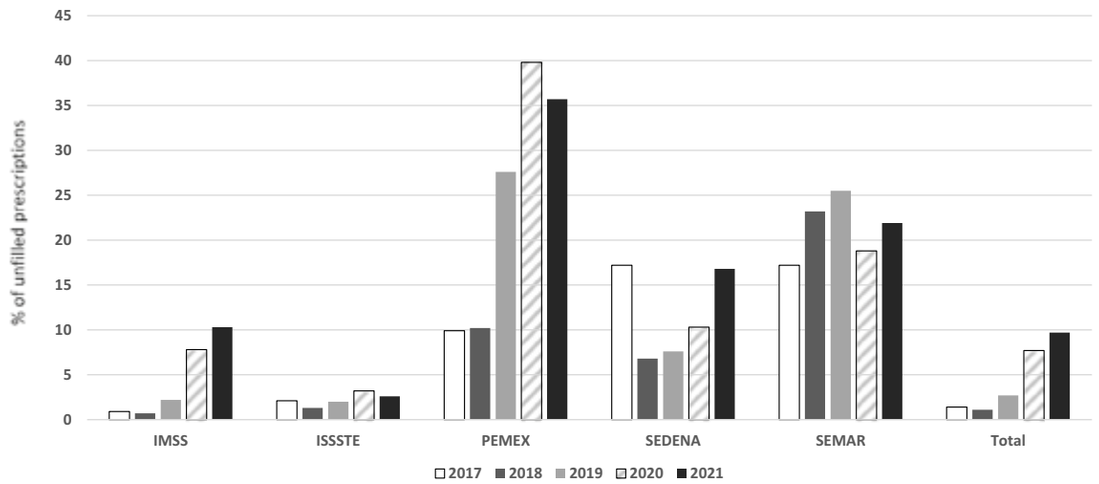


Figure 1. Percentage of unfilled prescriptions by beneficiary in the main Mexican social security institutions (2017-2021).[44]

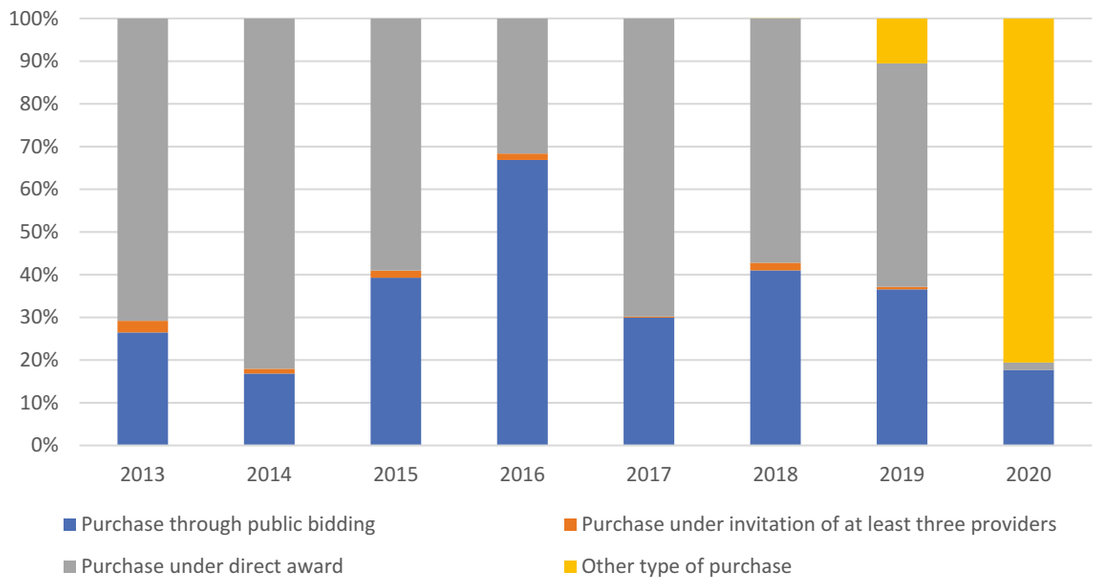


Figure 2. Percentage of purchase (value) of pharmaceuticals in the public sector, Mexico 2013-2020.[45]

shortages have been denounced in criminal courts, the National Human Rights Commission and the Inter-American Human Rights Commission by several civil society organizations, most notably, the National Movement for Health/Parents of Children with Cancer, and Zero Impunity.[24]

Demonstrations demanding solutions to the lack of medicines have also been organized in several states since the beginning of 2021. In November 2021, a group of parents of children with cancer promised to organize demonstrations at the Mexico City International Airport every Tuesday until the shortage of cancer drugs is solved.[46] The Mexican government responded negatively to the demonstrations.[47]

The lack of medicines in public institutions, in addition to the interruption of public services during the COVID-19 pandemic, has forced patients and their families to buy the pharmaceuticals they need in private pharmacies, increasing out-of-pocket expenditure in health. According to the National Income and Expenditure Household Survey 2020, the average quarterly expenditure in health in Mexican households increased 40% in the past two years, from $45 USD (901 constant MXN pesos) in 2018 to $63 USD (1,266 constant MXN pesos) in 2020.[48] Household expenditure on medicines, which grew by 68% (from $18.80 USD [376 MXN pesos] to $31.60 USD [632 MXN pesos]) in this same period, was the health item with the highest increase.[49]

Private expenditure on health and health conditions: There are no formal studies to date on the effects of the scarcity of medicines in public facilities on the treatments and outcomes of specific diseases. However, various groups of parents of children with cancer have publicly criticized the lack of cancer drugs in public hospitals as having negative impacts on the survival rates of children with leukemia and other cancers.[50] These medicines are expensive and low-income families cannot afford them. It is plausible that shortages of other essential medicines are producing increases in out-of-pocket expenditures on pharmaceuticals and reductions in treatment effectiveness.

The abrupt changes in institutions and procedures related to medicines procurement had important consequences on the availability and access to medicines in Mexico. The COVID-19 pandemic exacerbated the impact through medicine price inflation and global raw material shortages.[51] Two possible solutions have been discussed in policy and academic circles: 1) the reestablishment of the CCNPM and the original system for the consolidated procurement of non-patented medicines in the public sector, and 2) the creation of an international commission of experts in pharmaceutical policies to identify alternatives. Most recently, the AMLO government has proposed plans to assign the Mexican General Comptroller Office (*Secretaría de la Función Pública*) to control all pooled procurement procedures in Mexico, although the legislature has not approved this measure yet.[52]

The risk of not taking immediate action is that the current acute crisis of medicines shortages, high product prices, and rising household out-of-pocket expenditures will continue for several more years. The financial support of the AMLO administration to the health sector has been poor, in spite of the major cuts implemented by the previous administration between 2015 and 2018 and the occurrence of the Covid-19 pandemic. There have been basically no changes in the resources allocated to the health sector for the period 2018–2021.[53] These conditions are likely to have major consequences for the health and wellbeing of the Mexican population, especially the more vulnerable groups.

Recently, in March 2022, the AMLO government announced a national initiative to provide health services for the population without social security through an expansion of the program known as *IMSS-Bienestar* (to replace services provided by INSABI), directed at marginalized communities.[54] The program is expected to federalize state hospitals and primary health centers. These changes in the health system could have significant implications for procurement practices, as the changes are implemented in participating states across Mexico.

Lessons

This policy report on the evolution of measures taken by Mexican federal government to procure medicines shows that the changes introduced by the administration of President López Obrador, while intended to improve public procurement for the health system, were unfortunately poorly planned, abruptly implemented, and frequently ineffective or counterproductive. Instead of improving procurement, the measures undermined the strategic purchasing capacity of public institutions, produced major shortages of critical health inputs, and generated dissatisfaction and increased out-of-pocket expenditure among health care users. Analyzing and understanding the political economy of these policy changes represents an important research question, but it is beyond the scope of this policy review paper.

Many countries in Latin America are seeking to increase their organizational capacity of strategic purchasing of health products (especially medicines) as

a core function of their health systems, in order to expand health coverage and increase both efficiency and equity.[55] The following lessons about institutional capacity, from the recent experiences in Mexico, may be relevant for other countries:

(1) *Technical expertise for procurement*: Public procurement of pharmaceuticals is a complex process that demands organizational capacity to assure effective and efficient purchases. Any changes in this procedure should be made ensuring sufficient technical and managerial expertise and experience are provided, especially regarding the processes of national and international tenders of public procurement that involve complex assessments of price, quality, payment, delivery, and registration, and potential trade-offs among these different features. Building the necessary technical and managerial expertise takes time and effort, and requires institutional investment in retaining valued employees. Institutional capacity in these areas can be quickly undermined through abrupt institutional changes, as illustrated by the recent Mexican changes.

(2) *Procurement in the health system*: Public procurement of medicines is only one dimension assuring access to pharmaceuticals in the health system, and it needs to be closely linked to the processes of financing, selection, and distribution. Financing implies the mobilization of sufficient resources to purchase the medicines needed by the population. Selection requires highly technical expertise from the clinical, pharmacovigilance, and pharmacoeconomic fields to assure that medicine lists reflect population health needs. Timely distribution demands strong logistics. Disruptions in any of these processes can create serious shortages of medicines, which has significant economic and health consequences. Centralization of public procurement without selection and distribution backups, as was done in Mexico, creates risks for the entire national health system and for families with health problems.

(3) *Transparency of public procurement*: Transparency is a crucial characteristic of public procurement procedures. The purchase of pharmaceuticals using public resources should be a transparent and fair transaction between buyers and providers, with public information on prices, quality, and competitive bidding, and trade-offs made in purchase decisions. In pooled procurement processes in the public sector, open competition and clear rules should be guaranteed to allow all actors—including the industry—to collaborate and achieve public goals.

(4) *Accountability for public procurement*: The procurement of medicines represents one of the main categories of expenditure of public health systems, and mechanisms of accountability should exist to assure that corrupt practices are identified and corrected, and that charges of corruption are substantive and fair. With the absence of effective public institutions to exercise this kind of accountability in the current political context of Mexico, civil society organizations have emerged to help identify and analyze problems in the procurement of medicines. More broadly, Mexico needs mechanisms to monitor and evaluate public procurement processes on a regular basis (ideally by an independent organization), and changes to procurement procedures should be measured and publicly discussed, alongside recommendations for improvement.

Note

[a]. Mexican pesos were converted into US dollars using the average exchange rate obtained from Banco de Mexico (https://www.banxico.org.mx/tipcamb/main.do?page=tip&idioma=en#). For calculations to convert Mexican pesos to US dollars, please contact the authors for the supplementary file.

Disclosure of Potential Conflicts of Interest

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

References

1. Organization WH. Sustainable Development Goals (SDGs). [accessed May 4, 2022] https://www.who.int/health-topics/sustainable-development-goals#tab=tab_1.
2. Wirtz VJ, Hogerzeil HV, Gray AL, Bigdeli M, de Joncheere CP, Ewen MA, Gyansa-Lutterodt M, Jing S, Luiza VL, Mbindyo RM, et al. Essential medicines for universal health coverage. Lancet. 2017;389 (10067):403–76. doi:10.1016/S0140-6736(16)31599-9.

3. Roberts MJ, Hsiao W, Berman P, Reich MR. Getting health reform right: a guide to improving performance and equity. New York: Oxford University Press; 2004.
4. Cashin C, Nakhimovsky S, Laird K, Strizrep T, Cico A, Radakrishnan A , et al. Strategic health purchasing progress: a framework for policymakers and practitioners. Bethesda (MD): Health Finance & Governance Project, Abt Associates Inc; 2018.
5. Moye-Holz D, Dreser A, Gómez-Dantés O, Wirtz VJ. Promoting access to cancer medicine in Mexico: *seguro popular* key policy components. In: Babar Z, editor. Global Pharmaceutical Policy. Singapore, Asia: Palgrave Macmillan; 2020. p. 177–222.
6. Barraza Lloréns M, González Pier E, Giedion U. Retos para la priorización en salud en México. Giedion U, Distrutti M, Muñoz A, Pinto D, Díaz A, editors. La priorización en salud paso a paso: cómo articulan sus procesos México, Brasil y Colombia. Washington (DC): Inter-American Development Bank; p. 15–89 ; April 2018 accessed April 30, 2022. http://dx.doi.org/10.18235/0001092
7. Gómez-Dantés O, Wirtz V, Reich MR, Terrazas P, Ortiz M. A new entity for the negotiation of public procurement prices for patented medicines in Mexico. Bull WHO. 2012;90(10):788–92. doi:10.2471/BLT.12.106633.
8. Reglas de Operación de la Comisión Coordinadora para la Negociación de Preciso de Medicamentos y Otros Insumos para la Salud. Diario Oficial de la Federación 2008;June. [accessed October 9, 2021] http://www.dof.gob.mx/nota_detalle.php?codigo=5298148&fecha=07/05/2013
9. Llanos Guerrero A Eficiencia del gasto en salud: compra consolidada de medicamentos. Centro de Investigación Económica y Presupuestaria; March 16, 2021. [accessed February 11, 2022]. https://ciep.mx/4Ys7
10. OECD. Public procurement review of the Mexican institute of social security: enhancing efficiency and integrity for better health care. Paris, France: OECD, 2012. https://www.oecd.org/gov/budgeting/49408672.pdf [accessed February 12, 2022]
11. BID. Que financiar en salud y a qué precio. [accessed October 13, 2021] https://learning.edx.org/course/course-v1:IDBx+IDB25x+3T2020/home
12. Secretaría de Hacienda y Crédito Público, Mexico. Compranet. [accessed February 11, 2022] https://compranet.hacienda.gob.mx/web/login.html.
13. OECD. Second public procurement review of the Mexican institute of social security (IMSS). Paris, France, OECD, 2018. [accessed May 1, 2022] https://www.oecd-ilibrary.org/sites/9789264190191-en/index.html?itemId=/content/publication/9789264190191-en [accessed May 1, 2022]
14. Agren D. Lack of medicines in Mexico. Lancet. 2021;398(10297):289–90. doi:10.1016/S0140-6736(21)01656-1.
15. Diario Oficial de la Federación. Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley General de Salud y de la Ley de los Institutos Nacionales de Salud. November 29, 2019. [accessed September 8, 2021]. http://www.dof.gob.mx/nota_detalle.php?codigo=5580430&fecha=29/11/2019.
16. Reich MR Restructuring health reform, Mexican style, Health Syst Reform 2020;6. 1–11. [accessed February 11, 2022] https://www.tandfonline.com/doi/epub/10.1080/23288604.2020.1763114?needAccess=true
17. Cruz-Martínez A. Se han adherido al INSABI 24 entidades. La Jornada; February 12, 2020. [accessed May 2, 2022] https://www.jornada.com.mx/2020/02/12/politica/004n1pol
18. Diario Oficial de la Federación. Decreto por el que se reforman, adiciona y derogan diversas disposiciones de la Ley Orgánica de la Administración Pública Federal. November 30, 2018. [accessed November 30, 2021]. http://dof.gob.mx/nota_detalle.php?codigo=5545330&fecha=30/11/2018
19. Tron Zuccher D, Melgoza Rocha A. Operación Desabasto: así se detonó la escasez de medicamentos. Impunidad Cero. February 2021. [accessed February 11. 2022] https://www.impunidadcero.org/articulo.php?id=146&t=operacion-desabasto
20. Rodríguez A Compra de medicamentos para 2020 tiene riesgo de quedar desierta, alerta la consultora INEFAM. El Financiero; October 18, 2019. [accessed November 10, 2021] https://www.elfinanciero.com.mx/empresas/compra-de-medicamentos-para-2020-tiene-riesgo-de-quedar-desierta-alerta-la-consultora-inefam.
21. Diario Oficial de la Federación. Acuerdo por el que se delegan facultades a la persona titular de la Oficialía Mayor de la Secretaría de Hacienda y Crédito Público, en materia de compras consolidadas. [accessed November 10, 2021] https://dof.gob.mx/nota_detalle.php?codigo=5575191&fecha=11/10/2019.
22. Charvel S, Cobo F El responsable es el estado. Letras Libres 2021; 23. 26–29. [accessed February 11, 2022] https://letraslibres.com/wp-content/uploads/2021/10/dosier-cobo-mex.pdf.
23. Rodríguez A Se retrasa proceso de compra de medicamentos del gobierno. El Financiero; December 16, 2019. [accessed November 10, 2021] https://www.elfinanciero.com.mx/empresas/se-retrasa-proceso-de-compra-de-medicamentos-del-gobierno
24. Melgoza-Rocha A La lucha por la vida: el drama de las familias frente al desabasto. Letras Libres 2021; 23. 16–21. [accessed February 11, 2022] https://letraslibres.com/uncategorized/la-lucha-por-la-vida-el-drama-de-las-familias-frente-al-desabasto .
25. IMCO. Dictamen de reforma a la Ley de adquisiciones contiene importantes retrocesos en materia de excepciones a la licitación en el sector salud. IMCO; November 18, 2020 [Accessed February 1st, 2022] https://imco.org.mx/dictamen-de-reforma-a-ley-de-adquisiciones-contiene-importante-retroceso-en-materia-de-excepciones-a-la-licitacion-en-sector-salud.
26. Animal P. Gobierno permitirá importación de medicamentos aunque no tengan registro sanitario en México. Animal Político; January 29, 2020. [accessed February 1st, 2022] https://www.animalpolitico.com/2020/01/gobierno-importacion-medicamento-china-india-desabasto.
27. UNOPS. UNOPS apoyará las adquisiciones públicas de medicamentos en México. [accessed November 10, 2021]. https://www.unops.org/es/news-and-stories/news/unops-to-support-national-medicine-procurement-in-mexico.

28. Ibarra LG, Méndez J, Flores K A revolution in medicines procurement in Mexico: a discussion about the new UNOPS model; 20 Nov 2020. [accessed November 10, 2021]. https://geneva-network.com/event/a-revolution-in-medicines-procurement-in-mexico-a-discussion-about-the-new-unops-model.
29. Vega A UNOPS abre proceso de licitación de medicinas; abasto iniciará en mayo de 2021. Animal Político. [[accessed November 15, 2021]. https://www.animalpolitico.com/2020/12/unops-abrelicitacion-medicinas-abasto-2021.
30. Cruz-Martínez A Concluye la licitación de medicamentos con 45% de las claves asignadas. La Jornada; June 15, 2021. [accessed November 15, 2021]. https://www.jornada.com.mx/2021/06/15/politica/012n1pol.
31. Convoca C-MA INSABI a licitación pública de medicamentos. La Jornada; November 25, 2021. [accessed November 25, 2021]. https://www.jornada.com.mx/notas/2021/11/24/politica/publica-insabi-convocatoria-a-licitacion-publica-de-medicamentos.
32. Hernández L Gobierno veta a principales proveedores de fármacos. El Economista; April 9, 2019. [accessed November 10, 2021] https://www.eleconomista.com.mx/empresas/Gobierno-veta-a-principales-proveedores-de-farmacos-20190409-0038.html.
33. Staff F. Pisa, la empresa que causó la crisis por falta de medicamentos contra el cáncer. January 23, 2020. [accessed February 11, 2022] https://www.forbes.com.mx/pisa-la-empresa-que-causo-la-crisis-por-falta-de-medicamentos-contra-el-cancer.
34. Maldonado M Zoe Robledo revive a distribuidoras vetadas por AMLO. El Universal; April 13, 2020. [accessed Feb 20, 2022] https://www.eluniversal.com.mx/opinion/mario-maldonado/zoe-robledo-revive-distribuidoras-vetadas-por-amlo
35. Urrutia A, Muñoz AE Nueva empresa pública distribuirá medicinas. La Jornada; July 31, 2020. [accessed November 10, 2021] https://www.jornada.com.mx/ultimas/politica/2020/07/31/nueva-empresa-publica-distribuira-medicinas-amlo-8577.html.
36. Badillo D Distribución de medicamentos, un sistema dislocado. El Economista; July 18, 2021. [accessed November 15, 2021]. https://www.eleconomista.com.mx/politica/Distribucion-de-medicamentos-un-sistema-dislocado-20210718-0002.html.
37. Jornada L. AMLO reclama a funcionarios del sector salud por falta de medicamentos. La Jornada; November 11, 2021. [accessed November 15, 2021]. https://www.jornada.com.mx/notas/2021/11/10/politica/amlo-a-gabinete-ya-no-hay-excusas-para-desabasto-de-medicinas.
38. Universal E. AMLO analiza encargar a las Fuerzas Armadas la distribución de medicina. El Universal; November 23, 2021. [accessed November 23, 2021]. https://www.eluniversal.com.mx/nacion/amlo-analiza-encargar-las-fuerzas-armadas-la-distribucion-de-medicinas .
39. Guerrero C, Hernández E Militar encabezará reparto de medicinas. Reforma; November 30, 2021. [accessed November 30, 2021]. https://www.reforma.com/encabezara-militar-reparto-de-medicinas/ar2306639?v=7.
40. Cámara de Diputados. Piden diputados del PAN al Inai obligar a la UNOPS a transparentar los procesos de compra de medicamentos y material médico ante desabasto. Notilegis. Nota No 1383. Dec 14, 2021. [accessed February 14, 2022]. https://comunicacionsocial.diputados.gob.mx/index.php/notilegis/piden-diputados-del-pan-al-inai-obligar-a-la-unops-a-transparentar-los-procesos-de-compra-de-medicamentos-y-material-medico-ante-desabasto#gsc.tab=0
41. UNOPS. A Powerful Tool for Change. [accessed Feb 17, 2022]. https://www.unops.org/news-and-stories/stories/a-powerful-tool-for-positive-change.
42. Corral Y, Casteñada Prado A El desabasto de medicamentos existe y reconocerlo es el primer paso para solucionarlo. Nexos, October 28, 2021. [accessed November 15, 2021]. https://anticorrupcion.nexos.com.mx/el-desabasto-de-medicamentos-existe-y-reconocerlo-es-el-primer-paso-para-solucionarlo.
43. Chávez V. Suman 30 entidades 4504 quejas por falta de medicamentos. El Financiero; July 25, 2021. [accessed January 25, 2022] https://www.elfinanciero.com.mx/nacional/2021/07/26/suman-30-entidades-4504-quejas-por-falta-de-medicamentos.
44. Corral Y and Casteñada Prado A. El desabasto de medicamentos existe y reconocerlo es el primer paso para solucionarlo. Nexos, October 28, 2021. [accessed October 28, 2021]. https://anticorrupcion.nexos.com.mx/el-desabasto-de-medicamentos-existe-y-reconocerlo-es-el-primer-paso-para-solucionarlo.
45. Tron Zuccher D, Megloza Rocha A. Operación Desabasto. Así se detonó la escasez de medicamentos. Impunidad Cero, February 2021, pp. 32–33. [Accessed November 11, 2021]. https://www.impunidadcero.org/articulo.php?id=146&t=operacion-desabasto.
46. Vega A Padres de niños con cáncer protestarán en el aeropuerto cada martes mientras haya desabasto de medicamentos. Animal Político; November 9, 2021. [accessed January 25, 2022] https://www.animalpolitico.com/2021/11/padres-ninos-cancer-protesta-desabasto-medicamentos .
47. Garduño R Acusa AMLO a opositores de protestas de padres de niños con cáncer. La Jornada; November 25, 2021. [accessed January 26, 2021] https://www.jornada.com.mx/notas/2021/11/25/politica/acusa-amlo-a-opositores-de-protestas-de-padres-de-ninos-con-cancer.
48. INEGI. Encuesta Nacional de Ingreso y Gasto de los Hogares 2020 (ENIGH). Presentation July 28, 2021. [accessed September 9, 2021]. https://www.inegi.org.mx/contenidos/programas/enigh/nc/2020/doc/enigh2020_ns_presentacion_resultados.pdf
49. Llanos Guerrero A, Méndez Méndez JS Interrupción de los servicios de salud por Covid-19: implicaciones en el gasto de bolsillo. Ciudad de Mexico: Centro de Investigación Económica y Presupuestaria; August 13, 2021. [accessed February 12, 2022]. https://ciep.mx/IX9Q.
50. El Universal. Falta de medicamentos oncológicos, cuestión de vida o muerte: madres de familia. El Universal; June 30, 2021. [accessed September 9, 2021] https://www.eluniversal.com.mx/nacion/ninos-con-cancer-falta-de-medicamentos-oncologicos-cuestion-de-vida-o-muerte-madres-de.

51. Bookwalter CM Drugs shortages amid the Covid-19 pandemic. US Pharmacist; February 12, 2021. [accessed May 4. 2022] https://www.uspharmacist.com/article/drug-shortages-amid-the-covid19-pandemic.
52. Arista L AMLO: la SFP se encargará de las compras consolidadas y auditor secretarías. [accessed May 1st, 2022] https://politica.expansion.mx/presidencia/2021/07/29/amlo-la-sfp-se-encargara-de-las-compras-consolidadas-y-auditar-secretarias
53. Fundar. Presupuesto para el sector salud en tiempos de Covid-19. [accessed May 2, 2022]. https://fundar.org.mx/pef2022/presupuesto-para-el-sector-salud-en-tiempos-de-covid-19.
54. El Ceo. Lanza IMSS Bienestar nuevo programa de salud para personas sin seguro social; March 15, 2022. [accessed April 30, 2022]. https://elceo.com/politica/lanzan-imss-bienestar-nuevo-programa-de-salud-para-personas-sin-seguridad-social/
55. Vargas V, Rama M, Singh R Pharmaceuticals in Latin America and the Caribbean: players, access, and innovation across diverse models. Technical Report [accessed February 11, 2022] https://www.researchgate.net/publication/358103501_Pharmaceuticals_in_Latin_America_and_the_Caribbean_Players_Access_and_Innovation_Across_Diverse_Models.

European Geriatric Medicine
https://doi.org/10.1007/s41999-019-00181-5

RESEARCH PAPER

Potentially inappropriate prescribing to older adults in ambulatory care: prevalence and associated patient conditions

Dolores Mino-León[1] · Sergio Sánchez-García[2] · Liliana Giraldo-Rodríguez[3] · Hortensia Reyes-Morales[4]

Received: 11 December 2018 / Accepted: 8 March 2019
© European Geriatric Medicine Society 2019

Key summary points

Aim To analyze potentially inappropriate prescribing (PIP), its prevalence and patient conditions associated with this phenomenon, in a cohort of older adults receiving outpatient care.

Findings 41.8% of participants had at least one PIP. The most frequently identified PIPs involved nonsteroidal anti-inflammatory drugs (NSAIDs) and glibenclamide; clonazepam in patients with cognitive impairment; and interactions of warfarin with NSAIDs. Frailty, polypharmacy, lower educational levels, and taking hypoglycemics, antiasthmatics, nervous system or gastrointestinal disease drugs, anti-inflammatories-antirheumatics and analgesics were associated with PIP.

Message PIP, and association with medical and nonmedical factors in outpatient treatment highlights the need to take actions to improve drug treatment quality.

Abstract

Purpose To analyze potentially inappropriate prescribing (PIP), its prevalence and patient conditions associated with this phenomenon, in a cohort of older adults receiving outpatient care in Mexico.

Methods Data from 1252 adults ≥ 60 years of age, from primary care centers were analyzed. Information included sociodemographic data, medications, chronic diseases, polypharmacy (≥ 5 medications), functional dependence, cognitive impairment and frailty. Three logistic regression models were employed to identify associations between PIP (according to the Beers criteria) and different variable combinations.

Results A total of 41.8% of participants had at least one PIP. The most frequently identified PIPs involved nonsteroidal anti-inflammatory drugs (NSAIDs) and glibenclamide; clonazepam in patients with cognitive impairment; and interactions of warfarin with NSAIDs. In the multivariate analyses, Model 1 showed that frailty and polypharmacy were associated with PIP. In Model 2, only polypharmacy was associated with PIP. For Model 3, lower educational levels, taking hypoglycemics, nervous system disease drugs, antiasthmatics, gastrointestinal disease drugs and anti-inflammatories-antirheumatics and analgesics, were associated with PIP.

Conclusion PIP is common in outpatient treatment of health care services in Mexico. Its association with medical and nonmedical factors highlights the need to improve drug treatment quality focused on implementation of effective strategies, such as educative interventions, electronic medication safety alerts, and inclusion of pharmacists in the health team.

Keywords Inappropriate prescribing · Geriatric health services · Drug prescription · Quality of care

✉ Hortensia Reyes-Morales
hortensia.reyes@insp.mx

[1] Clinical Epidemiology Research Unit, Hospital de Especialidades, Centro Médico Nacional Siglo XXI, Instituto Mexicano del Seguro Social, Mexico City, Mexico

[2] Epidemiology and Health Services Research Unit, Aging Area, Centro Médico Nacional Siglo XXI, Instituto Mexicano del Seguro Social, Mexico City, Mexico

[3] Research Division, Demographic Epidemiology and Social Determinants Department, Instituto Nacional de Geriatría, Secretaría de Salud, Mexico City, Mexico

[4] Center for Health Systems Research, Instituto Nacional de Salud Pública, Avenida Universidad #655, Santa María Ahuacatitlán, 62100 Cuernavaca, Morelos, Mexico

Published online: 26 March 2019

Mino-León D, Sánchez-García S, Giraldo-Rodríguez L, Reyes-Morales H. Potentially inappropriate prescribing to older adults in ambulatory care: prevalence and associated patient conditions. Eur Geriatr Med. 2019;10(4):639-647. https://doi.org/10.1007/s41999-019-00181-5

Introduction

Between 2000 and 2050, the proportion of the global population that is 60 or older will double from 11% to 22%. In absolute numbers, this group will rise from 605 million people to two billion, representing an important demographic transformation [1]. Aging is a gradual and inevitable process that manifests itself primarily in morphological and physiological changes, making this transformation even more relevant. The International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) regards older adults as a special population **"**which differs of younger adults in terms of their comorbidity, polypharmacy and pharmacokinetics, as well as their increased vulnerability to adverse drug reactions" [2].

Multimorbidity leads to prescribing more medications, which favors polypharmacy and in turn raises the risk of potentially inappropriate prescribing (PIP) and adverse health events. Excess polypharmacy (≥ 10 medications) is considered a 5-year mortality predictor [3–5]. Inappropriate medications definition comprises those drugs for which the risk of suffering a resultant adverse event is higher than the clinical benefit. Inappropriate medications also include frequent use of medications, use of medications for longer than indicated, use of medications with a high-risk of drug–drug or drug–disease interactions, duplication of medications or prescribing drugs from the same therapeutic group, and not prescribing drugs that clinically should be prescribed [6–8].

Several studies have documented high rates of inappropriate prescribing in older adults, such as prolonged use of psycholeptic medications and/or nonsteroidal anti-inflammatory drugs (NSAIDs), which can reach 40% [6, 9, 10]. In addition, recent data have shown that almost half of older adults may be at risk of polypharmacy, PIP, and drug–drug interactions [11]. However, it has also been reported that polypharmacy does not necessarily increase the risk of PIP and that strategies directed at reducing polypharmacy to decrease PIP have not been successful [12].

The identification of factors associated with PIP is relevant for designing strategies focused on ensuring patients' access to potentially beneficial treatments, and protecting patients from inappropriate prescribing and its potential harm [13]. To contribute to improving knowledge in this field for Mexico, the goal of this study was to analyze PIP, its prevalence and patient conditions associated with this phenomenon, in a cohort of older adults receiving outpatient care.

Methods

A secondary analysis was conducted using the database of the study "Cohort of obesity, sarcopenia and frailty of older Mexican adults" (COSFOMA) (Cohorte de obesidad, sarcopenia y fragilidad de adultos mayores Mexicanos) [14]. We analyzed data from 1252 adults aged 60 and older, who attended one of the 48 primary care centers known as Family Medicine Units (Unidades de Medicina Familiar [UMFs]) in Mexico City, during 2014. These centers are part of the Mexican Social Security Institute (Instituto Mexicano del Seguro Social [IMSS]), a public institution that provides medical care to over half of the country's population.

Variables

Based on the information contained in the original database through patients' self-reporting, the following data were extracted to integrate the variables for this study.

Sociodemographic data: sex, age, partnership status, and level of education (basic education ≤ 10 years, and higher education > 10 years).

Medications

Drugs regularly used for the treatment of chronic diseases. Medications were registered by the name of their active ingredient and then classified according to the anatomical therapeutic chemical (ATC) classification system [15].

Polypharmacy

Defined as the use of five or more medications [16].

Potentially inappropriate prescribing

From the list of medications, identification of drugs included in the 2015 Beers Criteria [17], and the application of the criteria for potential drug–disease or drug–syndrome interactions, based on the clinical information of each patient.

Chronic diseases

Hypertension, heart failure, type 2 diabetes, hypothyroidism, rheumatoid arthritis, psychosis, peptic ulcers, neoplasms, chronic obstructive pulmonary disease (COPD),

cerebrovascular disease, Parkinson's disease, neuritis, peripheral vascular disease, chronic kidney failure, anemia, and hepatopathy. Criteria for major depression were established using the center for epidemiologic studies depression scale-revised (CESD-R) [18].

Multimorbidity

Defined as the presence of two or more chronic diseases.

Other clinical conditions

Functional dependence, evaluated using the Lawton–Brody instrumental activities of daily living scale [19]; cognitive impairment determined by a mini-mental examination score of ≤ 23 [20]; and frailty, classified into three categories using the Fried frailty criteria (frail, pre-frail, and robust) [21].

Statistical analysis

A descriptive analysis of the sociodemographic variables, chronic diseases, medications, PIP and other clinical conditions was performed. Bivariate analysis was conducted by calculating the crude odds ratio (OR) and 95% confidence intervals (95% CI) to identify the association between the independent variables and PIP. A correlation matrix was used to detect collinearity among independent variables. Then, three multivariate binary logistic regression analyses with the significant variables from the bivariate analysis were conducted, employing the strategy of incremental variable inclusion into each model (forward step). First, sociodemographic variables were introduced, along with polypharmacy, multimorbidity and other clinical conditions (functional dependence, cognitive deterioration, and frailty) (Model 1). Next, the multimorbidity variable was replaced by the individual diseases that were statistically significant in the crude analysis (Model 2). Finally, the same variables from Model 2 were introduced, and medications that had significance in the crude analysis were incorporated, and the polypharmacy variable was removed (Model 3). A p value < 0.05 was considered statistically significant. The analyses were conducted using version 11 of the statistical software STATA (StataCorp, Texas).

Results

Women comprised 59.9% of the 1252 cases analyzed. The average age of the total sample was 68.4 ± 7.1. According to the Beers Criteria, 524 (41.8%) participants had at least one PIP. The subgroup of patients with PIP was characterized by higher proportion of women; higher age; more patients living alone; lower educational levels; higher proportion of patients with functional dependence, cognitive deterioration and frailty; and higher number of cases with multimorbidity and polypharmacy (Table 1).

Table 1 Characteristics of study population

Characteristics	All *n* = 1252 *n* (%)	Non-PIP** *n* = 728 *n* (%)	PIP *n* = 524 *n* (%)
Sex*			
Female	750 (59.9)	410 (56.3)	340 (64.9)
Male	502 (40.1)	318 (43.7)	184 (35.1)
Age* (years)	68.4 ± 7.1	68.0 ± 7.0	69.1 ± 7.4
Partnership status*			
Does not live alone	744 (59.4)	459 (63.0)	285 (54.4)
Lives alone	508 (40.6)	269 (37.0)	239 (45.6)
Education (years)*			
≤ 10 years	646 (51.6)	348 (47.8)	298 (56.9)
> 10 years	606 (48.4)	380 (52.2)	226 (43.1)
Functional dependency*			
Yes	437 (34.9)	227 (31.2)	210 (40.1)
No	815 (65.1)	501 (68.8)	314 (59.9)
Cognitive impairment*			
Yes	304 (24.3)	157 (21.6)	147 (28.1)
No	948 (75.7)	571 (78.4)	377 (71.9)
Frailty*			
Robust	482 (38.5)	306 (42.0)	176 (33.6)
Pre-frail	630 (50.3)	364 (50.0)	266 (50.8)
Frail	140 (11.2)	58 (8.0)	82 (15.6)
Multimorbidity*			
Yes	233 (18.6)	112 (15.4)	121 (23.1)
No	1019 (81.4)	616 (84.6)	403 (76.9)
Polypharmacy*			
Yes	142 (11.3)	26 (3.6)	116 (22.1)
No	1110 (88.7)	702 (96.4)	408 (77.9)

*$p < 0.05$

***PIP* potentially inappropriate prescribing

Patients with PIP had higher rates of depression (35.5%), hypertension (24.6%) and type 2 diabetes (18.9%). These patients more frequently reported taking medications across all of the groups of drugs analyzed in this study, especially anti-inflammatory-antirheumatic and analgesic drugs (75.4%), antihypertensive drugs (50.6%), and hypoglycemic agents (29.6%) (Table 2). Of the medications to be avoided according to the Beers Criteria, nonsteroidal anti-inflammatory drugs (NSAIDs) and glibenclamide were the most frequently prescribed. The main drug–disease interaction was the use of clonazepam in patients with cognitive impairment (3.2%), and the principal drug–drug interaction was the use of warfarin together with NSAIDs (Table 3). The crude odds ratio

Table 2 Chronic diseases and drugs by self-reporting

Diseases and drugs (ATC classification)	Non PIP* $n=728$ n (%)	PIP $n=524$ n (%)	p
Depression	186 (25.5)	186 (35.5)	0.001
Hypertension	142 ((19.5)	129 (24.6)	0.031
Type 2 diabetes	87 (11.9)	99 (18.9)	0.001
Rheumatoid arthritis	24 (3.3)	28 (5.3)	0.085
Hypothyroidism	18 (2.5)	13 (2.5)	>0.05
Neoplasia	4 (0.5)	9 (1.7)	0.051
Peptic ulcers	6 (0.8)	8 (1.5)	>0.05
Heart failure	4 (0.5)	5 (1.0)	>0.05
Chronic pulmonary disease	6 (0.8)	5 (1.0)	>0.05
Peripheral vascular disease	6 (0.8)	5 (1.0)	>0.05
Anemia	4 (0.5)	4 (0.8)	>0.05
Cerebrovascular disease	6 (0.8)	4 (0.8)	>0.05
Chronic kidney failure	5 (0.7)	4 (0.8)	>0.05
Parkinson´s disease	2 (0.3)	3 (0.6)	>0.05
Neuritis	3 (0.4)	1 (0.2)	>0.05
Liver diseases	5 (0.7)	1 (0.2)	>0.05
Psychosis	1 (0.1)	1 (0.2)	>0.05
Drugs			
Anti-inflammatories-antirheumatics and analgesics (M01, N02)	21 (2.9)	395 (75.4)	0.000
Antihypertensives (C02)	219 (30.1)	265 (50.6)	0.000
Medications used for diabetes (A10)	104 (14.3)	155 (29.6)	0.000
Drugs used for nervous system diseases (N03, N05, N06)	23 (3.2)	103 (19.7)	0.000
Lipid modifying agents (C10)	82 (11.3)	97 (18.5)	0.000
Antianemic preparations (B03)	29 (4.0)	55 (10.5)	0.000
Alimentary tract and metabolism drugs (A02, A03)	24 (3.3)	45 (8.6)	0.000
Drugs used for bone diseases (A11, G03, M05)	22 (3.0)	28 (5.3)	0.041
Drugs for obstructive airways diseases (R03)	7 (1.0)	22 (4.2)	0.000
Antithrombotic agents and vasoprotectives (B01, C01, C05)	11 (1.5)	21 (4.0)	0.010
Antineoplastic and immunomodulating agents (H02, L01, L04, M01)	10 (1.4)	18 (3.4)	0.019

*_PIP_ Potentially inappropriate prescribing

for all variables showed significant association with PIP, except for rheumatoid arthritis or neoplasms (Table 4). Multivariate models with adjusted associations resulted in the following: in Model 1, polypharmacy (OR 6.88, CI 95% 4.38–10.81, $p<0.001$) and the clinical condition of frailty (OR 1.60, CI 95% 1.03–2.47, $p=0.037$) were statistically associated with PIP. In Model 2, only the polypharmacy variable (OR 6.81, CI 95% 4.33–10.75, $p<0.001$) was associated with PIP. Model 3 demonstrated several variables that were statistically associated with PIP, including lower educational levels (OR 1.56, CI 95% 1.03–2.43 $p=0.047$) and taking hypoglycemic agents (OR 9.27, CI 95% 5.06–16.98, $p<0.001$), nervous system disease drugs, including psycholeptics, psychoanaleptics and antiepileptics (OR 25.66, CI 95% 13.54–48.63, $p<0.001$); antiasthmatic drugs (OR 5.18, CI 95% 1.35–19.80, $p=0.016$); gastrointestinal disease-related drugs (OR 4.92, CI 95% 2.10–11.56, $p<0.001$); and anti-inflammatories, antirheumatics and analgesics (OR 278.07, CI 95% 152.61–505.66, $p<0.001$) (Table 5).

Discussion

The use of inappropriate medications in older patients is a public health problem that affects the morbidity and mortality of this population. The results of this study show that certain groups of drugs have higher probabilities of being inappropriately prescribed to elderly patients, regardless of clinical conditions such as frailty, cognitive impairment or

Table 3 Potentially inappropriate prescribing, according to Beers criteria (2015)

Beers criteria	*n* = 524 *n* (%)
Chronic use of NSAIDs*	388 (74.0)
Glibenclamide**	84 (54.2)
Clonazepam	47 (9.0)
Proton-pump inhibitors for > 8 weeks unless for high-risk patients	38 (7.3)
Cognitive impairment/clonazepam	17 (3.2)
History of gastric or duodenal ulcer/NSAIDs without gastroprotective agent	8 (1.5)
Heart failure/NSAIDs	4 (0.8)
Cognitive impairment/imipramine	4 (0.8)
Cognitive impairment/paroxetine	4 (0.8)
Oral or parenteral corticosteroids/NSAIDs without gastroprotective agent	3 (0.6)
Chronic kidney disease/NSAIDs	2 (0.4)
Warfarin/NSAIDs	2 (0.4)
Cognitive impairment/diazepam	1 (0.2)

**NSAIDs* nonsteroidal anti-inflammatory drugs

**Denominator corresponds to all patients receiving hypoglycemic agents ($n = 155$)

Table 4 Risk factors for having a potentially inappropriate prescription

Risk factor (reference)	OR (CI 95%)	*p**
Sex: female (male)	1.43 (1.14–1.81)	0.002
Age	1.02 (1.01–1.04)	0.008
Partnership status: lives alone (does not live alone)	1.43 (1.14–1.80)	0.002
Education (years): ≤ 10 (> 10)	1.44 (1.15–1.81)	0.002
Functional dependency: yes (no)	1.48 (1.17–1.87)	0.001
Cognitive impairment: yes (no)	1.42 (1.09–1.84)	0.008
Frailty: (robust)		
Pre-frail	1.27 (1.00–1.62)	0.054
Frail	2.46 (1.67–3.61)	0.000
Multimorbidity: yes (no)	1.65 (1.24–2.20)	0.001
Polypharmacy: yes (no)	7.68 (4.93–11.95)	0.000
Diseases: yes (no)		
Hypertension	1.35 (1.03–1.77)	0.031
Type 2 diabetes	1.72 (1.26–2.35)	0.001
Rheumatoid arthritis	1.66 (0.95–2.89)	0.076
Neoplasia	3.16 (0.97–10.33)	0.056
Depression	1.60 (1.26–2.05)	0.000
Medications: yes (no)		
Medications used for diabetes	2.52 (1.91–3.33)	0.000
Antianemic preparations	2.83 (1.78–4.50)	0.000
Antihypertensives	2.38 (1.88–3.00)	0.000
Drugs used for bone diseases	1.81 (1.02–3.20)	0.041
Drugs used for nervous system diseases	7.50 (4.70–11.97)	0.000
Lipid modifying agents	1.79 (1.30–2.46)	0.000
Drugs for obstructive airway diseases	4.51 (1.91–10.65)	0.001
Alimentary tract and metabolism drugs	3.11 (1.90–5.07)	0.000
Antineoplastic and immunomodulating agents	2.55 (1.17–5.58)	0.019
Antithrombotic and vasoprotective agents	2.72 (1.30–5.69)	0.008
Anti-inflammatories-antirheumatics and analgesics	103.09 (63.96–166.16)	0.000

*$p < 0.05$ = Statistical significance

Table 5 Multivariate logistic regression analyses for having a potentially inappropriate prescription

Risk factor (reference)	Model 1 OR (CI 95%)	p*	Model 2 OR (CI 95%)	p*	Model 3 OR (CI 95%)	p*
Sex: female (male)	1.25 (0.96–1.62)	0.099	1.24 (0.95–1.61)	0.112	0.98 (0.62–1.54)	0.914
Age	1.00 (0.98–1.02)	0.989	1.00 (0.98–1.02)	0.897	0.99 (0.96–1.02)	0.525
Partnership status: lives alone (does not live alone)	1.24 (0.95–1.60)	0.115	1.25 (0.96–1.63)	0.095	1.06 (0.68–1.68)	0.789
Education (years) ≤ 10 (> 10)	1.23 (0.96–1.58)	0.100	1.20 (0.94–1.55)	0.148	1.56 (1.03–2.43)	0.047
Functional dependency: yes (no)	1.13 (0.86–1.47)	0.379	1.12 (0.86–1.47)	0.392	1.04 (0.65–1.67)	0.874
Cognitive impairment: yes (no)	1.13 (0.84–1.51)	0.423	1.11 (0.83–1.49)	0.473	1.63 (0.99–2.70)	0.056
Frailty: (robust)						
Pre-frail	1.03 (0.79–1.33)	0.838	0.99 (0.76–1.30)	0.961	1.06 (0.67–1.68)	0.793
Frail	1.60 (1.03–2.47)	0.037	1.45 (0.91–2.30)	0.115	0.88 (0.40–1.92)	0.741
Multimorbidity: yes (no)	1.23 (0.90–1.68)	0.189	–	–	–	–
Polypharmacy: yes (no)	6.88 (4.38–10.81)	0.000	6.81 (4.33–10.71)	0.000	–	–
Diseases: yes (no)						
Hypertension			0.98 (0.72–1.33)	0.893	0.88 (0.50–1.57)	0.671
Type 2 diabetes			1.40 (0.98–1.98)	0.064	0.92 (0.48–1.77)	0.800
Depression			1.21 (0.91–1.61)	0.194	0.73 (0.44–1.20)	0.213
Medications: yes (no)						
Medications used for diabetes					9.27 (5.06–16.98)	0.000
Antianemic preparations					0.84 (0.36–1.94)	0.676
Antihypertensives					0.94 (0.59–1.49)	0.777
Drugs used for bone diseases					2.22 (0.79–6.26)	0.131
Drugs used for nervous system diseases					25.66 (13.54–48.63)	0.000
Lipid modifying agents					1.28 (0.74–2.24)	0.382
Drugs for obstructive airway diseases					5.18 (1.35–19.80)	0.016
Alimentary tract and metabolism drugs					4.92 (2.10–11.56)	0.000
Antineoplastic and immunomodulating agents					0.27 (0.07–1.09)	0.065
Antithrombotic and vasoprotective agents					1.00 (0.29–3.48)	0.997
Anti-inflammatories-antirheumatics and analgesics					278.07 (152.61–505.66)	0.000

*$p < 0.05$ = Statistical significance

functional dependence, conditions that make patients more vulnerable to suffering negative clinical outcomes (falls, hospitalizations, disabilities, and death) [21]. In addition, the strong association of polypharmacy with PIP documented raises this risk even more.

A relevant finding is that almost half of the patients were exposed to PIP, which is higher than the rate reported by other authors [22, 23]. Therefore, avoiding inappropriate medications should be a primary objective of medical attention for the elderly [3–5]; selection, dose and duration of pharmacological treatments should be carefully evaluated in clinical practice, particularly in patients suffering cognitive impairment (including the use of central action drugs that often produce chronic or acute behavioral and cognitive alterations) [24].

Regarding specific medications the results also showed that, according to the Beers Criteria, prescriptions for NSAIDs and glibenclamide are the most frequently identified PIPs. This pattern differs slightly from other reports that have found that hypnotic, sedative and anxiolytic drugs are the most frequently identified, present in more than two-thirds of PIP [22, 23, 25–30]. In Mexico, glibenclamide is included in the reference drug list of the IMSS; as a result, it is frequently prescribed to vulnerable elderly patients. Something similar occurs in Brazil, where this drug is included in the list of essential medicines, and the Brazilian government distributes it in primary care facilities [31]. Therefore, improving practitioners' prescription quality should include actions related to the medications that are sold or included in health institutions' medication formularies or the reference drug list.

Proton-pump inhibitors are high-risk medications that were found associated to PIP. The belief that these drugs are simply "gastric protection" has increased their use, and their treatment is often prolonged. Appropriate evaluation for bleeding risk factors before prescribing these drugs should be essential, as well as continuing periodic clinical and prescription review to define the need to discontinue

their use. The risk of serious adverse events, such as community-acquired pneumonia, bone fractures, *Clostridium difficile* infection, hypomagnesemia and kidney damage, is well known [32]. This finding is consistent with the global increase in the prescription of these medications, and points to a clear need to create strategies that guide doctors in their correct use, such as technology and multifaceted educative interventions, among others [33–36].

Older adults have high rates of pain syndromes and osteoarticular disease, for which anti-inflammatory-antirheumatic and analgesic medications (ATC M01 and N02) are frequently prescribed. The elevated proportion of patients with PIP who were prescribed these medicines is noteworthy in this study, and the proportion identified is higher than that mentioned in the literature (e.g., 18% in Brazil [37] and 31.4% in Portugal [22]) The overprescribing of NSAIDs among the patients in Mexico is a problem that has been repeatedly reported in the literature [10, 38]. It is also a problem for which the health system has not yet incorporated strategies to contain, regardless of the existing evidence of effective interventions in this context [39, 40].

Antiasthmatic drugs (R03) were also associated with PIP, with theophylline being one of the most frequently prescribed drugs of this group. This PIP illustrates the risk to which patients are exposed: theophylline affects the central nervous system (insomnia) and raises the risk of arrhythmias. Finally, other examples of PIPs identified in this study include the use of anticholinergic drugs that reduce urine flow and cause urinary retention, the use of nonselective beta-blockers in patients with chronic obstructive pulmonary disease (COPD), and the use of systemic corticosteroids instead of inhaled corticosteroids for the treatment of patients with moderate-to-severe COPD [14, 41].

Among sociodemographic characteristics that showed association with PIP, low educational level has also been described in other studies [26–28]. This finding suggests that patients' levels of awareness of their health and treatment, as well as their expectations, may play relevant roles in the prescriptions they receive. Patients with higher educational levels may have better access to information about medications and thus be more active in doctor-patient communication, exercising an influence over their prescription. Our results confirmed that even when controlling for the number of diseases, the effect of education level with respect to PIP held steady, as another study also showed [26]. This suggests that patients' educational levels can influence the quality of the medications they receive, independent of their clinical conditions, and highlights the importance of considering educational levels when designing intervention strategies to improve drug prescription to older adults.

A strength of this study is that the findings show the need in Mexico for having an updated reference drug list containing drugs that have been shown to be effective, safe and at reasonable costs; furthermore, the inclusion of the pharmacist in the health teams, and the modernization of the clinical record with electronic alerts for enhance medication use should be considered as part of the national drug policy.

Some limitations must be recognized. The secondary data analysis did not allow the application of more sensitive PIP criteria such as STOPP/START [42]. In addition, although these results are not generalizable to other contexts, they are representative of primary care users in a public institution that covers nearly 50% of the population of Mexico [43].

Conclusion

This study complement information regarding the potentially inappropriate use of medications in ambulatory healthcare provided to elderly patients. The significant association of medical and nonmedical factors with PIP highlights the need to take actions to improve the quality of drug treatment, through strategies directed both at the education of patients and the training of doctors in geriatric pharmacotherapy. Including the participation of the pharmacist in the care of elderly patients, computer support for decision-making in clinical practice should also be considered in those Countries in which these strategies have not been implemented. Additional actions must seek to reduce the risks of adverse health events by strengthening effective, educational communication with elderly patients.

Acknowledgements We thank the authorities and staff of the South and North Delegations of the Mexican Institute of Social Security (IMSS) of Mexico City for their support for this study.

Funding This work was funded by the Sector Fund Health Research and Social Security SS/IMSS/ISSSTE/CONACYT (México) SALUD-2013-01-201112, and the Fund for the Promotion of Health Research, IMSS, FIS/IMSS/PROT/PRIO/13/024. The funders had no role in the design, execution, analysis and interpretation of data, or writing of the study.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval The original study was approved by the National Scientific Research Committee (*Comité Nacional de Investigación Científica*) and the Health Research Ethics Committee (*Comité de Ética en Investigación en Salud*), both part of the IMSS, with registry number 2012-785-067. This article does not contain any studies with human participants performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the original study (COSFOMA). The data used in this study were anonymous.

References

1. World Health Organization (2014) Ageing and life-course. Facts about ageing. http://www.who.int/ageing/about/facts/es/. Accessed 13 Nov 2018
2. International Conference on Harmonisation ICH Harmonised tripartite guideline studies in support of special populations: Geriatrics E7 (1993). http://www.ich.org/fileadmin/Public_Web_Site/ICH_Products/Guidelines/Efficacy/E7/Step4/E7_Guideline.pdf. Accessed 13 Nov 2018
3. Field TS, Gurwitz JH, Avorn J, McCormick D, Jain S, Eckler M, Benser M, Bates DW (2001) Risk factors for adverse drug events among nursing home residents. Arch Intern Med 161:1629–1634
4. Herr M, Robine JM, Pinot J, Arvieu JJ, Ankri J (2015) Polypharmacy and frailty: prevalence, relationship, and impact on mortality in a French sample of 2350 old people. Pharmacoepidemiol Drug Saf 24:637–646
5. Jyrkkä J, Enlund H, Korhonen MJ, Sulkava R, Hartikainen S (2009) Polypharmacy status as an indicator of mortality in an elderly population. Drugs Aging 26:1039–1048
6. Beers MH, Ouslander JG, Fingold SF, Morgenstern H, Reuben DB, Rogers W, Zeffren MJ, Beck JC (1992) Inappropriate medication prescribing in skilled-nursing facilities. Ann Intern Med 117:684–689
7. World Health Organization (2011) Teacher's guide to good prescribing. France: World Health Organization. http://apps.who.int/medicinedocs/documents/s15940e/s15940e.pdf. Accessed 13 Nov 2018
8. Hamilton HJ, Gallagher PF, OMahony D (2009) Inappropriate prescribing and adverse drug events in older people. BMC Geriatr 9:5
9. Ble A, Masoli JA, Barry HE, Winder RE, Tavakoly B, Henley WE, Kuchel GA, Valderas JM, Melzer D, Richards SH (2015) Any versus long-term prescribing of high risk medications in older people using 2012 Beers Criteria: results from three cross-sectional samples of primary care records for 2003/4, 2007/8 and 2011/12. BMC Geriatr 15:146
10. Doubova SV, Torres-Arreola LP, Rosas-Carrasco O, Pérez-Cuevas R (2007) Quality of medication prescribing for elderly patients with non-malignant pain syndrome attending family medicine clinics. Rev Invest Clin 59:428–436
11. Novaes PH, da Cruz DT, Lucchetti ALG, Leite ICG, Lucchetti G (2017) The, "iatrogenic triad": polypharmacy, drug-drug interactions, and potentially inappropriate medications in older adults. Int J Clin Pharm 39:818–825
12. Carey IM, De Wilde S, Harris T, Victor C, Richards N, Hilton SR, Cook DG (2008) What factors predict potentially inappropriate primary care prescribing in older people? Analysis of UK primary care patient record database. Drugs Aging 25:693–706
13. Davies EA, O´Mahony MS (2015) Adverse drug reactions in special populations—the elderly. Br J Clin Pharmacol 80:796–807
14. Sánchez-García S, García-Peña C, Salvà A, Sánchez-Arenas R, Granados-García V, Cuadros-Moreno J, Velázquez-Olmedo LB, Cárdenas-Bahena Á (2017) Frailty in community-dwelling older adults: association with adverse outcomes. Clin Interv Aging 12:1003–1011
15. World Health Organization (2018) Collaborating centre for drug statistics methodology. Structure and principles. https://www.whocc.no/atc/structure_and_principles/. Accessed 13 Nov 2018
16. Hovstadius B, Petersson G (2012) Factors leading to excessive polypharmacy. Clin Geriatr Med 28:159–172
17. American Geriatrics Society (2015) Beers criteria update expert panel. American geriatrics society 2015 updated beers criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2015(63):2227–2246
18. Eaton W, Muntaner C, Smith C, Tien A (1998) Revision of the center for epidemiologic studies depression (CES-D) scale. Johns Hopkins University, Prevention Center, Baltimore
19. Lawton MP, Brody EM (1969) Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist 9:179–186
20. Folstein MF, Folstein SE, McHugh PR (1975) Mini-mental state: a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 12:189–198
21. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, Seeman T, Tracy R, Kop WJ, Burke G, McBurnie MA (2001) Cardiovascular health study collaborative research group. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 56:M146–M156
22. Eiras A, Teixeira MA, González-Montalvo JI, Castell MV, Queipo R, Otero Á (2016) Consumption of drugs in over 65 in Porto (Portugal) and risk of potentially inappropriate medication prescribing. Aten Primaria 48:110–120
23. Parodi-López N, Villán-Villán YF, Granados-Menéndez MI, Royuela A (2014) Potentially inappropriate prescribing in patients over 65 years-old in a primary care health centre. Aten Primaria 46:290–297
24. Robles-Bayón A, Gude-Sampedro F (2014) Inappropriate treatments for patients with cognitive decline. Neurologia 29:523–532
25. Gnjidic D, Hilmer SN, Blyth FM, Naganathan V, Cumming RG, Handelsman DJ, McLachlan AJ, Abernethy DR, Banks E, Le Couteur DG (2012) High-risk prescribing and incidence of frailty among older community-dwelling men. Clin Pharmacol Ther 91:521–528
26. Haider SI, Johnell K, Weitoft GR, Thorslund M, Fastbom J (2009) The influence of educational level on polypharmacy and inappropriate drug use: a register-based study of more than 600,000 older people. J Am Geriatr Soc 57:62–69
27. Lechevallier-Michel N, Gautier-Bertrand M, Alpérovitch A, Berr C, Belmin J, Legrain S, Saint-Jean O, Tavernier B, Dartigues JF, Fourrier-Réglat A (2005) 3C study group. Frequency and risk factors of potentially inappropriate medication use in a community-dwelling elderly population: results from the 3C study. Eur J Clin Pharmacol 60:813–819
28. Laurier C, Moride Y, Kennedy WA (2002) Health survey data on potentially inappropriate geriatric drug use. Ann Pharmacother 36:404–409
29. United Nations Political declaration and Madrid international plan of action on ageing (2002) New York: United Nations. https://www.un.org/development/desa/ageing/madrid-plan-of-action-and-its-implementation.html. Accessed 13 Nov 2018
30. Chang CB, Yang SY, Lai HY, Wu RS, Liu HC, Hsu HY, Hwang SJ, Chan DC (2015) Application of three different sets of explicit criteria for assessing inappropriate prescribing in older patients: a nationwide prevalence study of ambulatory care visits in Taiwan. BMJ Open 5:e008214
31. Oliveira MG, Amorim WW, de Jesus SR, Heine JM, Coqueiro HL, Passos LC (2015) A comparison of the Beers and STOPP criteria for identifying the use of potentially inappropriate medications among elderly patients in primary care. J Eval Clin Pract 21:320–325
32. Hernández-Arroyo MJ, Díaz-Madero A, Enríquez-Gutiérrez E, Teijeiro-Bermejo MC, Sáez-Rodríguez E, Gutiérrez-Martín MR (2018) Analysis of the use of proton pump inhibitors in primary health care. Semergen 44:316–322
33. Savarino V, Dulbecco P, de Bortoli N, Ottonello A, Savarino E (2017) The appropriate use of proton pump inhibitors (PPIs): need for a reappraisal. Eur J Intern Med 37:19–24
34. Dalton K, O'Brien G, O'Mahony D, Byrne S (2018) Computerised interventions designed to reduce potentially inappropriate

prescribing in hospitalised older adults: a systematic review and meta-analysis. Age Ageing 47:670–678
35. Straand J, Fetveit A, Rognstad S, Gjelstad S, Brekke M, Dalen I (2006) A cluster-randomized educational intervention to reduce inappropriate prescription patterns for elderly patients in general practice–the prescription peer academic detailing (Rx-PAD) study [NCT00281450]. BMC Health Serv Res 6:72
36. Gray SL, Hart LA, Perera S, Semla TP, Schmader KE, Hanlon JT (2018) Meta-analysis of interventions to reduce adverse drug reactions in older adults. J Am Geriatr Soc 66:282–288
37. Lutz BH, Miranda VIA, Bertoldi AD (2017) Potentially inappropriate medications among older adults in Pelotas, Southern Brazil. Rev Saude Publica 51:52
38. Luna-Medina MA, Peralta-Pedrero ML, Pineda-Aquino V, Durán-Fernández YC, Avalos-Mejía A, Aguirre-García Mdel C (2013) Inappropriate prescribing in older adults with chronic-degenerative disease. Rev Med Inst Mex Seguro Soc 51:142–149
39. Doubova SV, Mino-León D, Reyes-Morales H, Flores-Hernandez S, del Torres-Arreola LP, Pérez-Cuevas R (2010) Effects of two educational programmes aimed at improving the utilization of non-opioid analgesics in family medicine clinics in Mexico. J Eval Clin Pract 16:716–723
40. Doubova SV, Reyes-Morales H, Jiménez-Balderas FJ, Camargo-Coronel A, Navarro-Pureco S, del Torres-Arreola LP, Mino-León D, Olivares-Santos RA (2008) Guide for appropriate using of the non-opioid analgesics in the management of pain. Rev Med Inst Mex Seguro Soc 46:523–532
41. Poudel A, Ballokova A, Hubbard RE, Gray LC, Mitchell CA, Nissen LM, Scott IA (2016) Algorithm of medication review in frail older people: focus on minimizing the use of high-risk medications. Geriatr Gerontol Int. 16:1002–1013
42. O'Mahony D, O'Sullivan D, Byrne S, O'Connor MN, Ryan C, Gallagher (2015) STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. Age Ageing 44:213–218
43. Gutiérrez JP, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L, Romero-Martínez M, Hernández-Ávila M (2012) Encuesta nacional de salud y nutrición. Resultados nacionales. Instituto Nacional de Salud Pública (MX), Cuernavaca

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

PLOS ONE

RESEARCH ARTICLE

Access to Medicines by Seguro Popular Beneficiaries: Pending Tasks towards Universal Health Coverage

Edson Servan-Mori[1], Ileana Heredia-Pi[1], Julio Montañez-Hernandez[1], Leticia Avila-Burgos[1], Veronika J. Wirtz[1,2]*

1 Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Morelos, Mexico,
2 Department for Global Health, Boston University School of Public Health, Boston, United States of America

* vwirtz@bu.edu

CrossMark
click for updates

OPEN ACCESS

Citation: Servan-Mori E, Heredia-Pi I, Montañez-Hernandez J, Avila-Burgos L, Wirtz VJ (2015) Access to Medicines by Seguro Popular Beneficiaries: Pending Tasks towards Universal Health Coverage. PLoS ONE 10(9): e0136823. doi:10.1371/journal.pone.0136823

Editor: Abdisalan Mohamed Noor, Kenya Medical Research Institute - Wellcome Trust Research Programme, KENYA

Received: August 14, 2014

Accepted: August 10, 2015

Published: September 25, 2015

Copyright: © 2015 Servan-Mori et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: a) Our data do not contain identifying or sensitive subject information. b) There are no ethical restrictions on requesting access to the data from INSP. c) All data files are available from the web page http://ensanut.insp.mx/ but user name and password need to be requested via an email from the INSP. d) The authors do not own or manage the data; ownership is with INSP which provides data access upon request.

Funding: The authors have no support or funding to report.

Abstract

Objective

In the context of aiming to achieve universal health coverage in Mexico, this study compares access to prescribed medicines (ATPM) between Seguro Popular (SP) and non-SP affiliated outpatient health service users.

Materials and Methods

ATPM by 6,123 users of outpatient services was analyzed using the National Health and Nutrition Survey 2012. Adjusted bi-probit models were performed incorporating instrumental variables.

Results

17.3% of SP and 10.1% of the non-SP population lacked ATPM. Two-thirds of all outpatient SP and 18.5% of all outpatient non-SP received health services at Ministry of Health facilities, among whom, 64.6 and 53.6% of the SP and non-SP population respectively reported ATPM at these facilities. Lack of medicines in health units, chronic health problems (compared to acute conditions) and prescription $\geq$3 medicines were risk factors for non-ATPM. Adjusted models suggest that when using Ministry of Health services, the SP population has a higher probability of ATMP compared to the non-SP population.

Conclusion

Given the aspirations of achieving universal health coverage in Mexico, it is important to increase ATPM in Ministry of Health facilities thereby ensuring basic rights to health care are met.

Serván-Mori E, Heredia-Pi I, Montañez-Hernández J, Ávila-Burgos L, Wirtz VJ. Access to medicines by Seguro Popular beneficiaries: pending tasks towards universal health coverage. PLoS ONE. 2015;10(9):e0136823. https://doi.org/10.1371/journal.pone.0136823

Competing Interests: The authors have declared that no competing interests exist.

Introduction

Medicines are an essential element of a functioning health systems. Appropriate use of medicines contributes to the prevention, treatment and eradication of various diseases [1,2]. Access barriers to medicines limits the therapeutic capabilities of health personnel and jeopardizes patient health via reduced health service utilization as well as imposing financial burdens on users, which are often catastrophic [3].

Within resource constrained settings, low availability of medicines in health care units is particularly related to shortcomings in facility management, including through the purchasing, distribution or storage processes, as well as lack of training for personnel and insufficient investment in medicines in general [3]. Consequently, ensuring equitable and affordable access to medicines is an ongoing challenge for health systems.

In Mexico, the Seguro Popular (SP) has been implemented as a means to ensure timely and equitable access to medicines for poor populations [4–7]. SP is the main component of the Social Protection System in Health, which additionally includes the Protection Fund Against Catastrophic Medical Expenses and the Health Insurance Siglo XXI (previously known as, Insurance for a New Generation,). The SP was introduced in 2003 with the aim of ensuring the provision of health services and providing financial protection through a voluntary insurance to the populations that, due to their employment status (unemployed and self-employed), are excluded from social security [4–6].

The financial model input of the SP consists of federal government and state aid, with contributions from members according to their economic capacity [4]. Since its inception, the number of SP members has grown exponentially from approximately 2 million in 2003 to nearly 53 million by the end of 2012 [8,9]. In addition, funds allocated to SP have experienced a significant growth to 1,300%, from USD 382.6 million in 2004 to USD 5,087.6 million in 2012 (with an annual average/affiliated of USD 100) [10], of which up to 30% annually is intended for the purchase of medicines [7,9]. Currently, SP ensures access to a package of interventions called Universal Health Services Catalog (CAUSES), including 284 interventions and 522 medicines [10–13].

Despite SP's growing financial protection, supply of medicines in Mexico's public health units remains a barrier to accessing care [14,15]. Recent studies suggest that in 2008 the SP population had an 86.7% probability of incurring expenditure on medicines (among those who spent on health), with an average amount equivalent to 6.2% of disposable household income accounting for nearly 80% of household expenditure on health (6% higher than the national average) [16]. Results of external evaluations of SP 2006 show that demand for medicines has increased: 83.3% and 89.1% (in 2005 and 2006 respectively) of SP members who were treated as outpatients in Ministry of Health (MoH) units were prescribed medicines [17]. In 2002 the estimated figure for the same population was 55% [18].

Much of the published literature reports on the earlier years of SP implementation. Now that the government has declared success over meeting its goal of universal coverage, a study of SP affiliates access to prescribed medicines (ATPM) through primary care is warranted. This study aims to compare ATPM for SP and non-SP affiliated users of primary care services, taking into account the type of provider, socio-demographic profile health needs of users of these services, as well as the main barriers to ATPM for both insurance groups.

Materials and Methods

2.1 Data, study population and key definitions

We performed a cross-sectional study with data collected by the National Survey of Health and Nutrition (ENSaNut) 2012. This survey used a stratified multistage sampling, probabilistic

design and representation at national, state and stratified urban/rural levels in each of the 32 states of Mexico [19]. In particular, we analyzed the data from the primary care service user module and the associated households. The ENSaNut includes information from 194,758 individuals. The primary care service user module represents a random sample of 12,973 people who claimed having received primary care services during the two weeks prior to the survey and who received care from medical personnel. We obtained the data in an anonymized form for analysis from the public repository of the National Health and Nutrition Survey (ENSaNut). The local Committees of Research, Biosafety and Ethics at the National Institute of Public Health (INSP) in Mexico approved the survey. All subjects provide informed consent prior to taking part.

Access to prescribed medicines or ATPM was defined as receiving all medicines prescribed from primary care services, regardless of whether or not individuals had to pay. In principle, medicines could be obtained at the MoH facilities (the same place as the medical consultation) free of charge, or outside MoH facilities (e.g. private community pharmacies) where individuals have to pay for medicines. For both cases a dichotomous variable equal to one was used if the event occurred and zero was used if the event did not occur.

An individual who reported insurance affiliation to Seguro Popular at the time of the survey was classified as SP and those without any health insurance scheme were classified as non-SP (marked as 0).

The test sample included 6,123 individuals (around 4 million nationwide), with a sample loss of 13.6%. It is relevant to note that the analysis of key socio-demographic characteristics among both those included and those excluded from the study population suggests no statistical differences exist between the groups.

2.2 Analytic Strategy

The main socio-demographic characteristics of the study population according to SP membership are described. Through statistical independence tests ($\chi 2$ for categorical variables and t-student for continuous) [20,21] the main differences between the two groups of affiliation were described. Using the same tests, the ATPM and the main reasons for its non-occurrence were identified (lack of medicines in the care unit, remoteness, lack of time for the person who used health services were not included as part of the consultation received, lack of money, prices, or other). The influence of SP on ATPM was estimated in principle from the following specification:

$$ATPM = \alpha + \delta SP + \gamma X + \varepsilon \quad (1)$$

Where X is a vector of control variables of such effect and ε the error term [21]. This model assumes that there are no "unobservable" omitted variables which influence both the decision to join SP and the probability of using health services. This assumption is feasible when the definition of ATPM is independent of the place where the prescribed medicines were obtained. Enrolling in SP is non-random and voluntary which means that the estimation of the SP's influence on (δ) ATPM at the place of care (in the MoH), could be confounded by factors related to any differences associated with problems of self-selection [$corr(X, \varepsilon) \neq 0$]. This could result in biased and inconsistent estimates of the influence of the SP [22–24]. The first step estimations used to resolve this issue followed as:

$$SP = \psi Z + \tau \quad (2)$$

Where Z is a vector of instrumental variables, in such a way that such assumptions $corr(Z, SP) \neq 0$ and $corr(Z, \varepsilon) \neq 0$ are met [25].

The Z vector included the natural logarithm of the number of SP members at municipal-level between the years 2003–2010. This information is derived from administrative records of the National Commission for Social Protection in Health [26]. Previous studies have shown the validity of this instrumental variable [27,28]; it is highly correlated with the probability of being member of SP and not associated with the probability of receiving health care. However, unlike the aforementioned studies, our approach not only captures the penetration of the program at the municipal level and heterogeneity cross, it also incorporates the dynamics of expansion, anticipating that municipalities with greater penetration and higher expansion rates will include individuals with a higher probability of SP affiliation.

Additionally, X included the following control variables: reported health needs (acute, chronic or other) [29], the number of medicines prescribed (1, 2, ≥3), age, and sex. Other control variables at household level were sex, age, the head of houses' education and employment status, indigenous status [30], social program beneficiary of Oportunidades (formerly Prospera), and total annual household expenditure per adult equivalent (in terciles) [31]. (3) The place of residence (city or town) was characterized by population size (rural: <2500 inhabitants, urban: 2500–100 thousand, metropolitan: >100 thousand) and degree of marginalization (very low/low, medium, high/very high) [32].

In order to estimate the association between SP and ATPM two approaches were proposed. First, considering the endogeneity problem mentioned, we adjust an IV model using 2-stage least squares (2SLS) [22]. I would suggest rephrasing as: Because both SP and ATPM are binary variables whose error terms might not be independent, a bivariate probit model or bi-probit was used to analyze the probability of ATPM. [22, 33,34]. Second, and following other studies [34], we contrasted our IV estimations using a naïve model that assumes exogeneity, and therefore directly adjusted (1). Both approaches include crude and adjusted estimations in order to control for any possible distortion of the association between SP and ATPM that would arise from differences in socio-demographic, health, and contextual characteristics included in the X vector. Marginal effects were also reported (in percentage points or pp) [22,35,36]. All analyses were performed using Stata 13.1 [37].

Results

Table 1 shows the general characteristics of the study population (N = 4,064,495) according to SP membership. Some relevant differences include: (1) 20.6% of SP members (N = 2,753,713) and 15% of the non-SP population (N = 1,310,782) reported a chronic condition, while 69.9% and 77.5% of the respective groups reported having some acute condition; (2) 64.6% of SP members and 18.5% of non-members received health care in primary care MoH facilities, while 35.4% and 81.5% of the respective groups received care in a private clinic or pharmacy; (3) 55.7% of SP members and 60.3% of non-members were prescribed three or more medications; (4) the SP population lived in households whose head of house had an average of 1.7 years less schooling compared to non-SP affiliates. (5) Among the SP population, 9.5% belonged to indigenous households (3% more than the non-SP), 38.5% lived in households Oportunidades recipients (23.7% more than the non-SP) and 73.9% of households fall into terciles I and II for annual expenditure per equivalent adult (22% higher than non-SP). (6) With regard to the place of residence, 35% of the SP population lived in rural areas and 33.2% resided in environments of high/very high marginalization. For the non-SP population, these percentages were 16% and 15%, respectively.

At a national level, 82.7% of SP members and 89.9% of non-SP members reported ATPM in primary care services. The remaining individuals in both populations were unable to obtain either some or all of their prescribed medicines (Fig 1). ATPM changed according to individual

Table 1. Differences in the study population according to Seguro Popular Affiliation.

	Seguro Popular	No Seguro Popular	Difference test p-value
n	4,558	1,565	
N	2,753,713	1,310,782	
%	67.7	32.3	
Individual Characteristics			
Health needs			
Acute	69.9 [67.9,71.9]	77.5 [74.4,80.3]	0.00
Chronic	20.6 [18.9,22.5]	15.0 [12.6,17.8]	
Other	9.43 [8.33,10.7]	7.52 [5.87,9.59]	
Place where care was received			
Ministry of Health (MoH)	64.6 [61.9,67.3]	18.5 [15.9,21.5]	0.00
Pharmacy units	18.6 [16.4,21.0]	35.5 [31.7,39.4]	
Private doctor	16.8 [15.2,18.6]	46.0 [41.9,50.2]	
Number of prescription medications			
1	11.4 [10.2,12.8]	11.2 [9.17,13.7]	0.06
2	32.9 [30.9,35.0]	28.5 [25.3,31.9]	
≥3	55.7 [53.4,57.9]	60.3 [56.6,63.9]	
Age Group			
0–4	22.2 [20.4,24.1]	25.1 [22.0,28.4]	0.00
5–19	29.9 [27.5,32.3]	27.0 [23.5,30.8]	
20–49	28.9 [27.0,30.9]	34.8 [31.7,38.0]	
50–69	15.1 [13.7,16.6]	10.4 [8.40,12.8]	
≥70	3.89 [3.20,4.73]	2.84 [1.93,4.17]	
Man	37.5 [35.6,39.4]	42.5 [38.8,46.3]	0.02
Home of residence			
Household head			
Man	78.0 [76.1,79.8]	76.5 [73.2,79.5]	0.39
Years old	44.7 [44.0,45.4]	45.0 [43.8,46.1]	0.63
Years of schooling	6.48 [6.29,6.67]	8.13 [7.69,8.57]	0.00
Work	76.3 [74.3,78.2]	76.9 [73.6,79.9]	0.75
Indigenous	9.54 [8.10,11.2]	6.63 [4.99,8.76]	0.02
Oportunidades beneficiary	38.5 [36.2,40.8]	14.8 [12.3,17.8]	0.00
Tercile of annual expenditure			
I	39.8 [37.4,42.1]	20.0 [17.1,23.3]	0.00
II	34.1 [32.1,36.2]	31.9 [28.0,36.1]	
III	26.1 [23.9,28.6]	48.1 [44.0,52.1]	
City or town			
Size			
Rural	35.0 [32.8,37.4]	15.9 [13.8,18.2]	0.00
Urban	24.6 [22.7,26.7]	15.9 [13.4,18.8]	
Metropolitan	40.4 [37.7,43.1]	68.2 [64.7,71.4]	
Degree of marginalization			
Very low/low	50.7 [47.7,53.6]	75.0 [71.7,78.1]	0.00
Medium	16.2 [13.9,18.7]	10.3 [8.04,13.0]	
High/very high	33.2 [30.3,36.2]	14.8 [12.5,17.4]	

Note: Estimates considering the survey design.

doi:10.1371/journal.pone.0136823.t001

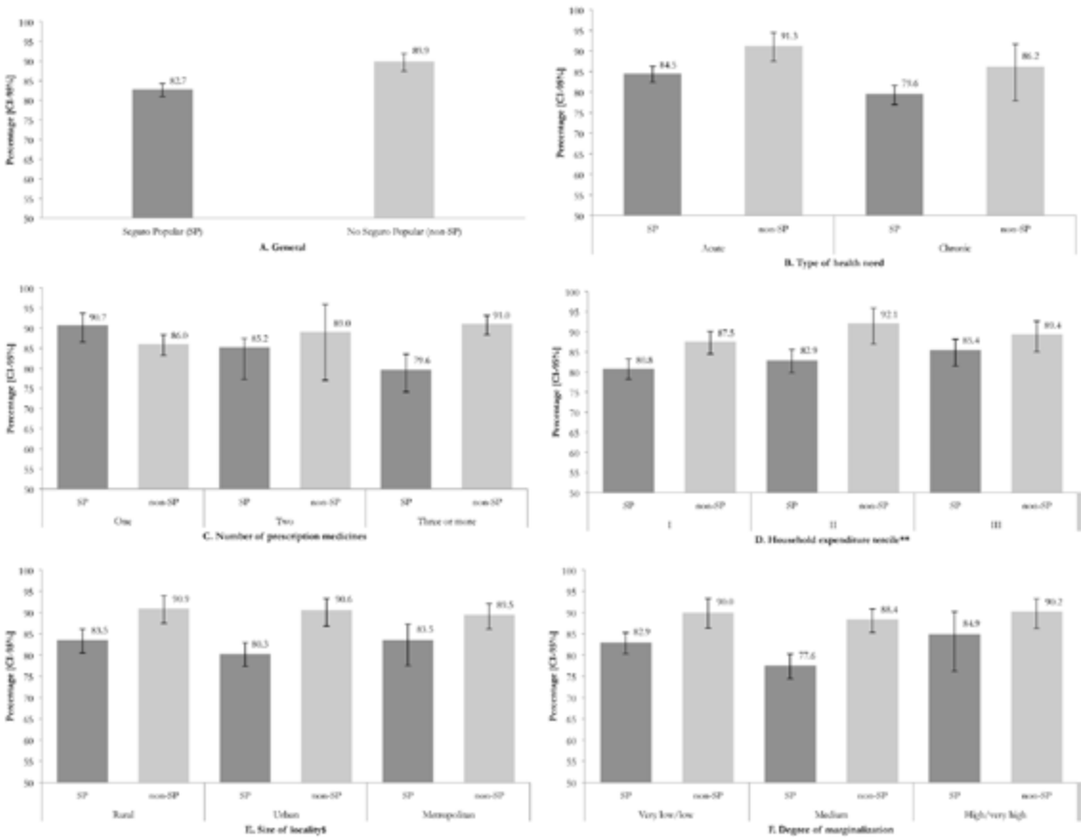


Fig 1. Access to prescribed medicines (ATPM) regardless of place according to individual characteristics and specific environment and affiliation to the Seguro Popular. Note: Estimates considering the survey design. *Estimated figures on the total population who received a prescription from medical personnel. **Calculation per adult equivalent. $ Rural: <2500 inhabitants, Urban: 2500–100000, Metropolitan: >100000.

doi:10.1371/journal.pone.0136823.g001

and household characteristics as well as type of care received. The probability of ATPM decreased when there was an increase in the number of medicines, when there was lower household spending, and in the presence of chronic diseases. In terms of size of locality and degree of marginalization, no trend was detected.

The descriptive analysis shows that, when stratified by type of institutions where health care was received, SP beneficiaries using the MoH reported greater ATPM than the non-SP members (64.6% v. 53.6%) (Fig 2). Interestingly, among beneficiaries of SP, the percentage of users who received either a portion or none of their prescription medicines was higher among those who used the MoH compared to those who used the private sector (23.4% v. 6.2%).

In nine out of ten cases, unavailability of medicines was reported as the reason for SP affiliated individuals experiencing no ATPM when receiving care at MoH institutions (Table 2). In contrast, when SP members reported no ATPM when receiving care in private institutions or pharmacy clinics, the primary reason was that the medicines seemed expensive or they lacked money to pay for the medicines (31%).

Finally, Table 3 shows the influence of SP on the probability of ATPM. When only analyzing the group of individuals that obtained prescription medicines at the same place where they received health care, SP increases the probability of ATPM 10.3 percentage points compared to

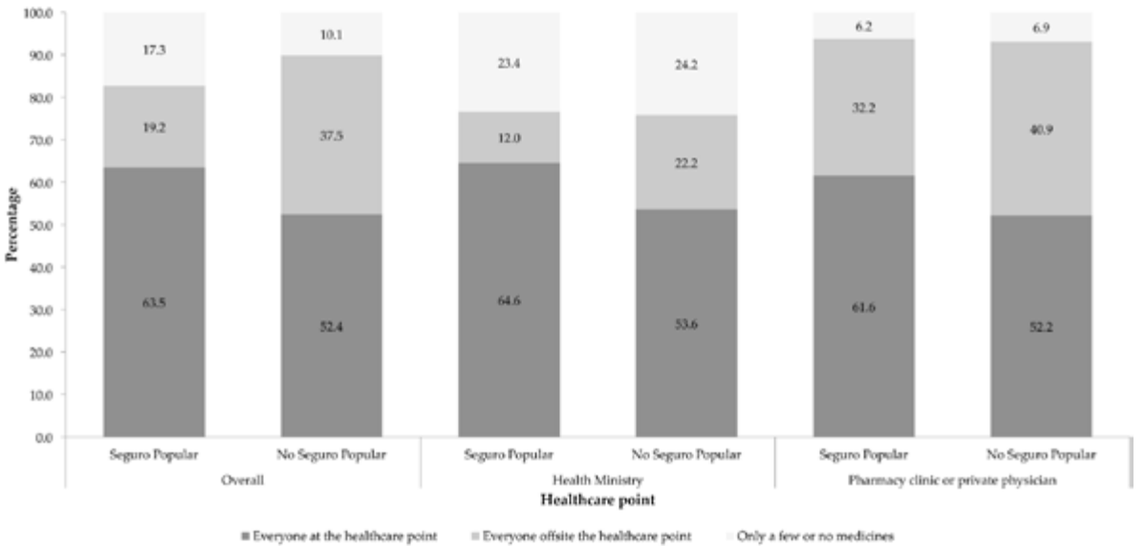


Fig 2. Access to prescribed medicines by type of care provider. Note: Estimates considering the survey design. *Indicator calculated on the total population who receive a prescription from medical personnel.

doi:10.1371/journal.pone.0136823.g002

Table 2. Overall reasons for not obtaining medicines, according to the place where the health care was received and to affiliation to the Seguro Popular.

	Seguro Popular	No Seguro Popular	Difference test p-value
n	4,558	1,565	
N	2,753,713	1,310,782	
%	67.7	32.3	
PANEL A: General			
Lack of medicine	85.9 [82.4,88.8]	58.6 [44.7,71.2]	0.00
Did not know where to go, lack of time or cannot leave work	0.24 [0.06,0.95]	6.09 [1.56,20.9]	
They seemed expensive or lack of money	5.79 [4.12,8.07]	21.3 [12.2,34.4]	
Health care does not include medicines	4.18 [2.53,6.82]	7.45 [3.56,14.9]	
Other reason	3.90 [2.52,5.97]	6.63 [2.90,14.5]	
PANEL B: Users of health services of the Ministry of Health			
Lack of medicine	91.4 [88.2,93.8]	83.3 [67.8,92.2]	0.02
Did not know where to go, lack of time or cannot leave work	0.13 [0.12,0.15]	2.43 [0.66,8.49]	
They seemed expensive or lack of money	2.16 [1.26,3.66]	5.08 [2.85,8.90]	
Health care does not include medicines	2.18 [0.90,5.16]	0.38 [0.05,2.71]	
Other reason	4.12 [2.60,6.47]	8.80 [2.24,28.9]	
PANEL C: Users of pharmacy units or private clinics			
Lack of medicine	48.0 [37.0,59.1]	38.9 [24.2,55.9]	0.18
Did not know where to go, lack of time or cannot leave work	0.94 [0.13,6.61]	8.99 [1.74,35.5]	
They seemed expensive or lack of money	30.8 [21.6,41.9]	34.2 [18.2,54.7]	
Health care does not include medicines	17.9 [10.8,28.3]	13.1 [6.25,25.3]	
Other reason	2.36 [1.96,2.84]	4.91 [2.22,10.5]	

Note: Estimates considering the effect of the survey design.

doi:10.1371/journal.pone.0136823.t002

Table 3. Comparison of access to prescribed medicines (*ATPM*) between those affiliated to Seguro Popular and those not affiliated.

	Probit Model		IV-Probit Model	
	Crude (B.1)	Adjusted (B.2)	Crude (B.3)	Adjusted (B.4)
	Marginal effects and CI95% reported			
Affiliation to the Seguro Popular	0.10**	0.06**	0.35**	0.29**
	[0.08,0.13]	[0.02,0.09]	[0.27,0.42]	[0.17,0.40]
Individual Characteristics				
Place of health care: Ministry of Health (Ref.: Private or pharmacy)		0.01		0.01
		[-0.02,0.04]		[-0.02,0.03]
Health need (Ref.: Acute)				
Chronic		-0.08**		-0.06**
		[-0.12,-0.04]		[-0.09,-0.04]
Other		-0.13**		-0.10**
		[-0.17,-0.08]		[-0.13,-0.06]
Number of prescribed medicines (Ref.: 1)				
2		-0.01		-0.01
		[-0.05,0.03]		[-0.04,0.03]
≥3		-0.06**		-0.05**
		[-0.10,-0.02]		[-0.08,-0.02]
Age		0.001**		0.001**
		[0.0004,0.002]		[0.0003,0.001]
Man		-0.01		-0.01
		[-0.04,0.01]		[-0.03,0.01]
Home of residence				
Household head				
Man		-0.04*		-0.03*
		[-0.07,-0.003]		[-0.05,-0.003]
Years old		-0.002**		-0.001**
		[-0.003,-0.001]		[-0.002,-0.001]
Years of schooling		-0.005**		-0.004**
		[-0.009,-0.002]		[-0.01,-0.002]
Work		0.01		0.01
		[-0.02,0.05]		[-0.02,0.04]
Indigenous		-0.004		-0.01
		[-0.05,0.04]		[-0.04,0.03]
Oportunidades beneficiary		0.01		0.01
		[-0.02,0.04]		[-0.01,0.03]
Tercile of annual expenditure (Ref.: III)				
I		0.09**		0.07**
		[0.06,0.12]		[0.04,0.09]
II		0.06**		0.05**
		[0.03,0.09]		[0.02,0.07]
City or town				
Size (Ref.: Rural)				
Urban		-0.09**		-0.07**
		[-0.13,-0.06]		[-0.10,-0.05]
Metropolitan		-0.06**		-0.03+
		[-0.10,-0.02]		[-0.06,0.002]
Degree of marginalization (Ref.: Very low/low)				

(*Continued*)

Table 3. (*Continued*)

	Probit Model		IV-Probit Model	
	Crude (B.1)	Adjusted (B.2) Marginal effects and CI95% reported	Crude (B.3)	Adjusted (B.4)
Medium		-0.008		-0.01
		[-0.05,0.03]		[-0.04,0.02]
High/very high		0.04*		0.03*
		[0.01,0.08]		[0.003,0.06]
Observations	6,123	6,123	6,123	6,123
Log likelihood	-3,999	-3,887	-7,347	-7,245
LR $\chi 2$	52.76	276.7	——	——
Prob > χ^2	0.000	0.000	——	——
Wald $\chi 2$	——	——	430.5	653.1
Prob > χ^2	——	——	0.000	0.000
AIC	8,002	7,816	14,719	14,551
rho (ρ)	——	——	-0.556	-0.477
Likelihood-ratio test of rho (ρ) = 0				
χ^2	——	——	30.70	12.48
Prob > χ^2	——	——	0.000	0.000

Note:
**P <0.01
*p <0.05
$^{+}$p <0.1

doi:10.1371/journal.pone.0136823.t003

non-SP members (Model B.2). This association is reduced to 5.5 percentage points after adjusting for control variables. As in the previous model, the probability of ATPM is reduced among those who reported a chronic health need (v. acute condition), when the number of prescription medicines was ≥3 (v. having only one medicine prescribed), between users categorized in tercile III of annual spending (v. terciles I and III), as well as for residents of urban or metropolitan areas, and those living in low/very low marginalization areas.

Discussion

Access to prescribed medicines or ATPM is one of the most sensitive indicators of the performance of the Mexican health system. This study contributes to the empirical analysis of a major health programs that the Mexican government has implemented in the last decade; the Seguro Popular or SP [7]. The main contribution of this study arises from the result comparing ATPM prescribed in ambulatory care between members of SP and those not affiliated with SP. Barriers to ATPM for the SP affiliated population result in overall lower access to medicines compared to that in the non-SP member population, one-fifth (17%) of SP beneficiaries did not obtain some or all of their prescribed medicines. This percentage is higher than was estimated in the non-SP population (10% of non-SP users failed to receive all of their prescription medicines).

This analysis also revealed that regardless of whether ambulatory health care is provided, being affiliated with SP has no influence on ATPM. Some explanatory factors include that one-third of SP affiliates seek primary care outside MoH facilities, which would result in out-of-pocket expenses to obtain medicines. In this case ATPM depends on one's ability to pay rather than their affiliation (74% of the SP are terciles I and II v. 52% of the non-SP group).

This study suggests that care in MoH facilities is a key factor in analyzing the influence of SP on ATPM. This is not surprising considering that medicines are only provided free to SP beneficiaries at the MoH point of care. In crude terms, the percentage of ATPM for SP is 64.6% compared to the non-SP group at 53.6%. Although the analytic model shows a high probability (28.5 percentage points) for SP affiliates receiving ATPM in MoH facilities compared to non-SP individuals, it is concerning that ten years after the SP's implementation 35.4% of SP affiliates still have to obtain medicines outside of MoH facilities.

Given the policy goals and implementation of a program like SP, ATPM is not yet at the level expected. SP guarantees ATPM for those medicines included in the formulary free of charge at the point of care. CAUSES, the SP insurance formulary, states that 285 interventions are included in the coverage, which represents 100% coverage for primary care visits and up to 90% coverage of secondary care consultations (SSA, 2014). International recommendations suggest 80% or greater availability to essential generic medicines in both public and private institutions [38].

Finally, the findings of this study demonstrate that users seeking care for chronic health problems as opposed to an acute and users prescribed $\geq$3 medications have a lower probability of obtaining their prescribed medicines. ATPM for chronic health needs is lower than for acute problems; this finding is supported by previous research [39]. Users with chronic conditions have a higher probability of comorbidities than those without resulting in higher out-of-pocket expenditure and the need for financial protection. The ENSANUT 2012 reveals that 47% of patients diagnosed with diabetes mellitus also have a diagnosis of high blood pressure [40].

Some limitations should be noted. First, the type of information source used (a population survey) has a transversal character, meaning it is subject to self-report biases as well as limitations in the ability to establish causal inference. Secondly, the study was unable to estimate the influence of SP solely among users of MoH. This limitation arises due to the small number of MoH service users that are not affiliated with SP. For every four users affiliated with SP, there is one non-SP user. Finally, we limited our study to access prescribed medicines rather than medicines in general, as the need for receiving pharmacotherapy is established by a health care provider. Despite these limitations, we believe that the following constituents promote assurance of the results:

1. The benefits of the sampling design of the survey used (probabilistic, nationally representative, state and urban/rural strata, and oversampling of households in greatest need of the country).
2. The use of instrumental variables to adequately correct the endogeneity problem for both discrete and unobservable variables (compared to other methods such as matching by propensity score), as well as the use in the analysis of control variables widely suggested in the international literature as determinants of service use. In order to test the validity of our results we used propensity score matching. The results produced are very similar to the ones reported in our manuscript (data not shown).

In conclusion the results of this study point to pending tasks that must be addressed before universal health coverage is to be achieved, specifically. Among the affiliated with SP, the lack of ATPM results in out-of-pocket spending on medicines and financial vulnerability of Mexico's poor population. Apart from ATPM, the study results highlight the fact that improving ATPM in MoH facilities alone will only partly increase overall access to medicines among lower-income households. Results show that one-third of SP affiliates decided to seek care outside MoH facilities. If the government aims to guarantee ATPM via universal coverage (SP), user preferences must be considered. As such, it is necessary to identify factors discouraging

the demand for MoH services, thus ensuring ATPM based on the health needs of disadvantaged populations in Mexico.

Acknowledgments

Ethical approval

We obtained the data in an anonymized form for analysis from the public repository of the National Health and Nutrition Survey (ENSaNut). The local Committees of Research, Biosafety and Ethics at the National Institute of Public Health (INSP) in Mexico approved the survey. All subjects provide informed consent prior to taking part.

Author Contributions

Conceived and designed the experiments: ESM VW. Performed the experiments: ESM VW. Analyzed the data: ESM VW JMH. Contributed reagents/materials/analysis tools: ESM VW IHP LAB. Wrote the paper: ESM VW IHP LAB.

References

1. Organización Mundial de la Salud (OMS). Medicamentos esenciales. Disponible en: http://www.who.int/topics/essential_medicines/es/. (Last accessed: 5 May 2013).
2. Organización Mundial de la Salud (OMS). Medicamentos esenciales. 10 datos sobre los medicamentos esenciales. Disponible en: http://www.who.int/features/factfiles/essential_medicines/es/index.html. (Last accessed: 5 May 2013).
3. Garrido-Latorre F, Hernández-Llamas H, Gómez-Dantés O. 2008. Surtimiento de recetas a los afiliados al Seguro Popular de Salud de México. *Salud Pública Mex* 50 supl 4:S429–S436.
4. Secretaría de Salud (SeSa). 2006. Utilización de servicios y trato recibido por los afiliados al Seguro Popular de Salud. In: Secretaría de Salud. Sistema de Protección Social en Salud. Evaluación de procesos. Mexico City: Secretaría de Salud, 2006: 39–57.
5. Gómez Dantés O, Ortiz M. 2004. Seguro popular de salud: Siete perspectivas. Salud Pública De México, 46(6), 585–588.
6. King G, Gakidou E, Imai K, Lakin J, Moore R, Nall C, et al. 2009. Public policy for the poor? A randomized assessment of the mexican universal health insurance programme. The Lancet, 373(9673), 1447–1454. doi: 10.1016/S0140-6736(09)60239-7
7. Knaul FM., González-Pier E, Gómez-Dantés O, García-Junco D, Arreola-Ornelas H, Barraza-Lloréns M, et al. 2012. The quest for universal health coverage: Achieving social protection for all in Mexico. The Lancet, 380(9849), 1259–1279. doi: 10.1016/S0140-6736(12)61068-X
8. Comisión Nacional de Protección Social en Salud. 2013. Cifras del Seguro Popular: Afiliación histórica. Disponible en: http://www.seguro-popular.salud.gob.mx/index.php?option = com_content&view = article&id=552&Itemid=481. (Last accessed: 13 July 2013).
9. Comisión Nacional de Protección Social en Salud. 2012. Libro Blanco. Sistema de Protección Social en Salud. "Seguro Popular". Disponible en: http://www.seguro-popular.salud.gob.mx/images/contenidos/Transparencia/rend_ctas_libros_bcos/seguropopular.pdf. (Acceded 2013 June 19).
10. Sistema de Protección Social en Salud. Informe de resultados 2012. Disponible en: http://gaceta.diputados.gob.mx/Gaceta/62/2013/feb/InfSPSS-20130201.pdf. (Acceded 2013 June 19).
11. Sistema de Protección Social en Salud. 2012. Informe de resultados del SPSS Enero-Diciembre 2012. Secretaría de Salud. Disponible en http://www.seguro-popular.salud.gob.mx/index.php?option = com_content&view = article&id=277&Itemid=293. (Acceded 2013 June 17).
12. Sistema de Protección Social en Salud. Informe de resultados 2011. Disponible en: http://www.slpsalud.gob.mx/archivos/Seguro-Popular/PEF/2011/Informe_Resultados_2011.pdf. Consultado: 19 de junio de 2013.
13. Instituto Nacional de Salud Pública. 2012. Evaluación Externa del Sistema de Protección Social en Salud 2012. Disponible en: http://salud_2013.salud.gob.mx/codigos/columnas/evaluacion_programas/pdf/EXT12_SPSS_SE.pdf. (Acceded 2013 June 24).

14. Wirtz VJ, Russo G, Kageyama ML. 2010. Acceso a medicamentos para los usuarios del primer nivel de los servicios de salud: análisis de las encuestas nacionales de salud 1994, 2000, 2006. Salud Pública Mex; 52:32–40.
15. López Moreno S, Granados Cosme JA, coordinadores. El abasto de medicamentos en México. México, DF: Universidad Autónoma Metropolitana, Unidad Xochimilco, 2010.
16. Wirtz VJ, Santa-Ana-Téllez Y, Servan-Mori E, Avila-Burgos Leticia. 2012. Heterogeneous Effects of Health Insurance on Out-of-Pocket Expenditure on Medicines in Mexico. Value Health 15: 593–603. doi: 10.1016/j.jval.2012.01.006 PMID: 22867767
17. Secretaría de Salud de México (SeSa). 2006. Sistema de Protección Social en Salud: Evaluación de Procesos. Primera edición. México 2007. Available in http://salud_2013.salud.gob.mx/codigos/columnas/evaluacion_programas/cnpss1.html.
18. Secretaría de Salud (SeSa)-Dirección General de Evaluación del Desempeño (DGED). 2006. Síntesis Ejecutiva 15. Surtimiento de recetas en los Servicios Estatales de Salud y en los Servicios de Salud del DF. Available in http://www.salud.gob.mx/unidades/evaluacion/publicaciones/publicaciones.htm
19. Romero-Martínez M, Shamah-Levy T, Franco-Núñez A, Villalpando S, Cuevas-Nasu L, Gutiérrez JP, et al. 2013. Encuesta Nacional de Salud y Nutrición 2012: diseño y cobertura. Salud Pública Mex; 55 supl 2:S332–S340.
20. Greenwood P.E., Nikulin M.S. 1996. A guide to chi-squared testing. Wiley, New York. ISBN 0-471-55779-X.
21. McDonald J.H., Handbook of Biological Statistics Sparky House Publishing, Baltimore, 2008.
22. Wooldridge JM. 2002. Econometric analysis of cross section and panel data. MIT Press, Cambridge, 2002.
23. Angrist J, Krueger A. 2001. Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments. Journal of Economic Perspectives 15(4):69–85.
24. Angrist J, Imbens GW, Rubin D. 1996. Identification of Causal Effects Using Instrumental Variables. Journal of the American Statistical Association 91 (434): 444–455.
25. Heckman JJ. 1997. Instrumental variables: a study of implicit behavioral assumptions used in making program evaluations. J. Hum. Resour 32: 441–462.
26. Comisión Nacional de Protección Social en Salud. 2010. Datos administrativos de la afiliación al Seguro Popular a nivel de las localidades y fecha de incorporación de las municipalidades. México, DF: Secretaría de Salud, 2010.
27. Galárraga O, Sosa-Rubí S, Salinas-Rodríguez A, Sesma-Vázquez S. 2010. Health insurance for the poor: impact on catastrophic and out-of-pocket health expenditures in Mexico. Eur J Health Econ 11 (5): 437–447. doi: 10.1007/s10198-009-0180-3 PMID: 19756796
28. Sosa-Rubí SG, Galárraga O, Harris JE. 2009. Heterogeneous impact of the "Seguro popular" program on the utilization of obstetrical services in Mexico, 2001–2006: A multinomial probit model with a discrete endogenous variable. Journal of Health Economics 28(1): 20–34. doi: 10.1016/j.jhealeco.2008.08.002 PMID: 18824268
29. Wirtz VJ, Serván-Mori E, Heredia-Pi I, Dreser A, Ávila-Burgos L. 2013. Utilización y gasto en medicamentos en México: avances y retos en el acceso equitativo a medicamentos. Salud Pública Mex 55 supl 2:S112–S122.
30. Comisión Nacional para el Desarrollo de los Pueblos Indígenas (CDI). 2009. Los hogares y la población indígena. Available in: http://www.cdi.gob.mx/index.php?id=211&option = com_content&task = view, 2009. (Last accessed: 1 October 2012).
31. Teruel GL, Rubalcava L. 2005. Escalas de Equivalencia para México, D.F. Serie: Documentos de Investigación. SEDESOL. Documentos de investigación 23, SEDESOL, 2005.
32. Consejo Nacional de Población (CONAPO). 2010. Índice de marginación por localidad. Available in http://www.conapo.gob.mx/es/CONAPO /Indice_de_Marginacion_por_Localidad_2010. (Acceded 2012 November 11].
33. Verbeek M.J.C.M. (2012). A Guide to Modern Econometrics, 4th edition. Chichester: John Wiley and Sons.
34. Galárraga O, Sosa-Rubí S, Salinas-Rodríguez A, Sesma-Vázquez S. 2010. Health insurance for the poor: impact on catastrophic and out-of-pocket health expenditures in Mexico. Eur J Health Econ 11 (5): 437–447. doi: 10.1007/s10198-009-0180-3 PMID: 19756796
35. Cameron AC and Trivedi PK. 2009. Microeconometrics Using Stata. College Station, TX: Stata Press, 2009.
36. Greene WH. 2003. Econometric analysis. Prentice Hall, Upper Saddle River, 2003.

37. Stata Corp. LP. Stata/SE 12.1 for Windows XP 64 bits. College Station Texas, USA: Stata Corp LP, 2011.

38. World Health Organization (WHO). 2012. A draft comprehensive global monitoring framework, including indicators, and a set of voluntary global targets for the prevention and control of non-communicable diseases. A/NCD/INF./1 31 October 2012. Ginebra, OMS, 2012.

39. Cameron A, Roubos I, Ewen M, Mantel-Teeuwisse AK, Leufkens HG, Laing RO. 2011. Differences in the availability of medicines for chronic and acute conditions in the public and private sectors of developing countries. Bull World Health Organ 1; 89(6):412–21. doi: 10.2471/BLT.10.084327 PMID: 21673857

40. Hernández Ávila M, Gutiérrez JP. Documento Analítico de la ENSANUT 2012. Diabetes mellitus: la urgencia de reforzar la respuesta en políticas públicas para su prevención y control. Available in: http://ensanut.insp.mx/doctos/analiticos/DiabetesMellitus.pdf (Acceded 2013 August 20).

OPEN ACCESS Freely available online

PLOS ONE

Impact of Over-the-Counter Restrictions on Antibiotic Consumption in Brazil and Mexico

Yared Santa-Ana-Tellez[1], Aukje K. Mantel-Teeuwisse[1], Anahi Dreser[2], Hubert G. M. Leufkens[1], Veronika J. Wirtz[2,3]*

1 WHO Collaborating Centre for Pharmaceutical Policy & Regulation, Utrecht Institute for Pharmaceutical Sciences (UIPS), Utrecht, The Netherlands, **2** Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Mexico, **3** Center for Global Health and Development, Boston University, Boston, Massachusetts, United States of America

Abstract

Background: In Latin American countries over-the-counter (OTC) dispensing of antibiotics is common. In 2010, both Mexico and Brazil implemented policies to enforce existing laws of restricting consumption of antibiotics only to patients presenting a prescription. The objective of the present study is therefore to evaluate the impact of OTC restrictions (2010) on antibiotics consumption in Brazil and Mexico.

Methods and Findings: Retail quarterly sales data in kilograms of oral and injectable antibiotics between January 2007 and June 2012 for Brazil and Mexico were obtained from IMS Health. The unit of analysis for antibiotics consumption was the defined daily dose per 1,000 inhabitants per day (DDD/TID) according to the WHO ATC classification system. Interrupted time series analysis was conducted using antihypertensives as reference group to account for changes occurring independently of the OTC restrictions directed at antibiotics. To reduce the effect of (a) seasonality and (b) autocorrelation, dummy variables and Prais-Winsten regression were used respectively. Between 2007 and 2012 total antibiotic usage increased in Brazil (from 5.7 to 8.5 DDD/TID, +49.3%) and decreased in Mexico (10.5 to 7.5 DDD/TID, −29.2%). Interrupted time series analysis showed a change in level of consumption of −1.35 DDD/TID ($p<0.01$) for Brazil and −1.17 DDD/TID ($p<0.00$) for Mexico. In Brazil the penicillins, sulfonamides and macrolides consumption had a decrease in level after the intervention of 0.64 DDD/TID ($p=0.02$), 0.41 ($p=0.02$) and 0.47 ($p=0.01$) respectively. While in Mexico it was found that only penicillins and sulfonamides had significant changes in level of −0.86 DDD/TID ($p<0.00$) and −0.17 DDD/TID ($p=0.07$).

Conclusions: Despite different overall usage patterns of antibiotics in Brazil and Mexico, the effect of the OTC restrictions on antibiotics usage was similar. In Brazil the trend of increased usage of antibiotics was tempered after the OTC restrictions; in Mexico the trend of decreased usage was boosted.

Citation: Santa-Ana-Tellez Y, Mantel-Teeuwisse AK, Dreser A, Leufkens HGM, Wirtz VJ (2013) Impact of Over-the-Counter Restrictions on Antibiotic Consumption in Brazil and Mexico. PLoS ONE 8(10): e75550. doi:10.1371/journal.pone.0075550

Editor: David N. Fredricks, Fred Hutchinson Cancer Center, United States of America

Received May 22, 2013; **Accepted** August 19, 2013; **Published** October 16, 2013

Copyright: © 2013 Santa-Ana-Tellez et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Funding: Yared Santa-Ana-Tellez received funding from CONACYT (National Council of Science and Technology Mexico). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests: The WHO Collaborating Centre for Pharmaceutical Policy & Regulation receives no direct funding or donations from private parties, including the pharma industry. Research funding from public-private partnerships, e.g. IMI, TI Pharma (www.tipharma.nl) is accepted under the condition that no company-specific product or company-related study is conducted. The Centre has received unrestricted research funding from public sources, e.g. The Netherlands Organisation for Health Research and Development (ZonMW), the Dutch Health Care Insurance Board (CVZ), EU 7th Framework Program (FP7), the Dutch Medicines Evaluation Board (MEB), and the Dutch Ministry of Health.

* E-mail: vwirtz@bu.edu

Introduction

Inappropriate use of antibiotics enhances the development of antibacterial resistance, which is an important public health issue. It leads to treatment failures causing deaths and an increase in use of more costly antibiotics [1,2]. In many of the Latin American countries, prohibition of over the counter (OTC) sales of antibiotics in private pharmacies is not enforced, and self-prescription with antibiotics is common [3] because antibiotics are still requested and sold without prescription in private pharmacies. During previous years, various countries implemented policies to enforce prohibition of OTC antibiotic sales. Chile was one of the first countries in the region documenting the implementation of this type of policy that took place in September 1999, which resulted in a notable decrease in the short-term consumption [4], nevertheless it slowly increased from 2002 onwards [5].

Other Latin American countries have followed Chile's example over the past years. In 2005, Colombia started to regulate the OTC sales of antibiotics only in the capital city Bogota, while in Venezuela at the beginning of 2006, a similar policy was implemented but only applied to three therapeutic groups: macrolides, quinolones and third generation cephalosporins. The effect of these policies were evaluated recently, showing a decrease in level of consumption in Colombia, but no change in level or trend in Venezuela [6]. Ultimately, two of the largest countries in Latin America, Brazil and Mexico, implemented a similar policy during 2010 enforcing the prohibition of all systemic antibiotic sales without prescription.

Santa-Ana-Tellez Y, Mantel-Teeuwisse AK, Dreser A, Leufkens HGM, Wirtz VJ. Impact of over-the-counter restrictions on antibiotic consumption in Brazil and Mexico. PLoS ONE. 2013;8(10):e75550. https://doi.org/10.1371/journal.pone.0075550

For many years Mexico had the highest antibiotic consumption in the region [7]. The antibiotics as therapeutic group have occupied the second place in retail sales (40% without a prescription), but the first place with regards to reports on adverse reactions [8] [9]. The consequences of self-prescription were highlighted during the epidemic of influenza A (H1N1) in 2009. Indeed, the Mexican government justified the antibiotic regulation in 2010 [10] arguing that it would prevent harmful self-medication with antibiotics that had led to delayed medical diagnosis of life-threatening complications during the influenza epidemic [9]. This regulation requires prescriptions for antibiotics to be retained and registered in pharmacies, and imposes fines to the owners of the pharmacies for non-compliance.

Brazil has been catalogued by IMS Health as a *pharmemerging* country with a pharmaceutical growth over the last few years and an increased government investment in pharmaceutical manufactures [11]. Approximately 40% of the medicines consumed in Brazil are antibiotics and they are commonly self-medicated; in 2008 alone, the sale of these medicines had a revenue of 377 million USD, with over 70 million units sold [12]. The National Health Surveillance Agency in Brazil (ANVISA) has discussed the need to improve the control of sales of antibiotics since 2009; however, it was the spread of the multi-resistant KPC bacteria (*Klebsiella Pneumoniae Carbapenemase*) and related deaths from hospital infections during 2010 that speeded up the process of carrying out the regulation [9], which was implemented in November of 2010 [13]. After that, the regulation had some modifications detailing that the pharmacies should keep a copy of the prescriptions; from April 2013, the antibiotics were included into the National Controlled Substances Management System (SNGPC) to improve the supervision of their consumption [14]. None of the two countries carried out an information campaign to prevent the inappropriate use of antibiotics, but Mexico did a campaign to inform the public about the regulatory changes.

Monitoring antibiotics consumption has been encouraged in order to design and evaluate interventions directed at optimizing the use of these medicines and prevent increasing resistance [15]. The evaluation of a policy implementation is relevant to identify its impact and take corrective actions if needed. Cross-national analysis can help to identify changes in trends of consumption in each country and understand the impact of similar measures in different settings. The aim of the present study is therefore to assess the impact of the antibiotics consumption restrictions introduced in 2010 in Mexico and Brazil and compare the effect of the measures in these two countries.

Methods

Data source and setting

For this study, we obtained retail quarterly sales data in kilograms of oral and injectable antibiotics in the private sector from 2007 to the first two quarters of 2012 for Brazil and Mexico by submitting a research protocol to IMS Health under their Global Health Research program explaining the objectives and methodology to conduct the present study. The database was constructed with information of manufacturers and retail wholesalers. The kilograms sold of each antibiotic was converted into a daily defined dose per 1,000 inhabitants days (DDD/TID) according to the Anatomical Therapeutic Chemical (ATC) classification system proposed by the World Health Organization [16]. Annual information on the population of Mexico and Brazil was obtained from the Pan American Health Organization records [17] and the population in each quarter was estimated using the growth rate per year.

The analysis was conducted in two stages: first, for the total amount of antibiotics consumption, and then for therapeutic subgroups. In both countries, penicillins, tetracyclines, quinolones, macrolides and sulfonamides were the most frequently consumed therapeutic subgroups [7], and these were therefore included as separate classes. All other antibiotics were grouped as "others" for the analysis.

Data analysis

We first conducted a descriptive analysis calculating the average consumption in the period before and after the intervention taking the consumption of the quarters corresponding to the winter season for both countries. For Brazil this corresponded to the second and third quarter of each year, while for Mexico winter season occurs during the fourth and first quarter.

Subsequently, we used interrupted time-series analysis [18] to measure the impact of the policy implementation in each country estimating changes in level and trend in antibiotics consumption after the enforcement of the regulations. For Brazil we indicated the beginning of the regulated consumption at the first quarter of 2011 since the startup of the banning of OTC of antibiotics sales was on November 29th of 2010; while for Mexico we considered the beginning of the regulated consumption at the last quarter of 2010, since the regulation took place from August 25th of the same year. For this analysis we included all data points (quarters) from the beginning of 2007 to the second quarter of 2012, except for the last quarter of 2010 for Brazil and the third quarter of 2010 for Mexico because these two periods were just partially affected by the restriction of OTC sales.

In the model, we included a reference group to account for changes in medicines consumption outside of the antibiotic regulation, such as changes in the economy and the health systems. We decided to use antihypertensive medicines since this group was not affected by the new policies and consumption does not present seasonal variation, but consumption would be affected by market growth or other external factors that we were interested in adjusting for.

All models were adjusted for seasonality by using dummy variables. This was only applied for the antibiotics group and conducted separately in the segments before and after intervention, because it was observed graphically that the seasonality patterns changed after the intervention. Autocorrelation was corrected using Prais-Winsten regression [19] and the Durbin Watson test of all models showed that no autocorrelation persisted. All analysis were executed using the STATA Software version 12 [20].

Results

Between January 2007 and June 2012 total antibiotics usage increased in Brazil (from 5.7 to 8.5 DDD/TID, +49.3%) and decreased in Mexico (10.5 to 7.5 DDD/TID, −29.2%) in the private sector. In each year, we observed that Brazil had the highest consumption during the second and third quarter while Mexico had the highest consumption between the fourth and first quarter. For both countries this corresponds to their respective winter seasons. Antihypertensive medicines did not show seasonality in consumption as was expected. In Brazil we observed that for both therapeutic groups, antihypertensives and antibiotics, the consumption increased during the study period. The slope for antihypertensives was 0.071 DDD/TID per quarter between 2007 and 2012 while the slope was 0.18 DDD/TID per quarter for antibiotics in the same period. In Mexico, the antihypertensives showed an *increase* in consumption (slope = 0.016 DDD/TID per

quarter) and the antibiotics had a negative trend of −0.15 DDD/TID per quarter (Figure 1). In addition to this, we observed a difference in seasonal patterns after intervention in both countries, the difference in consumption between summer and winter was smaller after the regulation started, particularly for Mexico (Figures 1 and 2).

Interrupted time series analysis adjusting for antihypertensive consumption showed a change in level of consumption of −1.35 DDD/TID ($p<0.01$) for Brazil (Table 1) and −1.17 DDD/TID ($p<0.00$) for Mexico (Table 2), without a significant change in the trend after the regulation was implemented (Figure 1). The change in level for Mexico was only significant after the adjustment for seasonality.

Penicillins were the most frequently consumed antibiotic in both countries (see Figures 2 and 3). Prior to the intervention, the average consumption of penicillins in Brazil was 3.1 DDD/TID (which represents 39% out of total antibiotics consumption). After the intervention in Brazil, the consumption had a significant decrease in level of −0.64 DDD/TID ($p<0.00$), a non-significant change in trend of 0.012 DDD/TID per quarter ($p = 0.814$) and an average consumption of 3.8 DDD/TID, but this decrease did not have an impact in the proportional consumption (40% out of the total) since the total consumption trend remained increasing. In Mexico this therapeutic sub-group had a consumption of 4.0 DDD/TID (41% out of total) before the intervention with a significant decrease in level after the intervention of −0.86 DID/TID ($p<0.00$), with no change in trend (0.002 DDD/TID per quarter, $p = 0.942$) and an average consumption of 2.7 DDD/TID corresponding to the 36% out of the total consumption after the policy intervention.

Quinolones had the same consumption in both countries before the regulations started, 1.1 DDD/TID (14% out of the total consumption in Brazil and 12% out of the consumption in Mexico). The mean consumption in Brazil for this group increased by 0.4 DDD/TID meaning a 2% increase relative to the total consumption and did not change in absolute values with a no significant change in level of consumption of −0.17 DDD/TID ($p = 0.328$) and a non-significant change in trend of 0.006 DDD/TID per quarter ($p = 0.885$). For Mexico, even though the absolute consumption did not change, it increased relatively by 3% out of the total consumption; neither the change in level and trend were statistically significant −0.041 DDD/TID ($p = 0.647$) and −0.006 DDD/TID per quarter ($p = 0.687$) respectively.

Macrolides had an increase in the absolute consumption of 0.2 DDD/TID in Brazil with a consumption of 1.5 DDD/TID after the regulation, representing a relative reduction of 1%, with 16% out of the total consumption. A significant change in level for this group was −0.47 DDD/TID ($p = 0.010$) and a non-significant change in trend of 0.02 DDD/TID per quarter ($p = 0.568$). The absolute consumption in Mexico of this therapeutic group had a reduction of −0.1 DDD/TID having a consumption of 1 DDD/TID after the regulation and representing a relative increase of 2% out of the total consumption with a change in level of 0.049 DDD/TID ($p = 0.622$) and a change in trend of −0.008 DDD/TID per quarter ($p = 0.662$).

The mean consumption of sulfonamides in Brazil did not change in absolute numbers having a 0.8 DDD/TID of consumption before and after the regulation, but represented a relative decrease of 2% out of the total consumption during the time studied. The change in level was statistically significant with a decrease of 0.44 DDD/TID ($p = 0.023$) and a no significant change in trend of 0.33 DDD/TID per quarter ($p = 0.430$). Mexico had a reduction of consumption of 50% in the absolute consumption of this sub-group from 1.2 to 0.6 DDD/TID, and a relative reduction of 3% out of the total consumption with a significant reduction of the level of 0.17 DDD/TID ($p = 0.068$) and a non-significant change in trend of 0.022 DDD/TID per quarter ($p = 0.145$).

Discussion

The main objective of this study was to estimate the impact of the OTC regulation on the antibiotics consumption in Brazil and Mexico in the private sector using retail data. We showed that after the regulations took place, an immediate and similar decrease of around 1 DDD/TID in the level of antibiotics consumption was seen in the private sector in both countries, despite the different consumption patterns before the implementation of these policies.

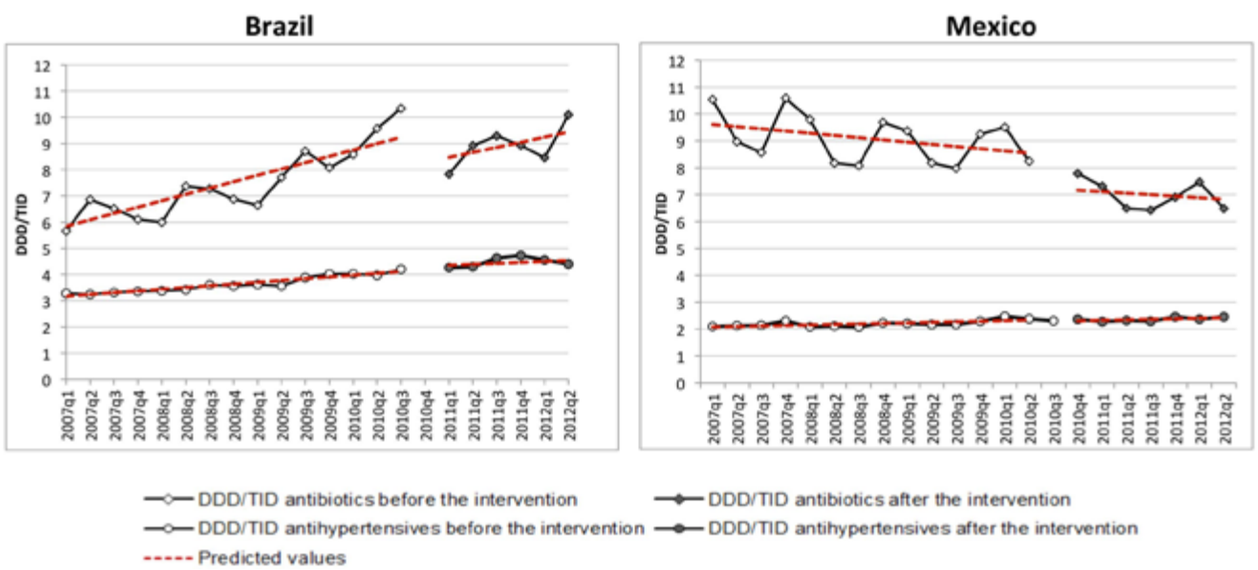
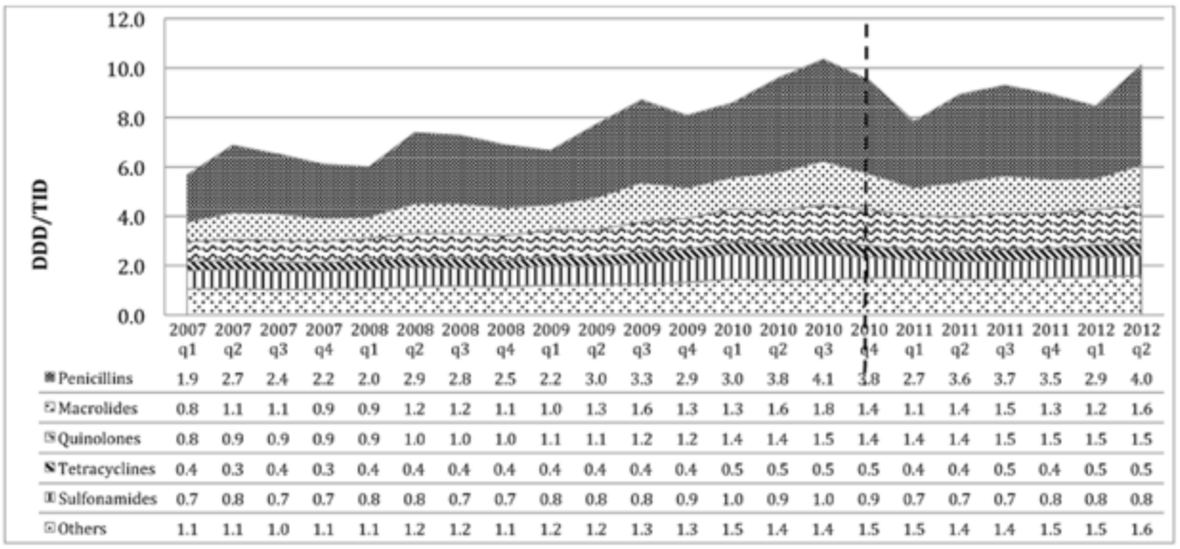


Figure 1. Trends in consumption in DDD/TID for Brazil and Mexico (2007–2012).
doi:10.1371/journal.pone.0075550.g001



	2007 q1	2007 q2	2007 q3	2007 q4	2008 q1	2008 q2	2008 q3	2008 q4	2009 q1	2009 q2	2009 q3	2009 q4	2010 q1	2010 q2	2010 q3	2010 q4	2011 q1	2011 q2	2011 q3	2011 q4	2012 q1	2012 q2
Penicillins	1.9	2.7	2.4	2.2	2.0	2.9	2.8	2.5	2.2	3.0	3.3	2.9	3.0	3.8	4.1	3.8	2.7	3.6	3.7	3.5	2.9	4.0
Macrolides	0.8	1.1	1.1	0.9	0.9	1.2	1.2	1.1	1.0	1.3	1.6	1.3	1.3	1.6	1.8	1.4	1.1	1.4	1.5	1.3	1.2	1.6
Quinolones	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.4	1.4	1.5	1.4	1.4	1.4	1.5	1.5	1.5	1.5
Tetracyclines	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.5
Sulfonamides	0.7	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.9	1.0	0.9	1.0	0.9	0.7	0.7	0.7	0.8	0.8	0.8
Others	1.1	1.1	1.0	1.1	1.1	1.2	1.2	1.1	1.2	1.2	1.3	1.3	1.5	1.4	1.4	1.5	1.5	1.4	1.4	1.5	1.5	1.6

Figure 2. Consumption of antibiotics therapeutic subgroups in Brazil. The dotted line represents the beginning of the regulation to prohibit the OTC sales of antibiotics.
doi:10.1371/journal.pone.0075550.g002

We also tested whether the policy was associated with a reduction in the consumption of the therapeutic groups; a significant change in level of consumption by therapeutic group was only observed for the penicillins and sulfonamides in both countries, and macrolides just in Brazil. Unexpectedly, we did not find statistical significant changes in trend of the total consumption or any of the therapeutic subgroups.

A previous study assessing the trend in consumption for Mexico and Brazil between 1997 and 2007 showed a decrease in consumption in Mexico and a stable consumption in Brazil [7]. Our study shows that this decrease in antibiotics consumption in Mexico continued after 2007. However, we found that Brazil is having an increase in consumption in the private sector between 2007 and 2012, and the regulation did not affect this trend. Assuming a relatively stable prevalence of bacterial infections, one could assume that the antibiotics consumption in Brazil would also be constant or decreasing for those antibiotic groups that were the mostly demanded without prescription before the regulation. Further analysis is needed to explore the factors such as the economic growth that could be contributing to the increase in antibiotics sales in this country as well as to assess the effects of increased sales on antibacterial resistance. By including antihypertensives as a control group, we ruled out the potential effects of a general change in consumption in the private sector such as the shifting from the public to the private sector or changes in consumption of pharmaceuticals due to economic changes in both countries.

In this study we calculated the consumption using retail (private sector) data for two reasons. First, the change in regulation on OTC sales could have a greater repercussion in the private sector given that in the public sector a prescription was needed to get medicines even before the regulation. Therefore, self-medication with antibiotics is less common in that sector [6]. Second, there are no other sources of information to calculate and compare the antibiotics consumption between countries because of the inexistent uniform databases between countries to conduct a similar analysis. To enable better comparisons of total drug consumption, we calculated the DDD/TID using the whole population of each country as denominator. Therefore, actual use of antibiotics in the whole country (including the public sector) is higher than the consumption found in the present work. According to IMS Health reports, pharmaceutical volume coverage was 46% for Mexico and 72% for Brazil [21].

The effect of regulating OTC sales of antibiotics in Brazil and Mexico was smaller than the impact found in Chile (−5.56 DDD/TID) but similar to the effect reported in Colombia (−1 DDD/

Table 1. Results of the time series analysis of Brazil for all antibiotics and by therapeutic sub-group.

	All	Tetracyclines	Penicillins	Sulfonamides	Macrolides	Quinolones	Others
Intercept	5.604 (0.000)	0.314 (0.000)	2.033 (0.000)	0.667 (0.000)	0.852 (0.000)	0.745 (0.000)	0. 973 (0.000)
Change in level after intervention DDD/TID¥	**−1.348 (0.005)**	−0.256 (0.113)	**−0.635 (0.018)**	**−0.414 (0.023)**	**−0.465 (0.010)**	−0.169 (0.328)	−0.163 (0.348)
Change in trend after intervention DDD/TID per quarter¥	−0.018 (0.798)	0.036 (0.375)	0.012 (0.814)	0.326 (0.430)	0.023 (0.568)	0.006 (0.885)	0.022 (0.596)
R^ 2	0.967	0.995	0.925	0.993	0.993	0.992	0.992

¥Adjusted for reference group, p values in parentheses. All: all therapeutic groups combined.
doi:10.1371/journal.pone.0075550.t001

Table 2. Results of the time series analysis of Mexico for all antibiotics and by therapeutic sub-group.

	All	Tetracyclines	Penicillins	Sulfonamides	Macrolides	Quinolones	Others
Intercept	9.695 (0.000)	1.130 (0.000)	3.538 (0.000)	1.390 (0.000)	0.966 (0.000)	1.073 (0.000)	1.582(0.000)
Change in level after intervention DDD/TID¥	**−1.172 (0.001)**	0.008 (0.958)	**−0.857 (0.000)**	−0.174 (0.068)	0.049 (0.622)	−0.041 (0.647)	0.131 (0.141)
Change in trend after intervention DDD/TID per quarter¥	0.026 (0.663)	0.015 (0.477)	0.002 (0.942)	0.022 (0.145)	−0.008 (0.662)	−0.006 (0.687)	0.005 (0.722)
R^2	0.995	0.975	0.962	0.990	0.989	0.987	0.973

¥Adjusted for reference group, p values in parentheses. All: all therapeutic groups combined.
doi:10.1371/journal.pone.0075550.t002

TID) [6]. However it is important to mention that in Colombia the regulation only took place in the capital city, therefore we were expecting a bigger impact in Mexico and Brazil where the regulation took place throughout the country as in Chile. The differences observed between countries could be due to many factors, for example: the regulation implemented in Chile during 1999 was reinforced with an educational campaign and involvement of pharmacists. However these actions were not sustained and possibly because of this the consumption started to increase since 2002 [5]. However, we found no description of a nationwide campaign to promote appropriate use of antibiotics at the time that both regulations took place for Brazil and Mexico. In Mexico the government informed the public about the regulatory changes. In addition, in Mexico physician offices were installed within or right next to pharmacies only separated by a wall; pharmacies' customers demanding antibiotics OTC are referred to these physicians' offices to get a prescription. There is not yet evidence about antibiotics prescribing patterns by these offices; but, since their installment was explicitly recommended by market consultancy groups in Mexico as a way "to avoid losses from antibiotics sales" [9], it is probable that prescriptions for antibiotics issued in these offices partly compensated for OTC sales of antibiotics. Although in Brazil a copy of the prescription for an antibiotic is required to be retained; however, there are anecdotal reports of problems in the verification of the prescription retention, and thus the policy might not be fully implemented. Therefore, from April 2013 onwards antibiotics are included into the National Controlled Substances Management (SNGPC) to improve the monitoring of their consumption. Pharmacies nationwide must submit information electronically concerning drugs subject to the reporting national system [14]. The SNGPC is an important regulatory tool for monitoring drug use nationally and played a key role in the removal of some appetite suppressant drugs from the Brazilian market when the data confirmed abuse [22]; thus, further changes in antibiotics consumption might be observed from 2013.

In the present study, in both countries, the therapeutic group of penicillins was the group with the major consumption and had the highest contribution to the seasonality patterns observed in the total consumption. High seasonal fluctuations in antibiotics consumption suggest inadequate use for viral acute respiratory tract infections (ARI) [23]. Graphically, we observed a change in the seasonality patterns after the policy started, particularly for Mexico, with less difference between consumption in winter and summer than before the regulations started. Penicillins has been reported to be the most common group for self-medication in Mexico [7]. The observed effect on seasonality may be due to the reduction of self-medication with antibiotics for acute respiratory infections. This seems to be confirmed by the fact that we found only a very small change in the overall percentage of consumption

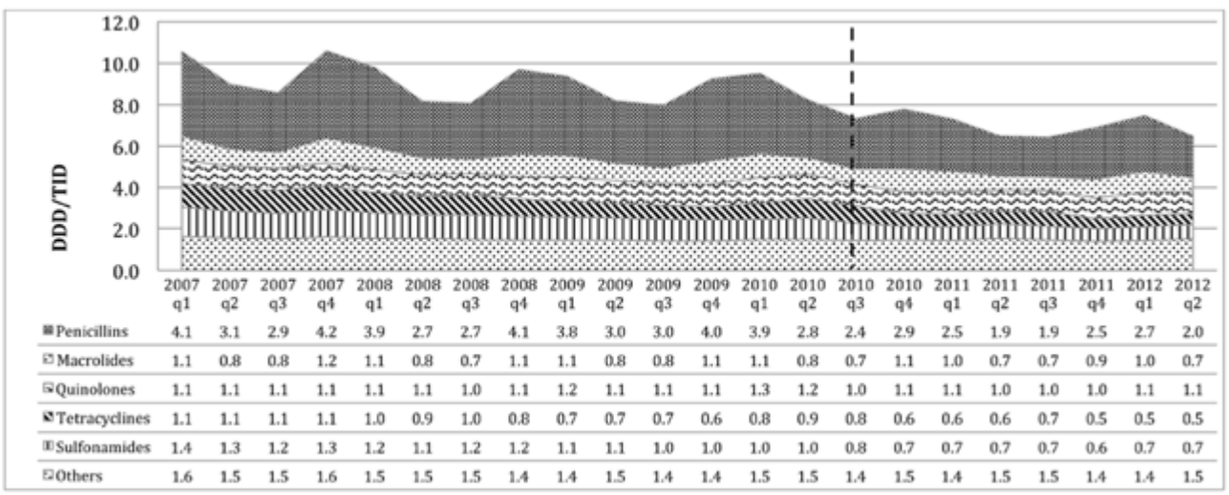


Figure 3. Consumption of antibiotics therapeutic subgroups in Mexico. The dotted line represents the beginning of the regulation to prohibit the OTC sales of antibiotics.
doi:10.1371/journal.pone.0075550.g003

of each of the therapeutic groups. The reduction in the percentage of penicillins (5%) out of total antibiotic consumption was replaced by macrolides and quinolones.

More work is required to generate evidence on how to develop an appropriate and effective policy to reduce inappropriate antibiotics consumption in the context of health system reforms in Latin America, where barriers to access to medicines for the poor population, economic crisis, and inadequate prescription and self-medication practices place important challenges. Even though regulating sales of antibiotics is relevant to promote appropriate use, it is only one component of a more comprehensive strategy that is required; campaigns targeting public promoting appropriate use of antibiotics and interventions directed to medical staff are also important to ensure adequate antibiotics consumption. Implementing monitoring systems to track the implementation of the regulation in terms of consumption, antibiotic resistance and infections rates are also core components of a more comprehensive strategy.

Conclusions

Despite different overall usage patterns of antibiotics in Brazil and Mexico, the effect of the policy enforcing OTC restrictions on antibiotics usage was similar. In Brazil the trend of increase usage of antibiotics was tempered after the OTC restrictions, in Mexico the trend of decreased usage was boosted. The reinforcement of regulations banning the OTC sales of antibiotics need to be monitored together with the development of more comprehensive measures to promote adequate utilization of antibiotics in both countries.

Author Contributions

Analyzed the data: YS VJW AKM. Wrote the paper: YS AKM VJW AD HGML.

References

1. Diekema DJ, Brueggemann a B, Doern GV (2000) Antimicrobial-drug use and changes in resistance in Streptococcus pneumoniae. Emerging infectious diseases 6: 552–556. doi:10.3201/eid0605.000519.
2. Goossens H, Ferech M, Vander Stichele R, Elseviers M (2005) Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet 365: 579–587. doi:10.1016/S0140-6736(05)17907-0.
3. Pan American Health Organization (2004) Legislación sobre antibióticos en América Latina. Washington, D.C. Available: http://www1.paho.org/spanish/ad/dpc/cd/amr-legis.pdf. Accessed 2013 March 2.
4. Bavestrello L, Cabello A, Casanova D (2002) [Impact of regulatory measures in the trends of community consumption of antibiotics in Chile]. Revista médica de Chile 130: 1265–1272. Available: http://www.ncbi.nlm.nih.gov/pubmed/12587509. Accessed 2013 April 17.
5. Bavestrello FL, Cabello MÁ (2011) Consumo comunitario de antimicrobianos en Chile, 2000–2008. Revista chilena de infectología 28: 107–112. doi:10.4067/S0716-10182011000200001.
6. Wirtz VJ, Herrera-Patino JJ, Santa-Ana-Tellez Y, Dreser A, Elseviers M, et al. (2013) Analysing policy interventions to prohibit over-the-counter antibiotic sales in four Latin American countries. Tropical medicine & international health□: TM & IH. doi:10.1111/tmi.12096.
7. Wirtz VJ, Dreser A, Gonzales R (2010) Trends in antibiotic utilization in eight Latin American countries, 1997–2007. Revista panamericana de salud pública = Pan American journal of public health 27: 219–225.
8. Dreser A, Wirtz VJ, Corbett KK, Echániz G (2008) Uso de antibióticos en México: revisión de problemas y políticas. Salud Pública de México 50: S480–S487. Available: http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0036-36342008001000009&lng=en&nrm=iso&tlng=en. Accessed 2013 April 17.
9. Dreser A, Vázquez-Vélez E, Treviño S, Wirtz VJ (2012) Regulation of antibiotic sales in Mexico: an analysis of printed media coverage and stakeholder participation. BMC public health 12: 1051. doi:10.1186/1471-2458-12-1051.
10. Diario Oficial de la Federacinó(2010) Acuerdo por el que se determinan los lineamientos a los que estará sujeta la venta y dispensación de antibióticos. Available: http://dof.gob.mx/nota_detalle.php?codigo=5144336&fecha=27/05/2010. Accessed 2012 November 17.
11. IMS Health (2006) Pharmerging shake-up. Available: http://www.imshealth.com/ims/Global/Content/Insights/Featured Topics/Emerging Markets/Pharma_Shake-up_Imperatives.pdf. Accessed 2013 April 2
12. Pfarma (n.d.) Pfarma. Available: http://pfarma.com.br/noticia-setor-farmaceutico/legislacao-farmaceutica/387-rdc-44-2010-antibioticos.html. Acessed 2013 April 4
13. ANVISA (2010) Resolução da Diretoria Colegiada – RDC N° 44, de 26 de Outubro de 2010. 26/10/10. Available: http://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2010/res0044_26_10_2010.html. Accessed 2012 December 11.
14. ANVISA (2013) Definida nova data para controle eletrônico de antibióticos. 17/01/2013. Available: http://portal.anvisa.gov.br/wps/content/anvisa+portal/anvisa/sala+de+imprensa/menu+-+noticias+anos/2013+noticias/definida+nova+data+para+controle+eletronico+de+antibioticos. Accessed 2013 April 18.
15. Pan American Health Organization (1999) Prevention and Control of Antimicrobial Resistance. Available: http://www1.paho.org/English/AD/DPC/CD/RegionalPlanParaguay.pdf. Acessed 2013 March 21
16. World Health Organization Collaborating Centre for Drug Statistics Methodology Norwegian Institute of Public Health, (Intitution O (2012) ATC/DDD Index. 2012. Available: http://www.whocc.no/atc_ddd_index/. Accessed 2012 November 12
17. Pan American Health Organization (n.d.) Pan American Health Organization Data Tabulator. Available: http://www.paho.org/English/SHA/coredata/tabulator/newTabulator.htm. Accessed 2012 November 12
18. Wagner AK, Soumerai SB, Zhang F, Ross-Degnan D (2002) Segmented regression analysis of interrupted time series studies in medication use research. Journal of clinical pharmacy and therapeutics 27: 299–309.
19. Chipman JS (1979) Efficiency of Least-Squares Estimation of Linear Trend when Residuals Are Autocorrelated. Econometrica 47: 115–128.
20. StataCorp (2011) Stata Statistical Software: Release 12.
21. Health IMS (2008) Pharmaceutical Market, Mexico and Brazil. London.
22. ANVISA (2012) Sistema de gerenciamento de produtos controlados completa cinco anos de funcionamento. 30/03/2012. Available: http://portal.anvisa.gov.br/wps/content/anvisa+portal/anvisa/sala+de+imprensa/menu+-+noticias+anos/2012+noticias/sistema+de+gerenciamento+de+produtos+controlados+completa+cinco+anos+de+funcionamento. Accessed 2013 April 1.
23. Ferech M, Coenen S, Malhotra-Kumar S, Dvorakova K, Hendrickx E, et al. (2006) European Surveillance of Antimicrobial Consumption (ESAC): outpatient antibiotic use in Europe. The Journal of antimicrobial chemotherapy 58: 401–407. Available: http://www.ncbi.nlm.nih.gov/pubmed/16735414. Accessed 2013 April 4.

Capítulo 6.
Equidad en el acceso a los servicios de salud

El acceso equitativo a los servicios de salud se refiere a que todas las personas, sin importar su situación social, laboral, económica, geográfica o cultural puedan acceder a servicios de salud de calidad, oportunos y adecuados. Representa uno de los objetivos fundamentales de todo sistema sanitario y es una condición indispensable para alcanzar la cobertura universal de salud. Desde su fundación, el CISS ha realizado investigación pertinente e innovadora en este tema, lo que ha permitido generar evidencia sobre las disparidades existentes en México, las cuales ponen en desventaja sistemática a ciertos grupos poblacionales. De una extensa obra académica y científica, hemos seleccionado cinco artículos que documentan brechas en el acceso a servicios de salud que, por ser injustas, evitables y modificables, son expresiones de inequidades en salud.

En uno de ellos, se presentan evidencias sobre cómo el acceso y la continuidad de la atención médica se ven interrumpidos por la rotación laboral, tanto en el sector formal como en el informal, lo que segmenta el acceso y el derecho a la atención médica según la posición laboral del trabajador. Otra de las publicaciones destaca los efectos de la segmentación y la fragmentación del sistema de salud mexicano en el uso de servicios ambulatorios en personas que viven con una enfermedad crónica no transmisible, y la existencia de una brecha de género en la probabilidad de acceder a servicios de salud. El estudio muestra que, en comparación con las mujeres, los hombres tienen una probabilidad incremental menor de caer en la categoría de no uso de servicios de salud, fueron más propensos a utilizar servicios de proveedores correspondientes a su seguro de salud y mostraron una probabilidad incremental menor de utilizar servicios privados.

Un estudio pionero para México sobre las coberturas en el continuo de atención materna (CAM) —el conjunto de acciones continuas e intervenciones de salud que una mujer debe recibir durante el embarazo, parto y puerperio— fue publicado en 2013. El artículo presentó un índice compuesto para medir esta cobertura e identificar la magnitud de las brechas entre distintas poblaciones de embarazadas. Dentro de esta línea de investigación, otro de los artículos seleccionados realizó una propuesta innovadora de un indicador más integral para medir las coberturas en el CAM. En esta publicación se realiza la propuesta del indicador de atención materna adecuada o idónea como un proxy de calidad de la atención durante el embarazo. Su aplicación, ha permitido evidenciar desigualdades en el acceso a la atención materna adecuada de acuerdo con la edad, nivel educativo, tipo de aseguramiento médico, nivel socioeconómico y condición étnica. Así, ha permitido mostrar que las mujeres adolescentes, las de menor nivel educativo, las que carecen de seguridad

social, las de menor nivel socioeconómico y las indígenas tienen menores probabilidades de recibir una atención adecuada durante el embarazo, parto y puerperio.

Finalmente, un quinto artículo documenta las desigualdades de acceso a los servicios de salud, ante una necesidad de atención, a partir de la estimación de un índice de desigualdad por nivel socioeconómico en la población de localidades de menos de 100 000 habitantes de México; un grupo que suele padecer mayores condiciones de pobreza.

Estas investigaciones han evidenciado la condición de vulnerabilidad y desventaja social de algunos grupos sociales y han apoyado la toma de decisiones para el fortalecimiento de programas y políticas de salud que buscan la equidad en el acceso a los servicios de salud.

Serván-Mori *et al.*
Global Health Research and Policy (2024) 9:40
https://doi.org/10.1186/s41256-024-00377-8

Global Health
Research and Policy

RESEARCH

Open Access

The gender gap in outpatient care for non-communicable diseases in Mexico between 2006 and 2022

Edson Serván-Mori[1], Ileana Heredia-Pi[1*], Carlos M. Guerrero-López[1], Stephen Jan[2,3,4], Laura Downey[2,3], Rocío Garcia-Díaz[5], Gustavo Nigenda[6], Emanuel Orozco-Núñez[1], María de la Cruz Muradás-Troitiño[7], Laura Flamand[8], Robyn Norton[2,3] and Rafael Lozano[9,10]

Abstract

Background Equitable health service utilization is key to health systems' optimal performance and universal health coverage. The evidence shows that men and women use health services differently. However, current analyses have failed to explore these differences in depth and investigate how such gender disparities vary by service type. This study examined the gender gap in the use of outpatient health services by Mexican adults with non-communicable diseases (NCDs) from 2006 to 2022.

Methods A cross-sectional population-based analysis of data drawn from National Health and Nutrition Surveys of 2006, 2011–12, 2020, 2021, and 2022 was performed. Information was gathered from 300,878 Mexican adults aged 20 years and older who either had some form of public health insurance or were uninsured. We assessed the use of outpatient health services provided by qualified personnel for adults who reported having experienced an NCD and seeking outpatient care in the 2 weeks before the survey. Outpatient service utilization was disaggregated into four categories: non-use, use of public health services from providers not corresponding to the user's health insurance, use of public health services from providers not corresponding to the user's health insurance, and use of private services. This study reported the mean percentages (with 95% confidence intervals [95% CIs]) for each sociodemographic covariate associated with service utilization, disaggregated by gender. The percentages were reported for each survey year, the entire study period, the types of service use, and the reasons for non-use, according to the type of health problem. The gender gap in health service utilization was calculated using predictive margins by gender, type of disease, and survey year, and adjusted through a multinomial logistic regression model.

Results Overall, we found that women were less likely to fall within the "non-use" category than men during the entire study period (21.8% vs. 27.8%, $P<0.001$). However, when taking into account the estimated gender gap measured by incremental probability and comparing health needs caused by NCDs against other conditions, compared with women, men had a 7.4% lower incremental likelihood of falling within the non-use category ($P<0.001$), were 10.8% more likely to use services from providers corresponding to their health insurance ($P<0.001$), and showed a 12% lower incremental probability of using private services ($P<0.001$). Except for the gap in private service utilization, which tended to shrink, the others remained stable throughout the period analyzed.

*Correspondence:
Ileana Heredia-Pi
ileana.heredia@insp.mx
Full list of author information is available at the end of the article

© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

Conclusion Over 16 years of outpatient service utilization by Mexican adults requiring care for NCDs has been characterized by the existence of gender inequalities. Women are more likely either not to receive care or resort to using private outpatient services, often resulting in catastrophic out-of-pocket expenses for them and their families. Such inequalities are exacerbated by the segmented structure of the Mexican health system, which provides health insurance conditional on formal employment participation. These findings should be considered as a key factor in reorienting NCD health policies and programs from a gender perspective.

Keywords Gender gap, Health service utilization, Segmentation, Outpatient health services, Non-communicable diseases, Universal health coverage, Mexico

Background

The burden of non-communicable diseases (NCDs) is rapidly increasing in low- and middle-income countries (LMICs) [1–9]. Its impact on the financial sustainability of their health systems [8, 9] and the NCD-associated costs stemming from high levels of social inequality [10] requires that LMICs reorient the actions of their health systems towards effectively combating NCDs [2, 7, 9, 11].

Equal access to effective health services is a pillar of health system performance [12–14] and critical from a human right perspective on health [15–17]. Access is achieved when individuals recognize their health needs and demand care. It also requires that health services meet several fundamental conditions, such as being geographically available, well-organized, affordable, of good quality, and acceptable. People must be able to access healthcare facilities to benefit from the supply of services, regardless of socioeconomic condition, ethnic status, gender, or place of residence [18]. The failure to meet these conditions leads to suboptimal and inequitable service utilization [1], unfavorable health outcomes [19], and loss of social well-being [20]. Within this context, utilization is intrinsically linked to effective access [21].

Before LMICs can address the barriers to accessing health services [22], they must fully understand their social and systemic determinants and pathways [23]. Despite its importance as a health determinant [24], studies in these countries have largely ignored gender when analyzing the effective use of health services for the care of people with NCDs [23, 25]. According to The Canadian Institutes of Health Research, unlike biological sex, *gender refers to the socially constructed roles, behaviors, expressions, and identities of girls, women, boys, men, and gender-diverse people. It influences how people perceive themselves and each other, how they act and interact, and the distribution of power and resources in society* [26]. In highly unequal contexts, such as those prevailing in LMICs, gender is rooted in an environment marked by an asymmetric exercise of power and fundamental rights as well as institutionalized disparities in men's and women's access to and use of social services [23, 27].

Gender not only influences how men and women work, perceive diseases, and contract illnesses, but also determines how they seek, access, and use health services, receive care, and are treated by health systems [28]. Despite its relevance, research on health service utilization in LMICs [1, 29–31] has assessed these differences exclusively by sex, overlooking their intersection with multiple social vulnerabilities [32], and thus underestimating the health-related disparities associated with gender [25]. Gender is a critical factor in health status, care access and utilization, and care quality. However, gender comparisons are incomplete without considering the underlying social and economic conditions [33]. Studies rarely explore the interaction of gender with variables unrelated to biological determinants, such as health insurance coverage, income, the capacity to pay for health services, autonomy in decision-making, the burden of family responsibilities, and care models [27]. Additionally, gender asymmetries in health service use are linked to how health care is organized and coordinated [34, 35].

More in-depth analyses of health system segmentation ("*health coverage of the population by position in the labor market*") [36] are required to fully understand its impact on meeting health system objectives such as efficiency, effectiveness, equity, and the provision of financial protection to the population [36, 37]. Segmentation denotes an uneven distribution of healthcare benefits among social groups. It occurs where access to essential social services for a substantial proportion of the population is contingent on market forces with the potential to induce institutionalized bias in public systems [37–40]. Constituting an explicit government policy, the health system segmentation simultaneously is a cause and consequence of institutionalized mechanisms of systematic exclusion and structural discrimination. These factors undermine the effective exercise of the right to health, especially for the most vulnerable groups [36–41]. Analyzing segmentation specifically would shed light on health systems' underlying dynamics, including barriers to effectively using their goods and services [42]. Nevertheless, very few empirical studies have addressed health system segmentation in LMICs [43].

Mexico, the 15th largest economy [44] and 10th most populous country in the world (second in Latin America and the Caribbean) [45], is experiencing a large and growing burden of NCDs, with men bearing the brunt, except in the case of cancers, which are more prevalent among women [46, 47]. This is occurring within the context of a society characterized by conservative attitudes regarding gender roles [48] and a segmented health system with a corporatist structure [36, 37]. The latter was reaffirmed in 2020, when the government reformed Article 4 of the Mexican Constitution [37], dividing the population into two groups: individuals linked directly/indirectly to the formal economy, enjoying Social Security coverage (50.2% of its population), and the rest, employed in the informal economy, lacking such coverage from a direct source [49]. To date, studies on the use of NCD-related health services have failed to incorporate in-depth analyses from a gender perspective [29–31, 50, 51] and have overlooked its link with health system segmentation and the role of segmentation in generating and deepening health inequalities and limiting quality of care [36]. Furthermore, while several studies suggest that outpatient care tends to be more discretionary and susceptible to social norms, gender bias, and discrimination, there is limited research on this topic in LMICs [33, 52–54], including Mexico.

Based on these factors, this study examined the evolution of the gender gap in the use of outpatient health services provided by trained personnel (doctors, nurses, and other health professionals) among Mexican adults experiencing NCDs from 2006 to 2022. We hypothesized that segmentation in the Mexican health system exacerbated the gender disparities experienced by women and men in the use of services for NCD care.

Methods

Design and study population

We conducted a joint cross-sectional population analysis using data from the 2006, 2011–2012, 2020, 2021, and 2022 waves of the National Health and Nutrition Survey (*ENSANUT* by its initials in Spanish). We excluded data from the National Health Survey (*ENSA* by its initials in Spanish) 2000 and the *ENSANUT* 2018–2019 due to a lack of comparability in measuring our outcome. The methodological characteristics of *ENSANUT* have been published elsewhere [55–59]. The *ENSANUT* protocols (available at https://ensanut.insp.mx/) were approved by the Ethics and Biosafety Committees of the National Institute of Public Health in Mexico.

We analyzed data from 312,509 Mexican adults (20 years and older) who were either covered by some form of public health insurance or lacked health insurance. Information was gathered from the following survey modules: sociodemographic characteristics, self-reported health needs (concerning illnesses or physical injuries from accidents or assaults) in the 2 weeks before the survey, types of health problems, and the search for and use of outpatient health services. After excluding 3.7% of surveyed individuals with incomplete information on the characteristics of interest, we analyzed data from a final sample of 300,878 adults, nationally representing 193.3 and 175.4 million women and men, respectively, during the study period. The sociodemographic and health profiles were similar for the excluded and the analyzed individuals.

Variables

We assessed the use of outpatient health services provided by qualified personnel (doctors, nurses, and other health professionals) to adults who reported having experienced an NCD (cardiovascular and metabolic diseases and risk factors, neurological disorders, cancer, chronic respiratory problems, chronic renal conditions, mental illnesses, and drug abuse [60]) and seeking outpatient care in the 2 weeks before the survey. This time frame of health service utilization was selected to ensure comparability across the different waves of *ENSANUT* and following the recommendations of the international literature which suggest that although a longer recall period may yield a greater quantity of information, the accuracy of the information decreases as the period increases [61].

We approached health system segmentation in Mexico by disaggregating adults into two user subgroups: (i) those receiving outpatient care from providers under their health insurance schemes, and (ii) those receiving outpatient care from private or public providers not belonging to their health insurance schemes. We instrumentalized this variable into four categories of usage patterns: non-use = 0, use of public health services from providers corresponding to the user's health insurance = 1, use of public health services from providers not correspond to the user's health insurance = 2, and use of private health services = 3. We considered gender as a binary variable, since data sources collected gender in this way, without distinguishing non-binary genders.

We also analyzed a relevant set of covariates [30, 50, 51, 62–70]: (i) *at the individual level:* age (20–39, 40–59 and ≥ 60 years), marital status (married/free union, divorced/separated/widowed, and single), employed in the last week (yes = 1, no = 0), head of household (yes = 1, no = 0), schooling (in years), health insurance coverage (none, Social Security or *Seguro Popular de Salud*), reasons for non-use pertaining to supply-side problems (related to opening hours, distance to the health facility, insufficient supplies or personnel, delay in the provision of care, and mistreatment by service providers), and

reasons for non-use pertaining to the demand-side factors (personal decision, financial problems, or feeling that care was unnecessary); (ii) *at the household level:* indigenous status (yes = 1, no = 0), identified according to the official guidelines, where households are considered indigenous if the head of household, a spouse and/or an older relative such as a grandmother speaks one of Mexico's indigenous languages [71, 72], and a standardized index (in tertiles) comprised of factorial assets and housing materials as a measure of socioeconomic status [73], where higher values indicated a larger number of assets and better housing conditions; and (iii) *area of residence:* rural/urban/metropolitan, covered by a social program and ranked according to a factorial social-deprivation index (in tertiles) including municipal access to basic public services, housing conditions and income, where higher values indicated higher levels of municipal social development [74], and designated by geographic region (Pacific-North, Border, Pacific-Central, Center-North, Center, Mexico City and State of Mexico, Pacific-South and the Yucatan Peninsula).

Statistical analysis

We initially calculated averages and percentages (with a 95% confidence interval [95% CI]) for the previously described covariates by gender, survey year, and the entire period analyzed, as well as for the categories of use and reasons for non-use concerning NCDs and other health conditions ($\overline{NCD}$). We then estimated the gender gap in health service utilization for NCD care, based on predictive margins and adjusted predictions (*aPred*) in a multinomial logistic regression model, controlling for all the sociodemographic characteristics mentioned above and for survey-year fixed effects. Predictions were formulated by gender (male or female), type of disease (NCD or $\overline{NCD}$), and survey year. Gender gaps were estimated using the following formula:

$$Gender\ gap_t = \left\{ \left[\frac{\left(aPred_{NCD,Male,t} / aPred_{\overline{NCD},Male,t}\right) - 1}{\left(aPred_{NCD,female,t} / aPred_{\overline{NCD},female,t}\right) - 1} \right] - 1 \right\} \times 100$$

In this metric, positive values indicated a greater incremental likelihood (percentage) of occurrence for men than for women regarding health service utilization for NCD care and health needs unrelated to NCDs. These gaps and their 95% CIs were computed using a nonlinear combination based on the delta method in the Stata statistical package *nlcom* command [75, 76]. We performed all analyses considering a complex survey design and sampling weights using the *svy* package module [77].

Results

The study included a greater percentage of men than women between the ages of 20 and 39 years, contrary to our findings for the age group ≥ 60 years (Table 1). The percentage of divorced, separated, or widowed individuals was greater among women (18.1% vs. 7.7%), while the percentage of individuals married or in a free union was greater among men (66.1% vs. 59.3%). Women's participation in the labor market increased considerably during the period analyzed, rising from 29.9% in 2006 to 47.5% in 2022, but remained stable for men at approximately 78%. Although the percentage of heads of household was greater for men (61.4% vs. 22.4%), it grew by as much as 65% for women over the years. Men reported a greater average level of schooling (9.3 vs. 8.9 years); however, the difference diminished towards the end of the period analyzed. Before 2019, *Seguro Popular* coverage was greater among women (9.8% vs. 8.2% in 2006 and 36.7% vs. 30.2% in 2011–2012); conversely, after 2019, the lack of public health-insurance coverage was 65% greater among women. The characteristics pertaining to household and place of residence were similar for men and women: 8% lived in indigenous homes, 40% lived in homes of low or medium socioeconomic level, and 80% lived in urban/metropolitan localities situated in low-marginalization municipalities, 20% of which enjoyed coverage by social programs. Their geographic distribution was also similar.

The percentage of adults reporting health problems in the 2 weeks before the survey was greater among women than among men (12.4% vs. 8.6%, $P < 0.001$) (Fig. 1, Panel A). It peaked in 2011–2012 (15.9% vs. 11.7%, $P < 0.001$) but decreased in 2022 (13.4% vs. 8.0%, $P < 0.001$) (Fig. 1, Panel A). Among adults who reported health needs, the percentage of those presenting at least one NCD was also slightly greater among women during the period of analysis (22.8% vs. 21.4%, $P < 0.1$) (Fig. 1, Panel B). It decreased from 19.2% (vs. 16.4%, $P < 0.001$) in 2006 to 18.1% (vs. 14.2%, $P < 0.001$) in 2011–2012, but then increased and stabilized at approximately 26%, with no differences observed between men and women (Fig. 1, Panel B). Additional estimates (Annex 1) show that, after controlling for all previously described covariates, the relative likelihood of reporting at least one NCD was 23.1% lower in men than in women (relative probability ratio = 0.769, 95% CI: 0.675, 0.877). It increased with age and among those who were not working or had less education.

Table 1 Main characteristics of Mexican adults analyzed according to gender, 2006–2022

	2006–2022		2006		2011–2012		2020		2021		2022	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Population weighted	193,285,494	175,439,218	31,049,866	26,471,190	34,960,029	32,000,379	41,805,418	38,281,590	42,538,225	39,281,789	42,921,876	39,414,352
%	52.4	47.6	54.0	46.0	52.2	47.8	52.2	47.8	52.0	48.0	52.1	47.9
	Calculated percentage or average [95% CI]											
Age (in years), %												
20–39	47.2 [46.7, 47.8]	48.4 [47.9, 48.9]	50.5 [49.7, 51.2]	50.3 [49.7, 51.0]	51.5 [50.8, 52.1]	52.0 [51.4, 52.7]	44.9 [43.7, 46.0]	46.4 [45.2, 47.5]	45.5 [44.3, 46.7]	47.6 [46.4, 48.7]	45.6 [44.1, 47.0]	47.1 [45.6, 48.5]
40–59	34.4 [34.0, 34.8]	33.9 [33.5, 34.4]	32.8 [32.3, 33.3]	33.0 [32.5, 33.6]	33.3 [32.8, 33.8]	33.4 [32.8, 33.9]	35.7 [34.8, 36.6]	34.6 [33.5, 35.6]	35.4 [34.5, 36.3]	33.8 [32.8, 34.7]	34.1 [33.0, 35.2]	34.6 [33.2, 36.0]
≥ 60	18.4 [17.9, 18.8]	17.6 [17.2, 18.1]	16.8 [16.2, 17.4]	16.6 [16.0, 17.3]	15.2 [14.7, 15.8]	14.6 [14.1, 15.1]	19.4 [18.4, 20.4]	19.1 [18.1, 20.1]	19.1 [18.2, 20.1]	18.7 [17.7, 19.7]	20.4 [19.1, 21.6]	18.3 [17.2, 19.5]
Marital status, %												
Married/ free union	59.3 [58.7, 59.9]	66.1 [65.5, 66.6]	64.0 [63.2, 64.8]	72.4 [71.6, 73.2]	62.6 [61.9, 63.3]	70.0 [69.3, 70.6]	57.2 [56.1, 58.4]	62.5 [61.3, 63.7]	58.3 [57.1, 59.6]	64.4 [63.2, 65.6]	56.1 [54.4, 57.8]	63.8 [62.3, 65.3]
Divorced/ separated/ widowed	18.1 [17.8, 18.5]	7.7 [7.4, 7.9]	15.8 [15.4, 16.3]	5.2 [4.9, 5.5]	16.8 [16.4, 17.2]	6.4 [6.1, 6.7]	19.3 [18.5, 20.0]	8.8 [8.2, 9.5]	18.7 [17.9, 19.5]	8.7 [8.1, 9.4]	19.2 [18.2, 20.2]	8.0 [7.4, 8.7]
Single	22.6 [22.1, 23.1]	26.3 [25.8, 26.8]	20.2 [19.6, 20.8]	22.4 [21.7, 23.1]	20.6 [20.0, 21.2]	23.6 [23.1, 24.2]	23.5 [22.5, 24.4]	28.6 [27.5, 29.7]	23.0 [21.9, 24.0]	26.9 [25.7, 28.0]	24.7 [23.2, 26.2]	28.2 [26.8, 29.5]
Employed in the last week, %	39.5 [38.9, 40.1]	77.7 [77.2, 78.1]	29.9 [29.2, 30.6]	76.6 [75.9, 77.3]	35.8 [35.1, 36.6]	78.9 [78.3, 79.6]	40.2 [38.8, 41.5]	74.6 [73.5, 75.7]	40.6 [39.4, 41.9]	76.6 [75.5, 77.6]	47.5 [45.9, 49.2]	81.3 [80.2, 82.5]
Head of household, %	22.4 [22.0, 22.9]	61.4 [60.9, 62.0]	15.9 [15.5, 16.4]	67.4 [66.7, 68.1]	19.1 [18.6, 19.6]	65.4 [64.8, 66.1]	23.3 [22.4, 24.2]	57.6 [56.4, 58.9]	25.3 [24.2, 26.4]	60.6 [59.4, 61.8]	26.2 [25.0, 27.4]	58.7 [57.1, 60.2]
Schooling (in years), avg	8.9 [8.8, 9.0]	9.3 [9.2, 9.4]	7.4 [7.2, 7.5]	8.0 [7.9, 8.2]	8.1 [8.0, 8.2]	8.6 [8.4, 8.7]	9.5 [9.3, 9.7]	9.8 [9.6, 10.0]	9.5 [9.3, 9.7]	9.8 [9.5, 10.0]	9.5 [9.3, 9.8]	9.8 [9.6, 10.1]
Ethnicity: indigenous, %	7.6 [6.9, 8.4]	7.8 [7.1, 8.5]	8.5 [7.4, 9.7]	8.8 [7.6, 10.0]	8.7 [7.7, 9.7]	8.7 [7.7, 9.7]	7.6 [5.6, 9.7]	7.9 [5.8, 10.1]	6.3 [4.7, 7.8]	6.3 [4.7, 8.0]	7.5 [5.4, 9.6]	7.6 [5.6, 9.7]
Health insurance, %												
Nothing	47.3 [46.4, 48.3]	48.6 [47.6, 49.6]	51.1 [50.0, 52.2]	53.0 [51.8, 54.2]	23.4 [22.7, 24.2]	29.9 [29.1, 30.7]	53.0 [50.7, 55.2]	53.2 [51.0, 55.4]	53.1 [50.8, 55.5]	52.7 [50.2, 55.2]	52.8 [50.2, 55.3]	52.3 [49.6, 55.0]
Social security	44.5 [43.6, 45.3]	44.7 [43.7, 45.6]	39.1 [37.9, 40.3]	38.9 [37.6, 40.1]	39.8 [38.6, 41.0]	39.9 [38.8, 41.1]	47.0 [44.8, 49.3]	46.8 [44.6, 49.0]	46.9 [44.5, 49.2]	47.3 [44.8, 49.8]	47.2 [44.7, 49.8]	47.7 [45.0, 50.4]
Seguro popular	8.2 [7.7, 8.7]	6.7 [6.3, 7.2]	9.8 [8.9, 10.7]	8.2 [7.4, 9.0]	36.7 [35.6, 37.8]	30.2 [29.1, 31.2]	–	–	–	–	–	–
Socioeconomic level, %												
Low	11.1 [10.4, 11.7]	11.3 [10.6, 11.9]	17.9 [16.6, 19.3]	18.5 [17.1, 19.9]	10.8 [10.0, 11.6]	11.3 [10.4, 12.1]	9.6 [7.8, 11.5]	10.2 [8.2, 12.2]	9.3 [7.8, 10.9]	9.6 [7.9, 11.2]	9.4 [7.3, 11.5]	9.1 [7.1, 11.2]

Table 1 (continued)

	2006–2022		2006		2011–2012		2020		2021		2022	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Middle	30.6 [29.9, 31.4]	29.9 [29.1, 30.7]	37.4 [36.2, 38.7]	36.9 [35.6, 38.2]	32.7 [31.7, 33.8]	32.2 [31.1, 33.2]	27.1 [25.3, 29.0]	26.6 [24.8, 28.5]	28.6 [26.7, 30.6]	27.9 [26.0, 29.8]	29.2 [27.3, 31.2]	28.5 [26.5, 30.5]
High	58.3 [57.3, 59.3]	58.8 [57.8, 59.9]	44.6 [42.9, 46.4]	44.6 [42.8, 46.3]	56.4 [55.0, 57.9]	56.5 [55.1, 58.0]	63.2 [60.5, 65.9]	63.2 [60.4, 66.0]	62.0 [59.2, 64.8]	62.6 [59.7, 65.4]	61.4 [58.4, 64.4]	62.4 [59.3, 65.4]
Area of residence, %												
Rural	20.4 [19.2, 21.7]	20.9 [19.7, 22.2]	20.8 [18.8, 22.9]	21.2 [19.1, 23.3]	20.7 [19.0, 22.5]	21.6 [19.8, 23.4]	21.1 [17.4, 24.8]	21.0 [17.2, 24.7]	19.7 [16.0, 23.4]	20.4 [16.6, 24.2]	19.9 [15.5, 24.4]	20.8 [16.3, 25.3]
Urban	26.9 [25.2, 28.6]	26.5 [24.9, 28.2]	24.3 [22.8, 25.8]	23.6 [22.1, 25.1]	19.0 [17.2, 20.8]	18.5 [16.7, 20.3]	30.2 [25.7, 34.6]	30.3 [25.8, 34.7]	29.5 [25.2, 33.8]	29.0 [24.7, 33.3]	29.3 [23.9, 34.8]	29.0 [23.7, 34.3]
Metropolitan	52.7 [51.1, 54.3]	52.5 [50.9, 54.1]	54.9 [52.9, 56.8]	55.2 [53.2, 57.2]	60.3 [58.2, 62.3]	59.9 [57.9, 62.0]	48.7 [44.1, 53.4]	48.8 [44.1, 53.4]	50.8 [46.2, 55.3]	50.6 [46.1, 55.2]	50.7 [44.9, 56.5]	50.2 [44.5, 55.9]
Social programs coverage, %	21.6 [21.0, 22.1]	21.4 [20.9, 21.9]	18.0 [16.1, 19.8]	17.5 [15.7, 19.3]	11.1 [10.7, 11.5]	11.0 [10.7, 11.4]	25.7 [24.5, 26.9]	25.4 [24.3, 26.6]	25.0 [23.8, 26.2]	25.0 [23.8, 26.1]	25.2 [23.7, 26.7]	24.9 [23.4, 26.3]
Municipality deprivation level, %												
Low	78.0 [76.6, 79.3]	78.8 [77.5, 80.1]	44.3 [41.8, 46.8]	45.3 [42.9, 47.8]	67.9 [65.8, 70.0]	68.9 [66.8, 70.9]	89.6 [86.6, 92.7]	89.7 [86.6, 92.8]	89.2 [85.9, 92.5]	89.4 [86.2, 92.6]	88.0 [84.2, 91.9]	88.2 [84.3, 92.0]
Middle	16.4 [15.1, 17.6]	15.9 [14.6, 17.2]	37.7 [35.2, 40.2]	37.2 [34.8, 39.7]	23.3 [21.2, 25.3]	22.4 [20.4, 24.4]	8.1 [5.4, 10.9]	8.2 [5.4, 11.0]	9.6 [6.4, 12.8]	9.6 [6.4, 12.7]	10.0 [6.4, 13.6]	10.3 [6.6, 14.0]
High	5.7 [5.0, 6.3]	5.3 [4.7, 5.8]	18.0 [16.2, 19.9]	17.5 [15.6, 19.3]	8.8 [7.5, 10.1]	8.7 [7.4, 10.0]	2.2 [0.7, 3.8]	2.1 [0.6, 3.6]	1.2 [0.0, 2.5]	1.0 [0.0, 2.1]	2.0 [0.3, 3.7]	1.6 [0.3, 2.8]
Geographic region,												
Pacific-North	8.9 [8.3, 9.6]	9.7 [9.0, 10.4]	8.7 [7.9, 9.4]	9.4 [8.5, 10.2]	8.8 [8.1, 9.5]	9.6 [8.9, 10.4]	9.1 [6.6, 11.6]	9.9 [7.2, 12.7]	8.9 [6.7, 11.0]	9.5 [7.2, 11.8]	9.2 [6.7, 11.8]	9.9 [7.2, 12.6]
Border	12.5 [11.7, 13.2]	13.2 [12.4, 13.9]	12.3 [11.3, 13.3]	13.4 [12.2, 14.5]	12.2 [11.4, 13.1]	12.9 [12.0, 13.8]	12.5 [9.1, 15.8]	13.1 [9.6, 16.5]	12.6 [9.5, 15.7]	13.3 [10.0, 16.5]	12.7 [10.1, 15.3]	13.3 [10.6, 16.0]
Pacific-Central	11.0 [9.8, 12.2]	11.0 [9.8, 12.1]	11.1 [9.7, 12.4]	10.5 [9.2, 11.8]	11.0 [9.8, 12.3]	11.0 [9.8, 12.2]	11.0 [8.2, 13.8]	11.2 [8.3, 14.0]	11.0 [7.4, 14.6]	11.1 [7.5, 14.6]	10.9 [5.9, 16.0]	11.0 [6.1, 15.8]
Centre-North	12.5 [11.7, 13.4]	12.4 [11.6, 13.2]	12.1 [11.1, 13.1]	11.5 [10.6, 12.4]	12.5 [11.4, 13.5]	12.2 [11.2, 13.2]	12.9 [9.6, 16.1]	12.8 [9.5, 16.1]	12.7 [10.5, 14.9]	12.7 [10.4, 14.9]	12.5 [10.1, 15.0]	12.6 [10.1, 15.1]
Centre	10.3 [9.2, 11.4]	9.9 [8.9, 11.0]	10.2 [9.0, 11.4]	10.0 [8.7, 11.3]	10.6 [9.2, 12.0]	10.2 [8.9, 11.6]	10.3 [7.6, 13.0]	9.9 [7.3, 12.5]	10.2 [6.8, 13.6]	9.8 [6.5, 13.2]	10.3 [6.2, 14.5]	9.9 [5.9, 13.8]
Mexico City and State of Mexico	22.3 [21.2, 23.4]	21.8 [20.7, 22.9]	24.1 [22.0, 26.2]	23.9 [21.8, 26.0]	22.4 [20.7, 24.2]	22.0 [20.3, 23.7]	21.8 [18.4, 25.2]	21.2 [17.8, 24.6]	22.0 [18.7, 25.3]	21.5 [18.2, 24.7]	21.7 [16.5, 26.9]	21.1 [15.9, 26.2]
South Pacific	12.8 [11.7, 13.9]	12.2 [11.1, 13.3]	12.7 [11.5, 13.9]	12.1 [11.0, 13.3]	13.0 [11.7, 14.2]	12.3 [11.1, 13.5]	12.7 [9.3, 16.2]	12.2 [8.8, 15.5]	12.7 [9.3, 16.0]	12.1 [8.9, 15.3]	12.8 [8.7, 16.9]	12.3 [8.4, 16.1]

Table 1 (continued)

	2006–2022		2006		2011–2012		2020		2021		2022	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Peninsula	9.6 [8.9, 10.4]	9.9 [9.1, 10.6]	8.9 [8.0, 9.8]	9.3 [8.3, 10.2]	9.5 [8.5, 10.4]	9.8 [8.8, 10.8]	9.7 [6.8, 12.6]	9.9 [7.0, 12.7]	10.0 [7.4, 12.5]	10.1 [7.6, 12.7]	9.8 [7.1, 12.5]	10.0 [7.2, 12.8]

[a] After the December 2018 elections, the new federal administration dismantled *Seguro Popular* and in its place established the Health Institute for Welfare (*Instituto de Salud para el Bienestar*, or *INSABI*) [36]. Data were drawn from the 2006, 2011–2012, 2020, 2021 and 2022 waves of the Mexican National Health and Nutrition Survey (*ENSANUT* by its initials in Spanish). Estimates were based on the complex survey design and sampling weights

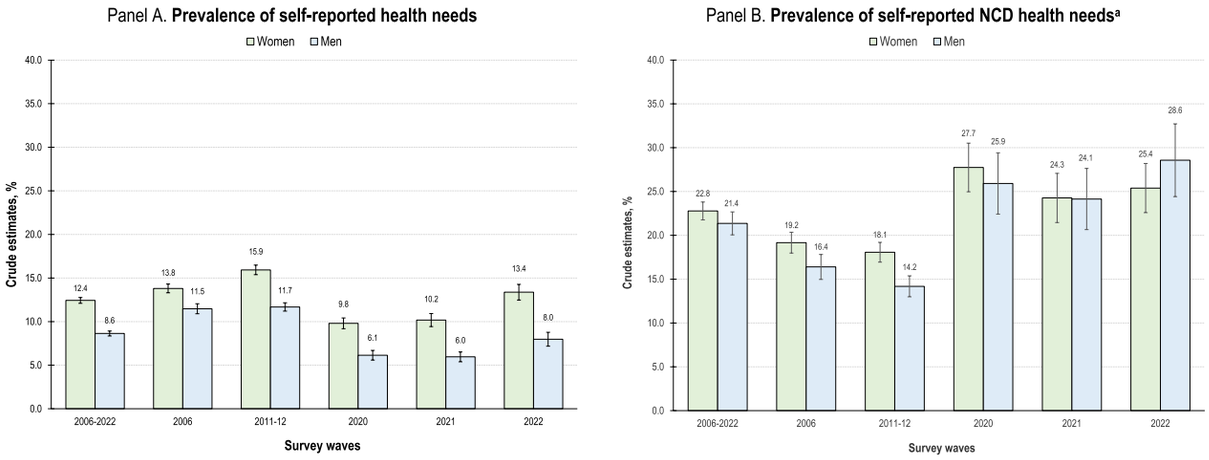


Fig. 1 Prevalence of self-reported NCDs and other health needs among Mexican adults according to gender, 2006–2022. [a]Prevalence estimates for adults who reported a health problem in the 2 weeks prior to the survey. Data drawn from the 2006, 2011–2012, 2020, 2021 and 2022 waves of the Mexican National Health and Nutrition Survey (*ENSANUT* by its initials in Spanish). Estimates based on complex survey design and sampling weights

Among those who reported health needs (Fig. 2), the percentage of health service users was greater for women than for men (66.7% vs. 58.4%, $P<0.001$). This percentage declined from 46.3% (vs. 38.5%) in 2006 to 39.7% (vs. 31.8%, $P<0.001$) in 2011–12, but then increased significantly to 84.5% (vs. 78.6%, $P<0.001$) in 2022 (Fig. 2, Panel A). Among those adults who sought NCD care, the percentage of users, which grew towards the end of the period analyzed, was similar for men and women (77%), except in 2006 (62.2% vs. 54.2%, $P<0.001$). It fell to 45% in 2011–2012 and then increased to approximately 90% in subsequent years (Fig. 2, Panel B).

The primary reasons for not using health services were related to the demand-side factors (86.0% in women vs. 89.7% in men) (Fig. 3, Panel A). The percentage was consistently lower for women, with the largest differences observed in 2020 and 2021 (77.3% vs. 84.1% and 85.3% vs. 88.9%, respectively), during which time reasons for non-use referred predominantly to the supply-side issues. Self-reports of these reasons for non-use grew significantly among those who sought NCD care (Fig. 3, Panel B). They increased among women, especially in 2021 when differences were greatest compared to men (42.5% vs. 30.9%).

Estimates from the multinomial logistic regression model showed a growing demand for public health services corresponding to the user's insurance and an increasing shift of individuals to the private sector (Table 2). Regarding service utilization for NCD care, we found that women were less likely to fall within the non-use category than men (21.8% vs. 27.8%, $P<0.001$) during the entire study period. Men demonstrated a lower likelihood of using health services from providers corresponding to their insurance than women (47.6% vs. 51.5%), while the use of public health services from providers not corresponding to the user's insurance and the use of private health services showed minimal differences between women and men (2.6% vs. 2.5% and 24.1% vs. 22.0%, respectively). However, when taking into account the estimated gender gap measured by incremental probability, and comparing health needs related to NCDs against other conditions, men had a 7.4% lower incremental likelihood of falling within the non-use category than women ($P<0.001$), were 10.8% more likely to use services from providers corresponding to their health insurance ($P<0.001$), and showed a 12% lower incremental probability of using private services ($P<0.001$). Conversely, they had an incremental probability 13.5% greater than women of using public services from providers not corresponding to their health insurance ($P<0.001$). Except for the gap in the use of private services, which tended to decrease, the rest remained stable over the period analyzed (Table 2).

Discussion

The results of this population-based study affirmed the existence of gender inequalities in the use of outpatient care for NCDs by Mexican adults throughout the nearly 2 decades analyzed (2006–2022), structurally determined by the segmentation of the Mexican health system.

During this period, self-reported NCDs in Mexico increased among both genders, consistent with other national, regional, and global estimates [46, 47, 78, 79]. Although previous research has indicated that women

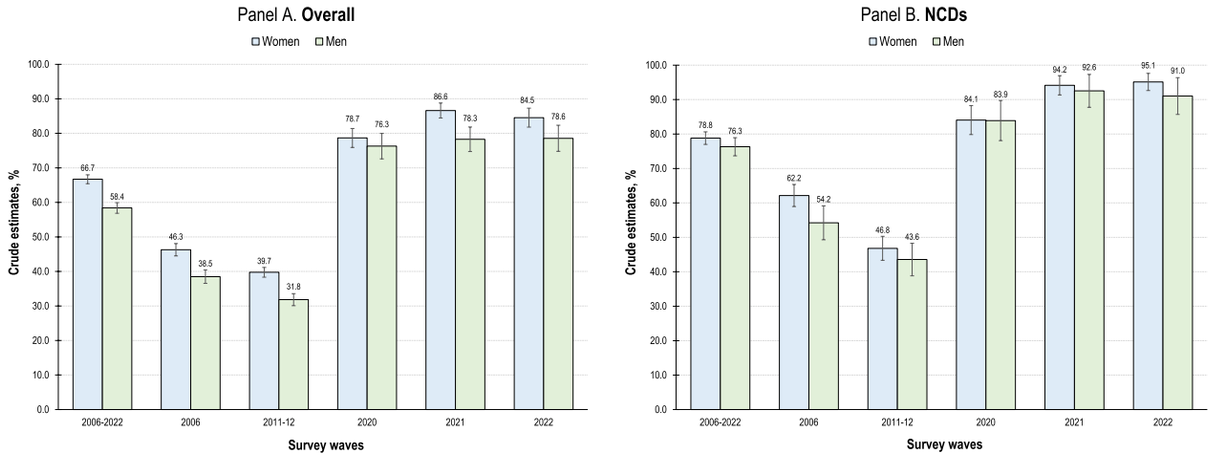


Fig. 2 Use of qualified outpatient care by Mexican adults, 2006–2022. Data from the 2006, 2011–2012, 2020, 2021 and 2022 waves of the Mexican National Health and Nutrition Survey (*ENSANUT* by its initials in Spanish). Estimates based on complex survey design and sampling weights

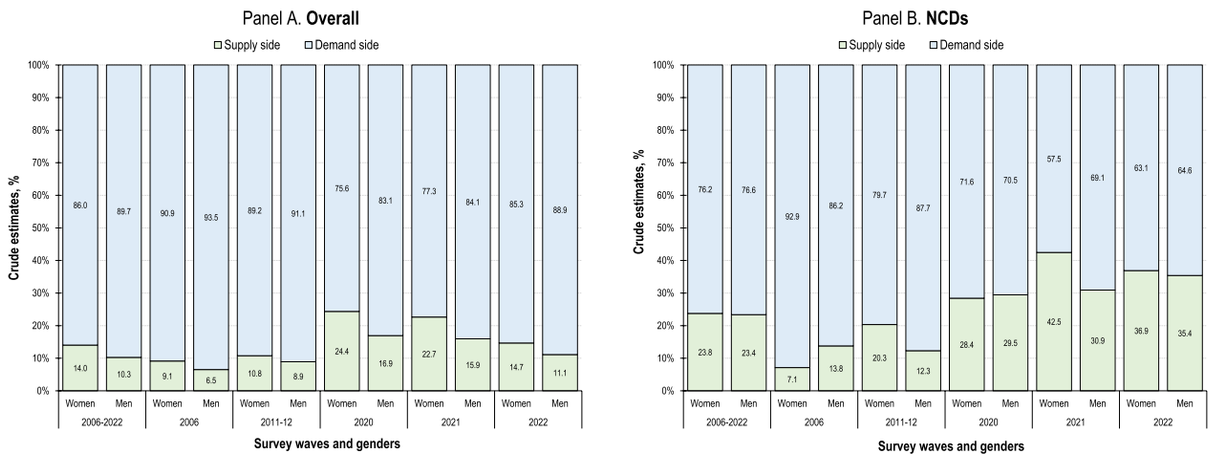


Fig. 3 Reasons for non-use of qualified outpatient care by Mexican adults, 2006–2022. Data from the 2006, 2011–2012, 2020, 2021 and 2022 waves of the Mexican National Health and Nutrition Survey (*ENSANUT* by its initials in Spanish). Estimates based on complex survey design and sampling weights

utilize health services more frequently than men, it is not consistent across all social groups. Generally, it depends on the type of service required. It is mediated by other factors such as income, age, ethnicity, and place of residence, as well as by variables linked to the type of health financing scheme and the organizational structure of services [27, 80].

The differences in service utilization patterns between men and women reflect three basic trends as follows. First, men and women experience different types of needs, with women having higher rates of morbidity and disability throughout their lives [27, 80]. Furthermore, given their longer life expectancy, women are more likely to experience age-related chronic diseases [27]. Second, how men and women use health services differ, stemming from gender-influenced socialization processes that determine how people recognize symptoms, perceive diseases and seek care [27]. This dynamic is shaped by cultural expectations, including the fact that women more frequently play the role as caregivers. This renders women more adept than men at detecting symptoms, resulting in women being more familiar with formal and informal health-care processes. Differences also exist between men and women regarding their levels of health literacy, defined as "*the ability to obtain, understand, evaluate and use basic health information and services to make well-founded health decisions*" [27, 81]. Finally, usage patterns are shaped by

Table 2 Gender gap in the use of qualified outpatient services for NCD care, 2006–2022

	2006–2022	2006	2011–2012	2020	2021	2022
	Incremental risk attributable to NCDs, % [95% CI]					
Panel A. Non-use of outpatient health services						
Men						
Non-NCDs (A)	42.8 [40.8, 44.8]	64.8 [62.5, 67.1]	72.9 [71.1, 74.7]	29.8 [26.6, 32.9]	21.3 [18.5, 24.1]	23.3 [20.4, 26.2]
NCDs (B)	27.8 [25.4, 30.2]	47.6 [44.2, 51.0]	58.4 [55.3, 61.6]	18.8 [16.1, 21.6]	12.5 [10.4, 14.6]	13.0 [11.0, 15.0]
Women						
Non-NCDs (C)	35.0 [33.4, 36.6]	57.0 [54.7, 59.3]	66.0 [64.1, 67.8]	23.4 [20.8, 25.9]	16.3 [14.2, 18.4]	18.0 [15.6, 20.3]
NCDs (D)	21.8 [20.0, 23.5]	39.7 [36.7, 42.7]	50.4 [47.5, 53.3]	14.3 [12.3, 16.4]	9.4 [7.9, 10.9]	9.7 [8.3, 11.2]
Gender gap[a], %	– 7.4 [– 11.2, – 3.6]	– 12.9 [– 17.8, – 8.0]	– 15.9 [– 21.6, – 10.3]	– 4.9 [– 8.5, – 1.2]	– 3.1 [– 6.4, 0.1]	– 3.3 [– 6.1, – 0.5]
Panel B. Non segmented use/use according to public health insurance						
Men						
Non-NCDs (A)	26.6 [25.0, 28.3]	17.6 [16.0, 19.2]	12.2 [11.0, 13.3]	27.7 [24.5, 30.8]	34.0 [30.8, 37.3]	40.5 [37.1, 43.9]
NCDs (B)	47.6 [44.9, 50.3]	35.6 [32.5, 38.7]	26.9 [24.2, 29.6]	48.2 [44.1, 52.4]	55.3 [51.2, 59.3]	62.2 [58.6, 65.8]
Women						
Non-NCDs (C)	30.0 [28.6, 31.5]	21.3 [19.6, 23.1]	15.2 [13.9, 16.4]	30.0 [26.9, 33.1]	35.9 [32.8, 39.1]	43.1 [39.8, 46.4]
NCDs (D)	51.5 [49.0, 53.9]	40.9 [37.9, 44.0]	32.0 [29.4, 34.6]	50.7 [46.7, 54.7]	57.0 [53.1, 61.0]	64.3 [60.9, 67.7]
Gender gap[a], %	10.8 [4.9, 16.7]	11.8 [6.8, 16.8]	9.4 [5.6, 13.1]	7.5 [1.6, 13.3]	6.2 [– 0.5, 12.9]	8.5 [1.1, 15.9]
Panel C. Segmented use—public/use of another public health provider						
Men						
Non-NCDs (A)	1.6 [1.2, 2.0]	1.8 [1.2, 2.3]	0.7 [0.5, 0.9]	1.8 [1.2, 2.5]	1.9 [1.2, 2.7]	1.7 [1.1, 2.4]
NCDs (B)	2.5 [1.7, 3.4]	3.2 [2.0, 4.3]	1.3 [0.8, 1.8]	2.8 [1.6, 4.0]	2.7 [1.5, 4.0]	2.4 [1.3, 3.5]
Women						
Non-NCDs (C)	1.8 [1.4, 2.1]	2.1 [1.5, 2.7]	0.8 [0.6, 1.1]	1.9 [1.3, 2.6]	1.9 [1.3, 2.6]	1.8 [1.1, 2.4]
NCDs (D)	2.6 [1.9, 3.4]	3.5 [2.4, 4.7]	1.5 [1.0, 2.1]	2.8 [1.7, 4.0]	2.7 [1.6, 3.8]	2.3 [1.3, 3.4]
Gender gap[a], %	13.5 [2.8, 24.1]	13.9 [5.7, 22.1]	10.7 [5.1, 16.3]	9.4 [0.2, 18.5]	8.2 [– 2.4, 18.8]	11.9 [– 3.3, 27.0]
Panel D. Segmented use—private health provider						
Men						
Non-NCDs (A)	29.0 [27.1, 30.8]	15.9 [14.2, 17.5]	14.2 [12.9, 15.6]	40.7 [37.4, 44.1]	42.8 [39.1, 46.5]	34.5 [30.8, 38.2]
NCDs (B)	22.0 [19.9, 24.1]	13.6 [11.8, 15.5]	13.4 [11.6, 15.1]	30.1 [26.7, 33.6]	29.5 [25.8, 33.2]	22.5 [19.4, 25.5]
Women						
Non-NCDs (C)	33.2 [31.7, 34.7]	19.5 [17.8, 21.3]	18.0 [16.6, 19.5]	44.7 [41.5, 47.9]	45.8 [42.4, 49.3]	37.2 [33.7, 40.7]
NCDs (D)	24.1 [22.0, 26.3]	15.9 [13.9, 17.9]	16.1 [14.2, 18.1]	32.1 [28.6, 35.7]	30.9 [27.1, 34.6]	23.6 [20.5, 26.6]
Gender gap[a], %	– 12.0 [– 19.4, – 4.6]	– 24.6 [– 41.9, – 7.3]	– 41.4 [– 87.1, 4.4]	– 7.8 [– 14.0, – 1.5]	– 4.8 [– 9.8, 0.3]	– 4.9 [– 9.1, – 0.7]

Regression model adjusted for all characteristics described in Table 1. Estimates based on complex survey design and sampling weights

[a] Calculated according to the following formula: ((((*B*/*A*) – 1)/((*D*/*C*) – 1)) – 1) × 100. Regarding health-service utilization for NCD care, positive values indicate higher probability of occurrence for men than for women. Data from the 2006, 2011–2012, 2020, 2021 and 2022 waves of the Mexican National Health and Nutrition Survey (*ENSANUT* by its initials in Spanish)

structural and institutional factors (less documented) that facilitate or hinder access to health services. These factors are entrenched within existing gender biases in the health-care systems that encourage greater utilization by women through the medicalization of normal biological processes and pregnancy and the availability of financial subsidies for services to be more likely to be used by women. In addition, the structural challenges of health systems include segmentation and fragmentation, which generate inefficiencies in providing care, as well as healthcare financing mechanisms that may favor one gender over the other [27].

In segmented health systems such as the Mexican one, where health insurance coverage is a condition linked to engagement in the labor market (higher labor participation rates result in greater coverage through employment-based schemes) [36], it is important to highlight this trend as a structural enabling factor for the use of health services [24, 82]. To approach the concept of labor market engagement, it is common to use the rate of female participation in the labor market or female economic participation, defined as the total number of employed women aged 15 years or older, as a proportion of the total number of women in that age group,

compared with a similar indicator for men [83]. We found that the participation of women in the labor market during the 17 years analyzed increased markedly, rising from 29.9% in 2006 to 47.5% in 2022. This finding aligns with other recent studies in Latin America showing a similar increase in the region over the last 30 years, while statistics for men have remained relatively stable [83]. As a result, the gender gap has narrowed, dropping from almost 36% in 1993 to 23% in 2021, affecting the distribution of household tasks within many families [83]. However, the magnitude of the change varies by country, with Mexico exhibiting one of the lowest female labor participation rates in Latin America (45%), which is below the regional average (53.3%) [83]. Mexico also has one of the lowest rates among countries in the OECD, only surpassing Turkey [35]. Moreover, women experience higher levels of precarious employment and are more likely to work in the informal sector [84]. Despite the positive trend indicating greater female participation in the labor market, recent years have witnessed a slowdown in the rate at which the gender gap is narrowing, a development compounded by the COVID-19 pandemic [83]. The inequality of opportunities between men and women regarding access to the labor market has a profound social impact, imposing high economic costs and consequently preventing the economy from realizing its full growth potential. It is noted that as many as 56% of women in the country work in the informal sector, which further worsens gender inequalities [85]. However, at an individual level, the participation of women in the labor market provides them immediate and long-term benefits, such as financial independence, and the ability to enjoy health insurance coverage and accumulate savings for retirement [83].

Women are more involved than men in household and caregiving duties, such as caring for family members: 40.9% of women versus 14.2% of men provide care for other people [86, 87], with 75.1% of the care being provided by women and 24.9% by men [87]. The amount of time women dedicate to these tasks renders them less available to work in the labor market and participate in other activities. It is one manifestation of gender inequality, which in turn, frequently translates into limited access to healthcare coverage and utilization. In Mexico, it has been documented that, during the COVID-19 pandemic, paid jobs became more precarious. At the same time, the brunt of unpaid work was shouldered mainly by the most vulnerable women (those with low income, living in union and those with children), with regard to both domestic and caregiving work [86]. Previous evidence had shown similar results in Mexico. A detailed analysis of female participation in the Mexican labor market revealed that the traits of discrimination expressed as occupational segregation, wage disparity, benefits and social security, place women in low-skilled and informal activities [88, 89]. For example, in Mexico the probability of women joining the labor market decreases if they are living with a partner, where the man is identified as the head of the household and the provider for the family [88–90].

The previously mentioned gender differences in health service utilization, with women more frequently visiting doctors and making more intense use of hospital services and home health care [27, 80]. However, simple assessments of these differences underestimate gender-associated disparities if they fail to consider underlying health needs [25]. Analyses like ours, which recognize the role of these needs in motivating individuals to seek care, and also take into account the differences in health needs between men and women, show that, among people with similar health profiles, and controlling for observable characteristics, older women are substantially less likely to use outpatient health services than their male counterparts [25]. Additionally, we found that women were 23.1% more likely than men to suffer from at least one chronic condition and this trend intensified with increased age, unemployment, and lower levels of education. This finding is consistent with other studies that have reported that women are more likely to experience multimorbidity (two or more coexisting conditions) [91].

Our study breaks new ground by highlighting how the segmentation of the Mexican health system, which provides differential care for populations depending on whether they are employed in the formal sector of the economy, contributes to accentuating the disadvantages that women experience in the use of outpatient services when faced with health needs related to an NCD. We have documented that men are systematically more likely to receive care in an institution covered by their insurance or in another public institution. In contrast, women are more likely either not to receive care or to use private outpatient services. The segmented Mexican health system conditions the use of health services according to the type of insurance coverage that an individual enjoys, which, in turn, is linked to employment status. The right to health and labor benefits is thus restricted, potentially undermining the effectiveness of the public health policy efforts of the Mexican government, with women suffering the greatest social disadvantages [35].

Although both genders have experienced an increase in the percentage of adults using health services for perceived needs, women continue to be at a disadvantage in receiving care from public institutions. They are more likely to seek care in the private sector, and thus face greater risk of catastrophic out-of-pocket expenditures for them and their families [92, 93]. This suggests

that during the process of seeking and using outpatient services, men with NCDs in Mexico enjoy advantages and are more successful in overcoming the barriers imposed by health institutions that provide differential care depending on employment status. Future studies should explore the coping mechanisms that individuals of different genders utilize to eliminate these barriers. Additionally, it is important to consider that our findings indicate that women experience a greater number of NCD-related health needs may reflect the "inverse care law" [94], which states that "*the availability of good health care tends to vary inversely with the need for it in the population served.*" Unfortunately, this law still holds in LMICs [95, 96], where the socially disadvantaged—women in this study—receive less and poorer quality health care despite having a greater number of health needs [95, 96]. This is attributable not only to financial barriers and segmented health systems, but also to social inequalities in seeking care and enjoying financial protection. If we also consider that only 50% of those who seek care for NCDs receive treatment, and of these, only 50% are successfully treated, we can more effectively measure the magnitude of the disadvantages suffered by women in caring for their health related to NCDs [97]. It is imperative to invest in health systems that ensure universal health coverage (UHC) with equity, provided in proportion to need, thus improving the population's health as a whole and reducing health inequalities [95].

These results illustrate the enormous challenges facing LMICs in designing and implementing gender-sensitive health policies, a key mechanism for moving toward UHC, particularly when health insurance highly depends on formal employment participation. The increase in the population aged 60 years or older, especially among women, should inform the design of long-term health policies and programs that take the gender perspective into account. Mexico will have to implement such policies and programs in the context of a health system that has been under tremendous pressure, instituting major reforms over the last 5 years. These developments have deepened the system's segmentation, reversed its decentralization, and generated an operational inability to maintain an adequate supply of medicines. In addition, such pressures have undermined access to health services, adversely affecting the system's financial viability because of reduced public spending on health. This, in turn, has contributed to limiting the supply of public health services and displacing demand toward the private sector [98, 99] among people in all socioeconomic strata.

Our study had several limitations. The first relates to its cross-sectional design, which did not allow for a causal interpretation of the results. Second, the study data were self-reported and may have been subject to recall bias. Nonetheless, previous studies have supported the reliability of self-reports regarding health needs related to chronic diseases [100] and health-care services [101, 102]. In addition, the literature has established that only 50% of those who suffer from these diseases are aware of their diagnosis [97]. Although there is a certain degree of underestimation of health service utilization after long recall periods, there is no evidence that recall biases differ by gender. Hence, our results should probably be considered conservative. Third, we did not evaluate factors related to the characteristics of health service providers, such as professional experience, specialty and available resources, or as geographic and social access [103]. When analyzing the gender gap in health-service utilization, we only partially documented the discrimination that women face in the process of utilizing health care, without considering the degree of evolution or severity of the disease. It has been noted that women suffer sequential and progressive discrimination in seeking care for NCDs in both outpatient and hospital care, among other contexts [25, 104]. Finally, our study did not consider relevant variables concerning attitudes toward specific health problems, which could differ between men and women, and are significantly related to service utilization. These variables include the degree of interest in health, responses to specific symptoms, and family demands [80]. It is clear that women are generally more likely to experience health needs resulting from NCDs than men, in contrast to the differences between men and women regarding the burden of disease due to NCDs [47]. This discrepancy could be explained by differences in the ways in which they conceptualize diseases that are socially constructed in relation to feminine and masculine characteristics and social roles [105].

Conclusions

We found a notable and persistent gender gap in the use of outpatient services in Mexico. When controlling for health status, women had a greater incremental risk of not using outpatient services and instead using private services for NCD care, indicating a gender-based issue in timely and equitable health-service utilization for women and men. The segmentation of the Mexican health system exacerbates the gender disparities experienced by women in the use of these services and this should be considered in any efforts to reorient health policies and programs towards combating NCDs from a gender perspective.

Abbreviations

NCDs	Non-communicable diseases
UHC	Universal health coverage
LMICs	Low- and middle-income countries
ENSANUT	National Health and Nutrition Survey
OCDE	Organization for Economic Cooperation and Development

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s41256-024-00377-8.

Additional file 1.

Acknowledgements
We would like to express our special thanks for the insightful comments made by the members of the steering committee integrated by: MPH. Michelle Ramírez, MSc. Yahaira Ochoa, Dr. Mariana Irina González, MPH. Julissa Chavira and Dr. Imer Flores. We are also especially grateful to Blanca Laura Ortega Román and Liliana Ordáz Salazar for their roles as general coordinators and research assistants of the project, respectively, as well as to Patricia E. Solis and Michael H. Sumner for their valuable assistance in translating this manuscript into English.

Memorial statement
We dedicate this manuscript to our colleague and friend Sandra G. Sosa-Rubí, Ph.D., who inspired us to pursue the analysis of equity during her fruitful lifetime, and who passed away in March 2021.

Author contributions
ESM conceived the idea of the paper, led the formal analysis and performed the data curation. IHP and ESM supported the conceptual approach and wrote the first draft of the manuscript. CMGL, SJ, LD, RGD, GN, EON, MCMT, LF, RN and RL provided critical inputs on multiple iterations. ESM is the guarantor of the work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The final version of the manuscript was revised and approved by all authors.

Funding
We are grateful to The Mexican Association of Pharmaceutical Research Industries, A.C. (*AMIIF*), for their funding and steadfast support. The funders had no say in the decisions related to the study design, data analysis, interpretation, decision to publish, or preparation of the manuscript.

Availability of data and materials
The analyzed data were obtained from the public repository of the National Health and Nutrition Survey, which is hosted by the National Institute of Public Health (*INSP*) (available at https://ensanut.insp.mx/).

Declarations

Ethics approval and consent to participate
Not applicable. This study involved no human participants, and was approved by the Research, Biosafety and Ethics Committees of the National Institute of Public Health in Mexico (ID: CI-507-2022/CB22-173).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
[1]Center for Health Systems Research, The National Institute of Public Health of Mexico, Universidad Av. 655, 62100 Cuernavaca, Morelos, Mexico. [2]The George Institute for Global Health, UNSW, Sydney, NSW, Australia. [3]The George Institute for Global Health, School of Public Health, Imperial College London, London, UK. [4]Center for Health Economics and Policy Innovation, Business School, Imperial College London, London, UK. [5]Department of Economics, Tecnologico de Monterrey, Monterrey, Nuevo Leon, Mexico. [6]Faculty of Nursing and Midwifery, The National Autonomous University of Mexico, Mexico City, Mexico. [7]Coordinator of Sociodemographic and Prospective Studies, The National Population Council of Mexico, Mexico City, Mexico. [8]Center for International Studies, El Colegio de Mexico, Mexico City, Mexico. [9]Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA. [10]School of Medicine, The National Autonomous University of Mexico, Mexico City, Mexico.

Received: 30 March 2024 Accepted: 22 August 2024
Published online: 29 September 2024

References

1. Malta DC, Bernal RTI, Lima MG, de Araújo SSC, da Silva MMA, Freitas MIdF, et al. Noncommunicable diseases and the use of health services: analysis of the National Health Survey in Brazil. Rev Saude Publica. 2017;51:1s–10s.
2. Manne-Goehler J, Geldsetzer P, Agoudavi K, Andall-Brereton G, Aryal KK, Bicaba BW, et al. Health system performance for people with diabetes in 28 low- and middle-income countries: a cross-sectional study of nationally representative surveys. PLoS Med. 2019;16:e1002751.
3. Naghavi M, Abajobir AA, Abbafati C, Abbas KM, Abd-Allah F, Abera SF, et al. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2017;390:1151–210.
4. Danaei G, Finucane MM, Lu Y, Singh GM, Cowan MJ, Paciorek CJ, et al. National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 2.7 million participants. The Lancet. 2011;378:31–40.
5. Zhou B, Bentham J, Di Cesare M, Bixby H, Danaei G, Cowan MJ, et al. Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19.1 million participants. The Lancet. 2017;389:37–55.
6. Abarca-Gómez L, Abdeen ZA, Hamid ZA, Abu-Rmeileh NM, Acosta-Cazares B, Acuin C, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. The Lancet. 2017;390:2627–42.
7. Basto-Abreu A, Barrientos-Gutierrez T, Wade AN, Oliveira de Melo D, Semeão de Souza AS, Nunes BP, et al. Multimorbidity matters in low and middle-income countries. J Multimorb Comorb. 2022;12:1–10.
8. Shanmuganathan S, Mustapha FI, Wilson A. Evaluating the sustainability of non-communicable diseases programs in Malaysia. BMC Public Health. 2022;22:1–7.
9. Watkins DA, Msemburi WT, Pickersgill SJ, Kawakatsu Y, Gheorghe A, Dain K, et al. NCD countdown 2030: efficient pathways and strategic investments to accelerate progress towards the Sustainable Development Goal target 3.4 in low-income and middle-income countries. The Lancet. 2022;399:1266–78.
10. Bloom DE, Cafiero ET, Jané-Llopis E, Abrahams-Gessel S, Bloom LR, Fathima S, et al. The global economic burden of non-communicable diseases [Internet]. Geneva, Switzerland; 2011. https://www3.weforum.org/docs/WEF_Harvard_HE_GlobalEconomicBurdenNonCommunicableDiseases_2011.pdf.
11. Nugent R, Bertram MY, Jan S, Niessen LW, Sassi F, Jamison DT, et al. Investing in non-communicable disease prevention and management to advance the sustainable development goals. The Lancet. 2018;391:2029–35.
12. Odoch WD, Senkubuge F, Hongoro C. How has sustainable development goals declaration influenced health financing reforms for universal health coverage at the country level? A scoping review of literature. Glob Health. 2021;17:1–13.
13. Kutzin J. Health financing for universal coverage and health system performance: concepts and implications for policy. Bull World Health Organ. 2013;91:602–11.
14. Hanson K, Brikci N, Erlangga D, Alebachew A, De Allegri M, Balabanova D, et al. The Lancet Global Health Commission on financing primary health care: putting people at the centre. Lancet Glob Health. 2022;10:e715–72.
15. Daniels N. Justice and access to health care [Internet]. Stanford Encyclopedia of Philosophy, 2009. p. 1–25. https://plato.stanford.edu/entries/justice-healthcareaccess/.
16. Daniels N. Justice, health, and health care. In: Rhodes R, Battin M, Silvers A, editors. Medicine and social justice: essays on the distribution of

health care. Oxford: Oxford University Press; 2012. p. 17–34. https://doi.org/10.1093/acprof:osobl/9780199744206.003.0002.
17. Hessler K, Buchanan A. Equality, democracy, and the human right to health care. In: Rhodes R, Battin M, Silvers A, editors. Medicine and social justice: essays on the distribution of health care. Oxford: Oxford University Press; 2012. p. 97–104. https://doi.org/10.1093/acprof:osobl/9780199744206.003.0009.
18. Rasul FB, Sarker M, Yasmin F, De Allegri M. Exploring health-seeking behavior for non-communicable chronic conditions in northern Bangladesh. PLOS Glob Public Health. 2022;2:1–16.
19. Stucki G, Bickenbach J. Health, functioning, and well-being: individual and societal. Arch Phys Med Rehabil. 2019;100:1788–92.
20. Institute of Medicine (US) Committee on Using Performance Monitoring to Improve Community Health. Understanting health and its determinants. In: Durch JS, Bailey LA, Stoto MA, editors. Improving health in the community: a role for performance monitoring. Washington, DC: The National Academies Press; 1997. p. 40–58.
21. Levesque J-F, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. Int J Equity Health. 2013;12:18.
22. Kruk ME, Gage AD, Joseph NT, Danaei G, García-Saisó S, Salomon JA. Mortality due to low-quality health systems in the universal health coverage era: a systematic analysis of amenable deaths in 137 countries. The Lancet. 2018;392:2203–12.
23. Lacasse A, Nguefack HLN, Page MG, Choinière M, Samb OM, Katz J, et al. Sex and gender differences in healthcare utilisation trajectories: a cohort study among Quebec workers living with chronic pain. BMJ Open. 2023;13:e070509.
24. Gajovic G, Janicijevic K, Andric D, Djurovic O, Radevic S. Gender differences in health care utilization among the elderly. Exp Appl Biomed Res. 2021;22:195–203.
25. Cameron KA, Song J, Manheim LM, Dunlop DD. Gender disparities in health and healthcare use among older adults. J Women's Health. 2010;19:1643–50.
26. Canadian Institutes of Health Research. Gender and health [Internet]. What is gender? What is sex? 2023. p. 1z. https://cihr-irsc.gc.ca/e/48642.html.
27. Gómez GE. Género, equidad y acceso a los servicios de salud: una aproximación empírica. Rev Panam Salud Publica. 2002;11:327–34.
28. Vlassoff C. Gender differences in determinants and consequences of health and illness. J Health Popul Nutr. 2007;25:47–61.
29. Bautista-Arredondo S, Vargas-Flores A, Moreno-Aguilar LA, Colchero MA. Utilización de servicios de salud en México: cascada de atención primaria en 2022. Salud Pública de México. 2023;65:s15-22.
30. Colchero MA, Gómez R, Pineda-Antúnez CJ, Bautista-Arredondo SA. Health care utilization during the Covid-19 pandemic in Mexico: the cascade of care. Salud Pública de México. 2021;63:743–50.
31. Colchero M, Gómez R, Bautista-Arredondo S. Caracterización de la "cascada de atención" en servicios públicos en México en localidades de menos de 100000 habitantes. Salud Pública de Mexico. 2019;61:734–41.
32. Valson JS, Kutty VR. Gender differences in the relationship between built environment and non-communicable diseases: a systematic review. J Public Health Res. 2018;7:43–9.
33. Travis CB, Meltzer AL, Howerton DM. Gender and health-care utilization. In: Chrisler JC, McCreary DR, editors. Handbook of gender research in psychology: volume 2: gender research in social and applied psychology. New York: Springer; 2010. p. 517–40. https://doi.org/10.1007/978-1-4419-1467-5_22.
34. Hay K, McDougal L, Percival V, Henry S, Klugman J, Wurie H, et al. Disrupting gender norms in health systems: making the case for change. The Lancet. 2019;393:2535–49.
35. Altamirano M. Política social e igualdad de género en México, 2012–2018. Foro internacional. 2020;60:755–89.
36. Becerril-Montekio V, Meneses-Navarro S, Pelcastre-Villafuerte BE, Serván-Mori E. Segmentation and fragmentation of health systems and the quest for universal health coverage: conceptual clarifications from the Mexican case. J Public Health Policy. 2024;45:164–74.
37. Meneses-Navarro S, Pelcastre-Villafuerte B, Becerril-Montekio V, Serván-Mori E. Overcoming the health systems' segmentation to achieve universal health coverage in Mexico. Int J Health Plan Manag. 2022;37:3357–64.
38. Bernales-Baksai P. Tackling segmentation to advance universal health coverage: analysis of policy architectures of health care in Chile and Uruguay. Int J Equity Health. 2020;19:106.
39. Ferre JC. Social policy expansion and segmentation in the first two decades of the 21st century in Latin America. Int J Soc Welf. 2023;32:486–505. https://doi.org/10.1111/ijsw.12579.
40. Cotlear D, Gómez-Dantés O, Knaul F, Atun R, Barreto ICHC, Cetrángolo O, et al. Overcoming social segregation in health care in Latin America. The Lancet. 2015;385:1248–59.
41. Martínez Franzoni J, Sánchez-Ancochea D. Undoing segmentation? Latin American health care policy during the economic boom. Soc Policy Adm. 2018;52:1181–200.
42. Gallaway MS, Aseret-Manygoats T, Tormala W. Disparities of access, use, and barriers to seeking health care services in Arizona. Med Care. 2022;60:113–8.
43. Owens G. Gender differences in health care expenditures, resource utilization, and quality of care. J Manag Care Pharm. 2008;14:2–6.
44. The World Bank. Mexico overview [Internet]. The World Bank in Mexico. 2023. p. 1–6. https://www.worldbank.org/en/country/mexico/overview.
45. The World Bank. Data bank [Internet]. Population, total. 2023. https://data.worldbank.org/indicator/SP.POP.TOTL.
46. Aceves B, Ingram M, Nieto C, de Zapien JG, Rosales C. Non-communicable disease prevention in Mexico: policies, programs and regulations. Health Promot Int. 2020;35:409–21.
47. Guerrero-López CM, Serván-Mori E, Miranda JJ, Jan S, Orozco-Núñez E, Downey L, et al. Burden of non-communicable diseases and behavioural risk factors in Mexico: trends and gender observational analysis. J Glob Health. 2023;13:1–11.
48. Gast J, Peak T, Hunt A. Latino health behavior: an exploratory analysis of health risk and health protective factors in a community sample. Am J Lifestyle Med. 2017;14:97–106.
49. Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). El CONEVAL presenta las estimaciones de pobreza multidimensional 2022 [Internet]. Ciudad de Mexico, Mexico; 2023. https://www.coneval.org.mx/SalaPrensa/Comunicadosprensa/Documents/2023/Comunicado_07_Medicion_Pobreza_2022.pdf.
50. Bautista-Arredondo S, Serván-Mori E, Colchero MA, Ramírez-Rodríguez B, Sosa-Rubí SG. Análisis del uso de servicios ambulatorios curativos en el contexto de la reforma para la protección universal en salud en México. Salud Pública de México. 2014;56:18–31.
51. Colchero MA, Gómez R, Bautista-Arredondo S. Elección de proveedores de servicios de atención y necesidades de salud de la población mexicana, 2021. Salud Pública de México. 2023;65:28–35.
52. Alizadeh M, Zamiran B, Eslamian A, SoleimanvandiAzar N, Mohammadi Gharehghani MA, Karimijavan G, et al. Scoping review of outpatient health services utilization among women. Prim Health Care Res Dev. 2023;24:1–14.
53. Garrison-Desany HM, Wilson E, Munos M, Sawadogo-Lewis T, Maïga A, Ako O, et al. The role of gender power relations on women's health outcomes: evidence from a maternal health coverage survey in Simiyu region, Tanzania. BMC Public Health. 2021;21:1–15.
54. Alcalde-Rubio L, Hernández-Aguado I, Parker LA, Bueno-Vergara E, Chilet-Rosell E. Gender disparities in clinical practice: are there any solutions? Scoping review of interventions to overcome or reduce gender bias in clinical practice. Int J Equity Health. 2020;19:1–8.
55. Romero-Martínez M, Barrientos-Gutiérrez T, Cuevas-Nasu L, Bautista-Arredondo S, Colchero A, Gaona-Pineda EB, et al. Metodología de la Encuesta Nacional de Salud y Nutrición 2020 sobre Covid-19. Salud Pública de México. 2021;63:444–51.
56. Romero Martínez M, Barrientos-Gutiérrez T, Cuevas-Nasu L, Bautista-Arredondo S, Colchero MA, Gaona-Pineda EB, et al. Metodología de la Encuesta Nacional de Salud y Nutrición 2021. Salud Pública de México. 2021;63:813–8.
57. Romero-Martínez M, Barrientos-Gutiérrez T, Cuevas-Nasu L, Bautista-Arrendondo S, Colchero MA, Gaona-Pineda EB, et al. Metodología de la Encuesta Nacional de Salud y Nutrición 2022 y planeación y diseño de la Ensanut Continua 2020–2024. Salud Pública de México. 2022;64:522–9.
58. Romero-Martínez M, Shamah-Levy T, Franco-Núñez A, Villalpando S, Cuevas-Nasu L, Gutiérrez JP, et al. Encuesta Nacional de Salud

y Nutrición 2012: diseño y cobertura. Salud Pública de México. 2013;55:S332–40.
59. Olaiz-Fernández G, Rivera-Dommarco J, Shamah-Levy T, Rojas R, Villalpando-Hernández S, Hernández-Avila M, et al. Encuesta Nacional de Salud y Nutrición 2006. 1st ed. Oropeza Abúndez C, editor. Cuernavaca, Morelos, México: Instituto Nacional de Salud Pública; 2006.
60. Secretaría de Salud de México (SSA). Enfermedades no transmisibles situación y propuestas de acción: una perspectiva desde la Experiencia de México [Internet]. 1st ed. Narro Robles JR, editor. Ciudad de México, México: Secretaría de Salud de México (SSA); 2018. https://www.gob.mx/cms/uploads/attachment/file/416454/Enfermedades_No_Transmisibles_ebook.pdf.
61. Khare SR, Vedel I. Recall bias and reduction measures: an example in primary health care service utilization. Fam Pract. 2019;36:672–6. https://doi.org/10.1093/fampra/cmz042.
62. Sahn DE, Younger SD, Genicot G. The demand for health care services in rural Tanzania. Oxf Bull Econ Stat. 2003;65:241–59.
63. Eme Ichoku H, Leibbrandt M. Demand for healthcare services in Nigeria: a multivariate nested logit model. Afr Dev Rev. 2003;15:396–424. https://doi.org/10.1111/j.1467-8268.2003.00078.x.
64. Cameron AC, Trivedi PK, Milne F, Piggott J. A microeconometric model of the demand for health care and health insurance in Australia. Rev Econ Stud. 1988;55:85–106.
65. Deb P, Trivedi PK. The structure of demand for health care: latent class versus two-part models. J Health Econ. 21:601–25. http://search.ebscohost.com/login.aspx?direct=true&db=edselp&AN=S0167629602000085&site=eds-live.
66. Andersen R. Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav. 1995;36:1–10.
67. López-Cevallos DF, Chi C. Health care utilization in Ecuador: a multilevel analysis of socio-economic determinants and inequality issues. Health Policy Plan. 2010;25:209–18. https://doi.org/10.1093/heapol/czp052.
68. National Academies of Sciences, Engineering and M. Factors that affect health-care utilization. Health-care utilization as a proxy in disability determination. 1st ed. Washington, DC: The National Academies Press; 2018. p. 21–38.
69. Dawkins B, Renwick C, Ensor T, Shinkins B, Jayne D, Meads D. What factors affect patients' ability to access healthcare? An overview of systematic reviews. Trop Med Int Health. 2021;26:1177–88. https://doi.org/10.1111/tmi.13651.
70. Brindley C, Wijemunige N, Dieteren C, Bom J, Meessen B, Bonfrer I. Health seeking behaviours and private sector delivery of care for non-communicable diseases in low- and middle-income countries: a systematic review. BMC Health Serv Res. 2024;24:127. https://doi.org/10.1186/s12913-023-10464-0.
71. Serván-Mori E, Juárez-Ramírez C, Meneses-Navarro S, Heredia-Pi I, Armenta-Paulino N, Orozco-Núñez E, et al. Ethnic disparities in effective coverage of maternal healthcare in Mexico, 2006–2018: a decomposition analysis. Sex Res Soc Policy. 2023;20:561–74.
72. Instituto Nacional de los Pueblos Indígenas (INPI). Indicadores de la población indígena [Internet]. Sistema de información e indicadores sobre la población indígena de México. Mexico City; 2015. https://www.gob.mx/inpi/documentos/indicadores-de-la-poblacion-indigena. Cited 1 May 2020.
73. Poirier MJP, Grépin KA, Grignon M. Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: a critical interpretive synthesis. Soc Indic Res. 2020;148:1–46.
74. Instituto Nacional de Estadística y Geografía (INEGI). Regiones socioeconómicas de México [Internet]. Clasificación de Entidades Federativas. 2004. https://sc.inegi.org.mx/niveles/. Cited 16 Jun 2020.
75. Oehlert G. A note on the delta method. Am Stat. 1992;46:27–9.
76. Phillips PCB, Park JY. On the formulation of wald tests of nonlinear restrictions. Econometrica. 1988;56:1065–83.
77. O'Donnell O, van Doorslaer E, Wagstaff A, Lindelow M. Data for health equity analysis: requirements, sources, and sample design. In: World Bank Institute, editor. Analyzing health equity using household survey data: a guide to techniques and their implementation. 1st ed. Washington, DC: The World Bank; 2008. p. 13–27.
78. Hambleton IR, Caixeta R, Jeyaseelan SM, Luciani S, Hennis AJM. The rising burden of non-communicable diseases in the Americas and the impact of population aging: a secondary analysis of available data. The Lancet Reg Health Ame. 2023;21:1–13.
79. Global Health Metrics. Non-communicable diseases—level 1 cause. The Lancet. 2020;396:s42–3.
80. Redondo-Sendino Á, Guallar-Castillón P, Banegas JR, Rodríguez-Artalejo F. Gender differences in the utilization of health-care services among the older adult population of Spain. BMC Public Health. 2006;6:1–9.
81. Sun S, Lu J, Wang Y, Wang Y, Wu L, Zhu S, et al. Gender differences in factors associated with the health literacy of hospitalized older patients with chronic diseases: a cross-sectional study. Front Public Health. 2022;10:1–10.
82. Gelberg L, Andersen RM, Leake BD. The behavioral model for vulnerable populations: application to medical care use and outcomes for homeless people. Health Serv Res. 2000;34:1273–302.
83. Gontero S, Vezza E. Participación laboral de las mujeres en América Latina: contribución al crecimiento económico y factores determinantes [Internet]. Santiago de Chile, Chile; 2023. Report No.: LC/TS.2023/88. https://www.cepal.org/es/publicaciones/67986-participacion-laboral-mujeres-america-latina-contribucion-al-crecimiento.
84. Instituto Nacional de Estadística y Geografía (INEGI). Encuesta Nacional de Ocupación y Empleo (ENOE): resultados de diciembre de 2023 [Internet]. Ciudad de Mexico, Mexico; 2024. https://www.inegi.org.mx/programas/enoe/15ymas/#documentacion.
85. Ruiz L, Pereznieto P. Women in formal and informal labour markets in Mexico [Internet]. Mexico City, Mexico; 2022. https://www.gov.uk/government/news/the-british-embassy-in-mexico-city-presents-the-report-women-in-formal-and-informal-labour-markets-in-mexico.
86. Flamand L, Vega CA, Aparicio RMR, Serna E. Trabajo remunerado y de cuidados en la Ciudad de México. Los efectos de la pandemia de covid-19 sobre las desigualdades sociales y la convivialidad [Internet]. São Paulo; 2023. Report No.: 57. https://mecila.net/wp-content/uploads/2023/05/WP-Flamand-et-al-Online-.pdf.
87. Instituto Nacional de Estadística y Geografía (INEGI). Encuesta Nacional para el Sistema de Cuidados (ENASIC) 2022: principales resultados [Internet]. Ciudad de Mexico, Mexico; 2022. https://www.inegi.org.mx/programas/enasic/2022/.
88. Torres García AJ, Ochoa Adame GL, Pedroza Villegas DO. Determinantes de la participación económica de la mujer en México: un enfoque de calificación laboral. Revista de economía. 2022;39:69–93.
89. Horbath JE, Gracia A. Discriminación laboral y vulnerabilidad de las mujeres frente a la crisis mundial en México. Economía, sociedad y territorio. 2014;14:465–95.
90. Cerrutti M, Zenteno Quintero R. Cambios en el papel económico de las mujeres entre las parejas mexicanas. Estudios Demográficos y Urbanos. 2000;15:65–95.
91. Kuan V, Denaxas S, Patalay P, Nitsch D, Mathur R, Gonzalez-Izquierdo A, et al. Identifying and visualising multimorbidity and comorbidity patterns in patients in the English National Health Service: a population-based study. Lancet Digit Health. 2023;5:e16–27.
92. Bayati M, Mehrolhassani MH, Yazdi-Feyzabadi V. A paradoxical situation in regressivity or progressivity of out of pocket payment for health care: which one is a matter of the health policy maker's decision to intervention? Cost Eff Resour Alloc. 2019;17:1–4.
93. Serván-Mori E, Orozco-Núñez E, Guerrero-López CM, Miranda JJ, Jan S, Downey L, et al. A gender-based and quasi-experimental study of the catastrophic and impoverishing health-care expenditures in Mexican households with elderly members, 2000–2020. Health Syst Reform. 2023;9:1–16.
94. Tudor HJ. The inverse care law. The Lancet. 1971;297:405–12.
95. Cookson R, Doran T, Asaria M, Gupta I, Mujica FP. The inverse care law re-examined: a global perspective. The Lancet. 2021;397:828–38.
96. Marmot M. An inverse care law for our time. BMJ. 2018;362:1–2.
97. Hart JT. Rule of halves: implications of increasing diagnosis and reducing dropout for future workload and prescribing costs in primary care. Br J Gen Pract. 1992;42:116–9.
98. Knaul FM, Arreola-Ornelas H, Touchton M, McDonald T, Blofield M, Avila Burgos L, et al. Setbacks in the quest for universal health coverage in Mexico: polarised politics, policy upheaval, and pandemic disruption. The Lancet. 2023;402:731–46.

99. Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). Nota técnica sobre la carencia por acceso a los servicios de salud, 2018–2020 [Internet]. Ciudad de México, México; 2021. https://www.coneval.org.mx/Medicion/MP/Paginas/Notas-pobreza-2020.aspx.
100. Harlow SD, Linet MS. Agreement between questionnaire data and medical records: the evidence for accuracy of recall. Am J Epidemiol. 1989;129:233–48.
101. Cleary PD, Jette AM. The validity of self-reported physician utilization measures. Med Care. 1984;22:796–803.
102. Roberts RO, Bergstralh EJ, Schmidt L, Jacobsen SJ. Comparison of self-reported and medical record health care utilization measures. J Clin Epidemiol. 1996;49:989–95.
103. Travassos C, Martins M. A review of concepts in health services access and utilization. Cad Saude Publica. 2004;20:S190–8.
104. Patel R, Chauhan S. Gender differential in health care utilisation in India. Clin Epidemiol Glob Health. 2020;8:526–30.
105. Ragonese C, Barker G. Understanding masculinities to improve men's health. The Lancet. 2019;394:198–9.

Artículo original

Desigualdades en el acceso a servicios, base de las políticas para la reducción de la brecha en salud

Juan Pablo Gutiérrez, PhD,[1] Ileana Heredia-Pi, D en C,[2] María Isidra Hernández-Serrato, M en C,[3]
Blanca Estela Pelcastre-Villafuerte, PhD,[2] Pilar Torres-Pereda, M en C,[2] Hortensia Reyes-Morales, D en C.[2]

Gutiérrez JP, Heredia-Pi I, Hernández-Serrato MI, Pelcastre-Villafuerte BE, Torres-Pereda P, Reyes-Morales H.
Desigualdades en el acceso a servicios, base de las políticas para la reducción de la brecha en salud.
Salud Publica Mex 2019;61:726-733.
https://doi.org/10.21149/10561

Resumen

Objetivo. Estimar la desigualdad en acceso a servicios de salud en poblaciones de localidades menores de 100 000 habitantes en México. **Material y métodos.** Análisis de la Encuesta Nacional de Salud y Nutrición 100k 2018. Se estimó el acceso con base en la afiliación a un esquema de aseguramiento (acceso potencial) y la atención para el más reciente problema de salud (acceso a atención) mediante el índice de concentración, utilizando una imputación del ingreso per cápita. **Resultados.** La afiliación a algún esquema de aseguramiento en salud fue de 82.42% y el acceso a atención de 60.03%. Se identificaron desigualdades en ambos indicadores, marginales para acceso potencial y con mayor concentración entre la población de menor ingreso; para acceso a atención se encontró desigualdad con mayor concentración entre la población de mayor ingreso. **Conclusión.** En México prevalecen desigualdades en acceso a servicios de salud para la población en condiciones de pobreza. Es necesario desarrollar intervenciones públicas con mayor granularidad para incidir de forma efectiva en la desigualdad.

Palabras clave: equidad en el acceso a los servicios de salud; inequidad social; pobreza

Gutiérrez JP, Heredia-Pi I, Hernández-Serrato MI, Pelcastre-Villafuerte BE, Torres-Pereda P, Reyes-Morales H.
Inequalities in access to services, basis for policies to reduce the health gap.
Salud Publica Mex 2019;61:726-733.
https://doi.org/10.21149/10561

Abstract

Objective. To estimate inequalities in access to health services among Mexican population living in localities of 100 000 or less inhabitants. **Materials and methods.** Cross-sectional analysis using the National Health and Nutrition Survey 100k 2018 survey data. Access was estimated using health insurance and care for the last health condition. As inequality measure, we estimated the concentration index using an imputation of household per capita income. **Results.** Among studied population, health insurance was 82.42% and access to care 60.03%. We identified inequalities in both indicators; marginal and pro-poor for insurance and pro-rich for access to care. **Conclusion.** In Mexico, even within the popuation living in poverty there are inequalities in access to health care. More granular public interventions are needed to address inequalities in an effective way.

Keywords: equity in access to health services; social inequity; poverty

(1) Centro de Investigación en Políticas, Población y Salud, Facultad de Medicina, Universidad Nacional Autónoma de México. México.
(2) Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. México.
(3) Centro de Información para Decisiones en Salud Pública, Instituto Nacional de Salud Pública. México.

Fecha de recibido: 30 de abril de 2019 • **Fecha de aceptado:** 6 de agosto de 2019
Autor de correspondencia: Hortensia Reyes-Morales. Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública.
Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
Correo electrónico: hortensia.reyes@insp.mx

Gutiérrez JP, Heredia-Pi I, Hernández-Serrato MI, Pelcastre-Villafuerte BE, Torres-Pereda P, Reyes-Morales H. Desigualdades en el acceso a servicios, base de las políticas para la reducción de la brecha en salud. Salud Publica Mex. 2019;61(6):726-733. https://doi.org/10.21149/10561

El logro de la Cobertura Universal en Salud (CUS) es un reto central para los sistemas de salud alrededor del mundo, en particular para países de ingresos bajos y medios. Para incidir en asegurar la protección a la salud, la respuesta a este reto implica contribuir a la equidad social. La Agenda 2030 sobre el Desarrollo Sostenible que la Organización de las Naciones Unidas (ONU) aprobó en 2015 para lograr la equidad en el mundo explicita el compromiso de "lograr la cobertura sanitaria universal, en particular la protección contra los riesgos financieros, el acceso a servicios de salud esenciales de calidad y el acceso a medicamentos y vacunas seguros, eficaces, asequibles y de calidad para todos" (Meta 3.8).[1] Por su parte, la Organización Mundial de la Salud (OMS) enfatiza la necesidad en la reducción de inequidades de salud, mismas que reflejan las inequidades sociales y repercuten en la vida de las poblaciones.[2] Para alcanzar estos objetivos, el acceso efectivo a los servicios de salud es un elemento central e implica tanto eliminar las barreras financieras como una oferta adecuada de servicios de calidad acorde con las características de la población.[3]

Lo anterior hace necesario un análisis que permita identificar la capacidad de la población para recibir servicios de salud y que requiere de claridad conceptual del término de acceso y su medición.[3,4] Un marco conceptual apropiado para estudiar el acceso a partir de datos derivados de encuestas, y en el que se basa este trabajo, es el Modelo Conductual para el uso de servicios de salud, que resalta la relevancia de características individuales y contextuales que intervienen para el acceso a la atención por poblaciones definidas; así, condiciones demográficas y de financiamiento (contexto) afectan la capacidad de obtener la atención (acceso) ante una necesidad de salud (condición individual) y definen resultados como salud percibida, salud evaluada y satisfacción del usuario.[5]

En México, con la reforma a la Ley General de Salud en 2003, se implementó el Sistema de Protección Social en Salud (SPSS) para el aseguramiento en salud como mecanismo para la protección financiera.[6] El SPSS redujo el porcentaje de la población sin un seguro de salud de cerca de 60%, en el año 2000, a 18% para 2012.[7] Este incremento en aseguramiento logró revertir la desigualdad en el mismo, lo que aminoró la brecha por nivel socioeconómico[8] y por condición étnica.[9] Sin embargo, y a pesar del avance en la protección financiera, persiste un grupo de población que no cuenta con la misma y, aun en la población con aseguramiento en salud, es difícil verificar que está efectivamente recibiendo atención cuando la requiere.

México es un país que se ha caracterizado por la inequidad social imperante que en el ámbito de la salud se ha reflejado en resultados sanitarios desfavorables entre la población en condiciones de pobreza.[10] La situación de pobreza en México se hace más notoria fuera de las grandes ciudades y entre la población indígena.[11] Lo anterior ofrece un marco de comprensión sobre el rezago y las dificultades para el acceso a los servicios de salud, las cuales se identifican en estas comunidades y son necesarias documentar, en aras de dar cumplimiento a la meta de equidad. Este es un paso crítico para promover oportunidades para toda la gente, identificando aquellos sectores de la población que más lo necesitan.[12,13]

Documentar las diferencias en acceso a servicios entre la población que reside en localidades fuera de las metrópolis, considerando las diferencias por nivel socioeconómico, por condición étnica y por participación en programas sociales, es necesario en la ruta hacia la reducción de las desigualdades en el contexto de la CUS. Por lo anterior y con el propósito de identificar las brechas en acceso que ocurren en el interior de las poblaciones en condiciones de pobreza, el objetivo de este trabajo es estimar las desigualdades por características socioeconómicas en acceso a servicios de salud entre la población con menor nivel de ingreso en México.

Material y métodos

Se realizó un análisis transversal a partir de los datos recolectados en hogares de la Encuesta Nacional de Salud y Nutrición (Ensanut 100k). El detalle de la metodología de la encuesta se reporta en otro documento.[14] En resumen, se trata de una encuesta con muestra probabilística de la población residente en localidades de México con menos de 100 000 habitantes, en el año 2018.

Para el análisis, se consideraron únicamente los datos correspondientes a hogares residentes en localidades de menos de 100 000 habitantes, para las cuales la muestra es representativa. Los datos utilizados para este análisis provinieron de un cuestionario en el que se obtuvo información sobre la vivienda y sobre cada integrante del hogar por medio de una persona mayor de edad perteneciente al mismo. Para el hogar, se registraron las condiciones generales de la vivienda y bienes, así como una sección reducida sobre el gasto, mientras que para cada integrante se incluyeron características demográficas, socioeconómicas, de condición de salud y acceso a servicios.

Variables de análisis

Las tres principales variables de resultado analizadas son el acceso potencial a servicios de salud, la condición de salud reportada y el acceso a atención, mismas que se definen a continuación.

Como acceso potencial a servicios de salud se tomó en cuenta la afiliación a algún esquema público de aseguramiento en salud para cada individuo. Para ello se utilizó la información que se reportó sobre el esquema de aseguramiento en salud, donde se consideró que los individuos con acceso potencial fueron quienes contaban con uno o más esquemas y, sin acceso potencial, las personas para las que se indicó que no contaban con algún esquema de aseguramiento.

Para la condición de salud reportada, se utilizaron las respuestas sobre episodios de enfermedad en los últimos 15 y 30 días, considerando que las personas sin problemas de salud fueron quienes reportaron no haber tenido una condición de salud que motivara la búsqueda de servicios de salud en ambos periodos y, con problemas de salud, las personas que tuvieron algún episodio en alguno de los dos periodos.

Finalmente, para la tercera variable y siguiendo publicaciones previas sobre acceso en términos de la definición del mismo como la capacidad, ante una necesidad de atención, de acceder sin barreras a un servicio resolutivo,[3,15] y considerando las limitaciones de la encuesta en el sentido de no incluir información sobre la resolución del problema de salud, se adoptó una definición acotada de acceso a atención como la posibilidad de atenderse sin barreras financieras atribuibles a la falta de un esquema de aseguramiento al presentar un problema de salud. Se consideró como posibilidad de atenderse al reporte de haber sido atendido por el último problema de salud reportado. De esta forma, el acceso a atención se define como:

$$Acceso\ a\ atención = 100\% - \%NoAfiliado - (\%Afiliado * \%NoAtendido)$$

Debido a que se requiere tomar en cuenta la necesidad de salud, la estimación incluye únicamente a las personas que tuvieron algún problema de salud bajo el supuesto de que el comportamiento de estas personas es representativo de lo que ocurre en sus hogares, en lo general, ante una necesidad de salud.

En ese sentido, se generaron dos métricas de acceso a atención (adicionales al acceso potencial). En la primera, se considera la atención al problema de salud reportado con cualquier proveedor, en tanto que, en la segunda, se acota a la atención al problema de salud con el proveedor para el cual la persona cuenta con aseguramiento en salud, para lo que en la fórmula arriba mencionada se valora entonces como no atendido a todo aquel que recibió atención con un proveedor diferente, en lo general un proveedor privado.

Como subpoblaciones para el análisis se incluyeron la condición étnica, la participación en el programa *Prospera* (programa público de transferencias condicionadas vigente hasta 2019)[16] y el sexo.

Por lo que se refiere a la condición étnica, se consideró si la persona formaba parte de un hogar donde algún integrante del mismo declarara ser hablante de lengua indígena. La participación en *Prospera* se definió a partir del reporte del hogar que recibe apoyo de este programa.

Para el análisis de desigualdad se utilizó como medida socioeconómica una estimación del ingreso per cápita de los hogares generada a partir de un proceso de imputación con información de la Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) de 2016.[17] El abordaje detallado se reporta en otro documento;[18] en breve, el método identifica un conjunto de características de los hogares —características de la persona jefe(a) de hogar, composición del hogar— y de las viviendas —bienes y materiales de la misma— que se usan en una regresión lineal como predictores del logaritmo del ingreso per cápita en la ENIGH 2016, para luego aplicar los coeficientes de esa regresión en la Ensanut 100k 2018.

Análisis

Se generaron medidas descriptivas (medias con desviación estándar y porcentajes con intervalo de confianza al 95% [IC95%]) para la población en su conjunto y para las subpoblaciones, con el propósito de caracterizarlas e identificar posibles patrones.

Para la medición de la desigualdad se estimó el Índice de Concentración (IC) ajustado de acuerdo con la propuesta de Wagstaf.[19] En lo general, el IC se deriva de la curva de concentración del indicador de salud de interés ordenado por una variable continúa de condición socioeconómica (en este caso, el ingreso per cápita). El IC se define como el doble del área entre la curva de concentración y la diagonal de igualdad, y tiene un rango que va de -1 a 1, en el cual el valor de cero es la ausencia de desigualdad (equivalente a la diagonal de 45° de igualdad). El índice toma valores positivos, en este caso de análisis, cuando el indicador de salud se concentra hacia la población de mayor ingreso, y negativos cuando lo hace hacia la población de menor ingreso.

El índice de concentración se estima con la fórmula siguiente:

$$IC = \frac{2}{N^2 * \mu_h} * \sum_i^n h_i * r_i$$

En donde h_i es el indicador de salud, μ_h la media del indicador de salud y r_i es la posición relativa del individuo $_i$ en la distribución el ingreso per cápita, siendo

la persona n la de mayor ingreso. El ajuste sugerido por Wagstaff[18] busca resolver el hecho de que para variables dicotómicas como las analizadas en este documento, la fórmula previa no genera resultados acotados a la escala de -1 a 1, por lo que el abordaje es normalizarlo al dividir el valor del índice entre 1 menos la media del indicador de salud, como se señala en la fórmula siguiente:[20]

$$IC = \frac{\frac{2}{N^2 * \mu_h} * \sum_i^n h_i * r_i}{1 - \mu_h}$$

El IC se puede estimar por modelos de regresión y en este trabajo se utilizó la implementación del modelo en el comando *conindex* en el programa Stata 15.0.[21] Como estratificadores para el análisis se usó el logaritmo del ingreso per cápita imputado.

Resultados

En su conjunto, el análisis incluye 42 502 observaciones individuales que corresponden a 61.5 millones de personas que residían en localidades de menos de 100 000 habitantes en México. Estos individuos habitaban 10 461 hogares.

La población de estudio, de acuerdo con la clasificación socioeconómica generada, se ubicó mayoritariamente en los cuatro primeros deciles (los de menor ingreso) de la distribución nacional (66.15% del total de individuos), con 29.05% en el decil 1, en tanto que en el decil 10 —el de mayor ingreso— se ubicó únicamente 1.05% de las personas.

Del total de personas, 21.24% residía en los hogares considerados indígenas de acuerdo con el criterio señalado en la metodología y 43.35% en hogares inscritos en *Prospera*, 48.63% fueron hombres y 51.37% mujeres, con una edad promedio de 32.18 años. La persona jefe(a) de hogar estudió en promedio 6.39 años, esto es, poco más de la primaria. Respecto al aseguramiento en salud, 82.43% de las personas estaban afiliadas a algún esquema de aseguramiento en salud: 60.64% al Seguro Popular, 21.28% a alguna institución de seguridad social y 0.51% a un esquema privado (cuadro I).

En el cuadro II se presenta el contraste entre los subgrupos analizados (indígenas vs. no indígenas, *Prospera* vs. no *Prospera* y hombres vs. mujeres). En cuanto a la situación de afiliación a algún esquema de aseguramiento en salud, la población indígena reportó mayor afiliación que quienes no son indígenas (85.94 vs. 81.47%), y las mujeres mayor afiliación que los hombres (84.47 vs. 80.26%). La mayor diferencia se observa entre población *Prospera* y no *Prospera*: quienes

Cuadro I
CARACTERÍSTICAS GENERALES DE LA POBLACIÓN RESIDENTE EN LOCALIDADES MENORES A 100 000 HABITANTES. MÉXICO, 2018

Variables	*n= 42 502* %	*IC95%*
Hombre	48.63	47.23-50.02
Mujer	51.37	49.98-52.77
Edad promedio*	32.18	29.84-34.56
Afiliado a algún seguro de salud	82.43	80.58-84.27
Seguridad social	21.28	18.01-24.56
Seguro Popular	60.64	56.99-64.27
Privado	0.51	0.01-0.15
Hogar indígena	21.24	16.39-26.09
Hogar *Prospera*	43.35	40.12-46.59
Decil promedio*	3.64	3.43-3.86
Deciles		
1	29.05	25.33-32.78
2	14.18	12.49-15.86
3	12.57	10.40-14.74
4	10.35	8.19-12.51
5	8.77	6.81-10.74
6	7.62	6.29-8.94
7	7.01	5.18-8.84
8	5.84	4.05-7.64
9	3.57	2.48-4.66
10	1.05	0.54-1.57
Años de estudio del jefe(a) de hogar*	6.39	6.06-6.72

* Media (desviación estándar)
Fuente: análisis de la Encuesta Nacional de Salud y Nutrición 100k

reportaron estar en *Prospera* tuvieron alguna afiliación a esquema de aseguramiento en salud en 88.66%, en contraste con 77.65% entre los no *Prospera*. Para las tres variables, la diferencia entre ambas categorías fue significativa, con base en los intervalos de confianza al 95% (IC95%).

De las personas con algún problema de salud en los últimos 30 días, 61.84% reportó haberse atendido con algún proveedor, independientemente de si éste correspondía con su esquema de aseguramiento. Considerando esta definición de acceso a atención, la población indígena reportó un nivel mayor (64.97%) en comparación con la no indígena (60.94%), en tanto que la población en hogares *Prospera* reportó mayor acceso que la no *Prospera* (64.21 vs. 60.41%), y las mujeres reportaron mayor acceso (64.72%) en comparación con los hombres

Cuadro II
Características del acceso a la atención de la salud en población en localidades de menos de 100 000 habitantes por sexo, condición étnica e incorporación a *Prospera*. México, 2018

	Porcentaje (IC95%)			
Variables	*Afiliado (acceso potencial) n=42 450*	*Acceso con cualquier proveedor n=6 476*	*Acceso con proveedor al que está afiliado n=6 476*	*Sin problema de salud en los últimos 30 días n=42 497*
Total	82.42	61.84	60.03	82.97
	(80.58 - 84.27)	(58.25 - 65.43)	(56.36 - 63.70)	(81.31 - 84.63)
No indígenas	81.47	60.94	58.79	83.21
	(79.33 - 83.61)	(56.98 - 64.90)	(54.77 - 62.80)	(82.02 - 84.40)
Indígenas	85.94	64.97	64.36	82.08
	(83.66 - 88.22)	(57.55 - 72.39)	(56.83 - 71.89)	(76.54 - 87.62)
No *Prospera*	77.65	60.41	58.83	81.27
	(74.76 - 80.54)	(54.73 - 66.09)	(53.02 - 64.64)	(78.63 - 83.91)
Prospera	88.66	64.21	62.02	85.20
	(87.36 - 89.95)	(61.17 - 67.24)	(59.13 - 64.91)	(83.93 - 86.47)
Hombre	80.26	58.47	56.20	83.86
	(78.07 - 82.45)	(53.38 - 63.56)	(50.87 - 61.54)	(81.46 - 86.26)
Mujer	84.47	64.72	63.31	82.13
	(82.52 - 86.41)	(60.06 - 69.38)	(58.50 - 68.12)	(80.59 - 83.68)

Fuente: análisis de la Encuesta Nacional de Salud y Nutrición 100k

(58.47%) aunque en todos los casos los intervalos de confianza se traslapan entre los grupos comparados.

La medida de acceso que considera sólo la atención con el proveedor para el cual la persona cuenta con afiliación resultó muy similar con 60.03% de la población, en lo general, atendida con el proveedor correspondiente a su aseguramiento en salud.

Análisis de desigualdades

En lo general, los valores del índice de concentración estimados fueron de magnitudes relativamente menores, lo que sugiere niveles bajos de desigualdad por las variables analizadas, con algunas excepciones. Habitualmente se considera como desigualdad importante valores del índice de concentración iguales o mayores a 0.2 en valor absoluto, situación que no se presenta en los casos analizados.

Por lo que se refiere al acceso potencial, definido como la afiliación a algún esquema de aseguramiento en salud, el valor del IC fue de -0.044, lo que refleja marginalmente una mayor concentración de los afiliados entre la población de menor ingreso (cuadro III). En cuanto a las diferentes subpoblaciones, el índice de concentración fue negativo para la población hablante de lengua indígena, entre quienes el valor se incrementó a -0.123, mientras que fue no significativamente diferente de cero para la no hablante de lengua indígena, es decir, entre la población no indígena no hubo desigualdad entre niveles de ingreso en relación con la afiliación (acceso potencial), en tanto que para la población indígena existió una mayor concentración de la afiliación entre la población de menores ingresos. Al clasificar por la participación en *Prospera*, el índice fue positivo y de magnitud similar en ambos grupos (0.042 para no *Prospera* y 0.047 para *Prospera*), esto es, hubo ligeramente mayor concentración en la población de mayor ingreso. Por sexo, el índice fue negativo tanto para varones como para mujeres, aunque de mayor magnitud para estas últimas (-0.070 vs. -0.022 en varones).

Al considerar las dos mediciones de acceso, las estimaciones resultaron similares (cuadro III). El índice de concentración para el acceso a la atención con cualquier proveedor fue de 0.050 en tanto que se redujo a 0.042 para el proveedor con afiliación; en ambos casos, la estimación sugiere una desigualdad marginal con mayor acceso entre la población de mayor ingreso.

Para la población indígena y no *Prospera*, los valores del índice mostraron reducido poder estadístico, posible-

Cuadro III
ÍNDICES DE CONCENTRACIÓN PARA EL ACCESO A LA ATENCIÓN DE LA SALUD EN POBLACIÓN DE LOCALIDADES DE MENOS DE 100 000 HABITANTES POR CONDICIÓN ÉTNICA, PARTICIPACIÓN EN *PROSPERA* Y SEXO. MÉXICO, 2018

	Total	*No indígenas*	*Indígenas*	*p**	*No Prospera*	*Prospera*	*p‡*	*Hombres*	*Mujeres*	*p§*
Afiliación (acceso potencial)	-0.044	0.007	-0.123	0.000	0.042	0.047	0.000	-0.022	-0.070	0.000
Error estándar	0.007	0.008	0.016		0.015	0.010		0.010	0.011	
Acceso a cualquier proveedor	0.050	0.094	-0.035	0.004	0.048	0.124	0.219	-0.050	0.141	0.000
Error estándar	0.015	0.017	0.032		0.030	0.017		0.022	0.020	
Acceso a proveedor afiliado	0.042	0.089	-0.039	0.0002	0.044	0.100	0.0383	-0.059	0.133	0.000
Error estándar	0.015	0.016	0.032		0.030	0.017		0.021	0.020	

* Diferencia entre no indígenas e indígenas
‡ Diferencia entre no *Prospera* y *Prospera*
§ Diferencia entre hombres y mujeres

Fuente: análisis de la Encuesta Nacional de Salud y Nutrición 100k

mente por el bajo tamaño de muestra. Los datos indicaron una dirección hacia mejor acceso en la población indígena de menor ingreso, en tanto que entre no indígenas el acceso fue mejor entre aquéllos con mayor ingreso. Al clasificar por hogares *Prospera* y no *Prospera*, en ambas métricas resultó una concentración del acceso hacia la población de mayor ingreso, siendo esta desigualdad mayor entre quienes habitan en hogares *Prospera*.

Por sexo, los resultados sugieren un fenómeno no anticipado: desigualdad en sentidos opuestos entre hombres y mujeres; entre hombres el acceso se concentró en los de menor ingreso, mientras que entre las mujeres fue en las de mayor ingreso.

Discusión

Este trabajo identifica la presencia de desigualdades en el acceso a la atención a la salud entre la población de localidades de menos de 100 000 habitantes en México, grupo que, entre el conjunto de la población nacional, presenta mayores condiciones de pobreza. Al interior de esta población se encuentra la presencia de desigualdades en el acceso a la atención de la salud asociadas con el nivel socioeconómico. Los resultados señalan que, si bien se ha logrado eliminar brechas en aseguramiento por condición socioeconómica en México e incluso la afiliación es mayor entre la población de menores ingresos, existen diferencias importantes en cuanto a la atención de problemas de salud que estarían limitando el acceso a los servicios.

El análisis de las tres dimensiones de acceso (acceso potencial, acceso a la atención por cualquier proveedor y acceso a la atención por el proveedor de afiliación) propuestas en este estudio permite identificar las desigualdades en el acceso a servicios de salud entre la población con mayores desventajas sociales. Los hallazgos confirman que la condición de aseguramiento no garantiza el acceso real a la atención a la salud, ya que subyacen retos adicionales para lograr la atención de los problemas de salud, como se ha reportado en análisis recientes.[22] Diversas razones pueden determinar que una persona afiliada a un esquema de aseguramiento en salud no reciba los servicios a los que tiene derecho: desde la inexistencia del servicio específico que es requerido (ausencia de disponibilidad) hasta la falta de información sobre los servicios a los que puede acceder o la desconfianza en los que son ofrecidos.[3]

Es de destacarse la presencia de diferencias al interior de un subconjunto de la población en México con mayor nivel de vulnerabilidad social y económica en relación con el promedio al identificarse desigualdades para el acceso a servicios de salud entre subgrupos poblacionales específicos. Esto permite una mayor precisión que los análisis previos en los que se incluyen todos los estratos socioeconómicos de la población y en los que es difícil identificar desigualdades para las poblaciones más desfavorecidas, principalmente las que residen en áreas rurales dispersas, pertenecen a grupos indígenas o viven en condiciones de pobreza, que se ocultan por información de segmentos de población con mejor acceso.[8,23,24] En este trabajo, la delimitación del análisis a la población con mayor marginación mostró que el acceso a servicios de salud está relacionado con la condición socioeconómica para este subconjunto de la

población, lo que no se había visibilizado en el análisis de la población total que había reportado un mayor acceso en este subgrupo en contraste con el promedio nacional.[14]

Otros estudios realizados en México no han reportado diferencias en el acceso y utilización de servicios de salud explicadas por la condición étnica y han identificado otras condiciones estructurales en las que habitan los indígenas mexicanos que explican dichas diferencias y que constituyen los mecanismos persistentes de su vulnerabilidad en salud.[23-25] Los resultados de este estudio señalan menor desigualdad al interior de la población indígena en contraste con la población no indígena y con el promedio nacional al observarse valores del índice de concentración de los que no es posible rechazar que sean diferenciables de cero.

Finalmente, los resultados pueden estar reflejando ciertos efectos heterogéneos (diferenciados) de las políticas públicas de salud en esta población. La reducción de las desigualdades en el acceso a servicios de salud entre indígenas y no indígenas puede indicar aciertos de la focalización de la política social entre la población indígena de México. Al igual que estudios previos realizados en población mexicana, el presente análisis identifica ganancias en el empoderamiento de la mujer, para el acceso a los servicios de salud[7,8] y, adicionalmente, muestra mejores condiciones de acceso potencial entre las mujeres, también con mayores niveles de desigualdad entre ellas al comparar con los hombres.

Una limitación importante en este análisis es la medición parcial de las dimensiones del acceso, que sólo conjunta la afiliación y la atención a los problemas de salud y no capta la capacidad resolutiva de la atención. No obstante, reflejar el comportamiento de las personas en cuanto a la decisión de uso de servicios puede considerarse una aproximación útil. Por otra parte, la identificación de la condición étnica en la población analizada se simplificó al considerar únicamente ser hablante de una lengua indígena. En tanto que esta definición es limitativa, es comparable con otros estudios y permite una mejor diferenciación de las particularidades de ser indígena en México de forma separada de ser pobre. En este contexto, incluso entre la población en condiciones de pobreza, es posible identificar diferencias en el acceso relacionadas con el nivel de ingreso —lo que en otros contextos no se ha logrado mostrar—,[26] así sea marginalmente. Los resultados de este estudio señalan que el nivel de ingreso se asocia positivamente con la posibilidad de acceder a la atención de la salud, lo que es claramente reflejo de la inequidad social en el país.

En conclusión, las desigualdades en el acceso a salud al interior de la población en condiciones de mayor vulnerabilidad socioeconómica en México hacen indispensable la implementación de acciones de política pública con mayor granularidad y que sean capaces de identificar diferencias al interior de grupos vulnerables para incidir de forma efectiva en las desigualdades en salud en particular y avanzar hacia una mayor equidad social.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Organización de las Naciones Unidas. Resolution adopted by the General Assembly 70/1. Transforming our world: the 2030 Agenda for Sustainable Development. Nueva York: ONU, 2015 [citado julio 2019]. Disponible en: https://digitallibrary.un.org/record/808134
2. Organización Mundial de la Salud. Subsanar las desigualdades en una generación: alcanzar la equidad sanitaria actuando sobre los determinantes sociales de la salud. Ginebra: OMS, Comisión sobre Determinantes Sociales de la Salud, 2009 [citado julio 2019]. Disponible en: https://apps.who.int/iris/bitstream/handle/10665/69830/WHO_IER_CSDH_08.1_spa.pdf;jsessionid=9BF67F041E184667A4E845E77261D414?sequence=1
3. Fajardo-Dolci G, Gutiérrez JP, García-Saisó S. Acceso efectivo a los servicios de salud: operacionalizando la cobertura universal en salud. Salud Publica Mex. 2015;57:180-6. https://doi.org/10.21149/spm.v57i2.7415
4. Gulliford M, Figueroa-Munoz J, Morgan M, Hughes D, Gibson B, Beech R, *et al.* What does 'access to health care' mean? J Health Serv Res Policy. 2002;7:186-8. https://doi.org/10.1258/135581902760082517
5. Andersen RM. National health surveys and the behavioral model of health services use. Med Care. 2008;46(7):647-53. https://doi.org/10.1097/MLR.0b013e31817a835d
6. Knaul FM, Arreola-Ornelas H, Wong R, Lugo-Palacios DG, Méndez-Carniado O. Efecto del Seguro Popular de Salud sobre los gastos catastróficos y empobrecedores en México, 2004-2012. Salud Publica Mex. 2018;60:130-40. https://doi.org/10.21149/9064
7. Gutiérrez JP, Hernández-Ávila M. Cobertura de protección en salud y perfil de la población sin protección en México, 2000-2012. Salud Publica Mex. 2013; 55(suppl 2):S83-90. https://doi.org/10.21149/spm.v55s2.5102
8. Gutiérrez JP, García-Saisó S, Espinosa-de la Peña R, Balandrán DA. Monitoreo de la desigualdad en protección financiera y atención a la salud en México: análisis de las encuestas de salud 2000, 2006 y 2012. Salud Publica Mex. 2016;58:9. https://doi.org/10.21149/spm.v58i6.7922
9. Leyva-Flores R, Infante-Xibille C, Gutiérrez JP, Quintino-Perez F. Inequidad persistente en salud y acceso a los servicios para los pueblos indígenas de México, 2006-2012. Salud Publica Mex. 2013;55(suppl 2):S123-8. https://doi.org/10.21149/spm.v55s2.5107
10. Martínez-Valle A. Social class, marginality and self-assessed health: a cross-sectional analysis of the health gradient in Mexico. Int J Equity Health. 2009; 8:3. https://doi.org/10.1186/1475-9276-8-3
11. Consejo Nacional de Evaluación de la Política de Desarrollo Social. Medición de la pobreza en México y en las Entidades Federativas 2016. Resumen Ejecutivo. Ciudad de México: Coneval, 2017 [citado julio 2019]. Disponible en: https://www.coneval.org.mx/Medicion/MP/Documents/Pobreza_16/Pobreza_2016_CONEVAL.pdf
12. Paes de Barros R, Ferreira FHG, Molinas-Vega JR, Saavedra-Chanduvi J. Measuring Inequality of Opportunities in Latin America and the Caribbean. Washington DC: Palgrave Macmillan, 2009.
13. Dover DC, Belon AP. The health equity measurement framework: a comprehensive model to measure social inequities in health. Int J Equity Health. 2019;18:36. https://doi.org/10.1186/s12939-019-0935-0

14. Romero-Martínez M, Shamah-Levy T, Cuevas-Nasu L, Gaona-Pineda EB, Gómez-Acosta LM, Mendoza-Alvarado LR, *et al*. Metodología de la Encuesta Nacional de Salud y Nutrición para localidades con menos de 100 000 habitantes (Ensanut 100k). Salud Publica Mex. 2019;61(5):678-84. https://doi.org/10.21149/10539
15. Gutiérrez JP, García-Saisó S, Dolci GF, Hernández Ávila M. Effective access to health care in Mexico. BMC Health Serv Res. 2014;14:186. https://doi.org/10.1186/1472-6963-14-186
16. Dávila-Lárraga LG. ¿Cómo funciona Prospera?: mejores prácticas en la implementación de programas de transferencias monetarias condicionadas en América Latina y el Caribe. (Nota técnica del BID; 971) Banco Interamericano de Desarrollo, 2016 [citado julio 2019]. Disponible en: https://publications.iadb.org/es/como-funciona-prospera-mejores-practicas-en-la-implementacion-de-programas-de-transferencias
17. Encuesta Nacional de Ingresos y Gastos de los Hogares 2016: ENIGH: nueva serie: descripción de la base de datos / Instituto Nacional de Estadística y Geografía. Ciudad de México: INEGI, 2016 [citado julio 2019]. Disponible en: https://www.inegi.org.mx/contenidos/programas/enigh/nc/2016/doc/702825091996.pdf
18. Gutiérrez JP. Clasificación socioeconómica de los hogares en la ENSANUT 2012. Salud Publica Mex. 2013;55(suppl 2):S341-6. https://doi.org/10.21149/spm.v55s2.5133
19. Wagstaff A. The concentration index of a binary outcome revisited. Health Econ. 2011; 20(10):1155-60. https://doi.org/10.1002/hec.1752
20. Kjellsson G, Gerdtham U-G. On correcting the concentration index for binary variables. J Health Econ. 2013; 32:659-70. https://doi.org/10.1016/j.jhealeco.2012.10.012
21. O'Donnell O, O'Neill S, Van Ourti T, Walsh B. Conindex: Estimation of concentration indices. Stata J. 2016; 16:112-38. https://doi.org/10.1177/1536867X1601600112
22. Rivera-Hernández M, Rahman M, Galárraga O. Preventive healthcare-seeking behavior among poor older adults in Mexico: the impact of Seguro Popular, 2000-2012. Salud Publica Mex. 2019;61:46-53. https://doi.org/10.21149/9185
23. Servan-Mori E, Torres-Pereda P, Orozco E, Sosa-Rubí SG. An explanatory analysis of economic and health inequality changes among Mexican indigenous people, 2000-2010. Int J Equity Health. 2014; 13:21. https://doi.org/10.1186/1475-9276-13-21
24. Pisanty-Alatorre J. Inequidades en la mortalidad materna en México: un análisis de la desigualdad a escala subestatal. Salud Publica Mex. 2017;59(6):639-49. https://doi.org/10.21149/8788
25. Servan-Mori E, Pelcastre-Villafuerte B, Heredia-Pi I, Montoya-Rodríguez A. Essential health care among Mexican indigenous people in a universal coverage context. Ethn Dis. 2014;24(4):423-30. [citado septiembre 27, 2019]. Disponible en: https://www.ethndis.org/edonline/index.php/ethndis/article/view/167/125
26. Ngugi AK, Agoi F, Mahoney MR, Lakhani A, Mang'ong'o D, Nderitu E, *et al*. Utilization of health services in a resource-limited rural area in Kenya: Prevalence and associated household-level factors. PLOS ONE. 2017;12(2):e0172728. https://doi.org/10.1371/journal.pone.0172728

Guerra *et al. BMC Health Services Research* (2018) 18:457
https://doi.org/10.1186/s12913-018-3283-7

BMC Health Services Research

RESEARCH ARTICLE Open Access

Loss of job-related right to healthcare associated with employment turnover: challenges for the Mexican health system

Germán Guerra[1], Emilio Gutiérrez-Calderón[2], Nelly Salgado de Snyder[1], Víctor Hugo Borja-Aburto[3], Adolfo Martínez-Valle[4] and Miguel Ángel González-Block[5*]

Abstract

Background: The Mexican health system segments access and right to healthcare according to worker position in the labour market. In this contribution we analyse how access and continuity of healthcare gets interrupted by employment turnover in the labour market, including its formal and informal sectors, as experienced by affiliates to the Mexican Institute of Social Security (IMSS) at national level, and of workers with type 2 diabetes (T2DM) in Mexico City.

Methods: Using data from the National Employment and Occupation Survey, 2014, and from IMSS electronic medical records for workers in Mexico City, we estimated annual employment turnover rates to measure the loss of healthcare access due to labour market dynamics. We fitted a binary logistic regression model to analyse the association between sociodemographic variables and employment turnover. Lastly we analysed job-related access to health care in relation to employment turnover events.

Results: At national level, 38.3% of IMSS affiliates experienced employment turnover at least once, thus losing the right to access to healthcare. The turnover rate for T2DM patients was 22.5%. Employment turnover was more frequent at ages 20–39 (38.6% national level; 28% T2DM) and among the elderly (62.4% national level; 26% T2DM). At the national level, higher educational levels (upper-middle, OR = 0.761; upper, OR = 0.835) and income (5 minimum wages or more, OR = 0.726) were associated with lower turnover. Being single and younger were associated with higher turnover (OR = 1.413). T2DM patients aged 40–59 (OR = 0.655) and with 5 minimum wages or more (OR = 0.401) experienced less turnover. Being a T2DM male patient increased the risk of experiencing turnover (OR = 1.166). Up to 89% of workers losing IMSS affiliation and moving on to other jobs failed to gain job-related access to health services. Only 9% gained access to the federal workers social security institute (ISSSTE).

Conclusions: Turnover across labour market sectors is frequently experienced by the workforce in Mexico, worsening among the elderly and the young, and affecting patients with chronic diseases. This situation needs to be prospectively addressed by health system policies that aim to expand the financial health protection during an employment turnover event.

Keywords: Healthcare utilization, Chronic illness, Informal sector, Labour markets

* Correspondence: miguel.gonzalezblock@gmail.com
[5]Universidad Anahuac Mexico, Av. Universidad 46. Col. Lomas Anáhuac, CP 52760 Huixquilucan, Edomex, Mexico
Full list of author information is available at the end of the article

© The Author(s). 2018 **Open Access** This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

Guerra G, Gutiérrez-Calderón E, Salgado de Snyder N, Borja-Aburto VH, Martínez-Valle A, González-Block MÁ. Loss of job-related right to healthcare associated with employment turnover: challenges for the Mexican health system. BMC Health Serv Res. 2018;18(1):457. https://doi.org/10.1186/s12913-018-3283-7

Background

According to the Commission on Social Determinants of Health of the World Health Organization, labour markets and their policies, along with the working and employment conditions, have a considerable impact on health and health equity [1]. When healthcare financing depends on social security arrangements, the affiliation, access and utilisation of healthcare services by the population is determined mostly on the terms of employment [2].

A trait shared by low and middle income countries is the segmentation of the workforce into formal and informal labour markets [3]. The formal market is characterised by access to contributory or tax-based social protection schemes (including insurance for healthcare, disability, life, workers' compensation plans, day-care and pensions) with varying degrees of coverage, gained through the type of work or employment activities performed in public or private institutions and business, and reported to the taxing authority [4]. The informal labour market is defined by the exclusion of access to such schemes and its reliance on out-of-pocket expenditure to access private services as well as on government support provided through social assistance programmes such as safety nets, cash transfers and voluntary contributory schemes to facilitate access to packages of limited health services. This segmentation has been considered a problem in Mexico because it excludes large population groups from social security rights and restricts access to government-subsidised healthcare, in a context where turnover across formal and informal labour market segments can occur [5]. Arguably, participating in the formal or informal labour markets can be considered a social determinant of health since access to health services and related health outcomes depend on the conditions of employment [6–9].

The Mexican government defines the workforce in the informal labour market as the proportion of the population that either is considered vulnerable because of the working and employment conditions of their workplace, or is not recognised by employers or their source of work as being under an employment relationship [10]. According to this definition, 62.3% of the total employed population in Mexico participates in the informal sector [11].

The high proportion of informality in the Mexican labour market occurs as a result of the asymmetry in social rights across the workforce. The Mexican Constitution of 1917 enshrined healthcare as a shared responsibility of employers and employees following the model legislated in Germany under Bismarck in 1883. In 1929, the Constitution was modified to spur economic growth through the federalising of labour legislation and mandating a federal social security law [12]. This law was enacted in 1943, creating the Mexican Institute of Social Security (IMSS) and leading to the integration of all social security schemes, except those of the most powerful industries such as banks, railroad, oil, electricity and beer companies, which retained their own schemes. Informal sector workers were offered limited government assistance through the Ministry of Health and Social Assistance. In 1959, federal worker social security schemes were integrated in a separate national institution, the Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (known as ISSSTE), while local (state and municipal) governments developed arrangements of their own to protect their employees. In 1983, Article 4 of the Constitution was amended to include the right to health protection for all Mexicans, thus empowering a new Ministry of Health to coordinate the health sector as a whole and to increase the range of non-contributory services as well as voluntary affiliation to alternative health financial protection schemes.

It is important to note that, in Mexico, labour market and social security segmentation go hand-in-hand because social security institutions and government assistance programmes are vertically integrated and provide access to exclusive medical and social services. This policy model assumes that most of the workforce remains static within each social security or social assistance scheme along significant periods of time, and that beneficiaries seek healthcare mostly through providers corresponding to the institutions related to their labour market segment. However, Levy-Algazy [5] reported that, within a one-year period between 2005 and 2006, up to 20% of IMSS workers moved from the formal labour market segment to informality or to economic inactivity, thus losing access to IMSS healthcare. Furthermore, insured workers often utilise private healthcare providers or Ministry of Health facilities, leading to service duplication, high out-of-pocket expenditure and decreased incentives to improve insured services [13–15].

Persistently high levels of informality may be tied to high levels of employment turnover between formal and informal sectors. In turn, precarious working conditions in the informal sectors might lead to workforce turnover towards economic inactivity, with the corresponding loss of social benefits and continuity of care. This situation may be particularly problematic for Mexico, a country where chronic diseases account for the highest share of mortality and disability [16]. Previous studies [17, 18] have highlighted the sociodemographic factors associated with employment turnover towards unemployment in Mexico, indicating that a larger proportion of women experience unemployment more frequently when compared to men, while continuous employment trajectories are associated to higher income, education and age, as well as to being married. Work just published suggest

that employment turnover by IMSS-affiliated workers (IAW) in Mexico City is associated to a 43% decrease in the quality of care received by patients with diabetes and with a 19% decrease in diabetes control [19].

The present article analyses the frequency and social determinants of employment turnover in the Mexican labour market, including its formal and the informal sectors, in a cohort of IMSS-affiliated workers (IAW) across the calendar year 2014. Employment turnover allow us to approach the extent to which, the loss and the subsequent gain of healthcare rights following changes in employment status, is experienced within the Mexican workforce. Access to health services other than IMSS is analysed in relation to turnover events. We focus on estimating the frequency and determinants of employment turnover of IAW from affiliation to disaffiliation at the national level and particularly by IMSS affiliates diagnosed with type 2 diabetes mellitus (T2DM) in Mexico City. T2DM is Mexico's first cause of disability adjusted life years as well as the second cause of mortality [16].

Methods

Employment turnover

Based on works by Short, Robertson, and the Organisation for Economic Co-operation and Development [20–22], we define employment turnover as the transition event from being employed in the formal labour market segment, to another employment status, including working in the informal labour market, over a particular period. When quantification is performed at the end of the observed period (t_{+1}), in relation to an initial stock of persons at the beginning of the observed period (t_0), a turnover rate can be calculated. Sources of information on IMSS affiliation status allows for the estimation of employment turnover among the IAW, and also of the change of access to healthcare other than IMSS. We approach formal/informal turnover by measuring the annual employment turnover rate (AETR) of the IAW, which is defined as follows:

$$\mathrm{AETR} = \frac{\sum \mathrm{IAW}_{t+1} | \mathrm{T} \geq 1}{\sum \mathrm{IAW}_{t0} | \mathrm{T} = 0} \times 100$$

Where:

IAW_{t0} is any IAW with access to IMSS health services as a current job benefit at the beginning of the observed period;

IAW_{t+1} is any IAW who experienced employment turnover at least once during the observed period;

T is the number of times an individual experienced turnover between "t_0" and "t + 1";

t_0 is the beginning of the observation period and;

t_{+1} is the end of observation period.

The intensity of the employment turnover is also measured by counting the times an individual experiences the loss of access to IMSS healthcare services in the period under study. The measurement of turnover intensity indicates the distribution of the initial stock of the IAW according to the frequency of turnover events. The annual employment turnover intensity rate ($\mathrm{AETIR_n}$) is defined as the percentage of the IAW that experience an event of employment turnover "n" times, between "t_0" and "t + 1" as follows:

$$\mathrm{AETIR_n} = \frac{\sum \mathrm{IAW}_{t+1} | \mathrm{T} = \mathrm{n}}{\sum \mathrm{IAW}_{t0} | \mathrm{T} = 0} \times 100$$

Where IAW_{t+1} is any IAW individual that experienced employment turnover "n" times during the observation period, for n = {1,2,3,4}.

Longitudinal data

The calculation of the AETR and $\mathrm{AETIR_n}$ uses longitudinal data that registers the frequency of turnover events along time. We used data from the National Survey of Occupation and Employment (ENOE) to analyse employment turnover among the IAW at the national level. The ENOE is a trimonthly survey applied to a representative household sample in Mexico with the objective of obtaining statistical information on the occupational characteristics and determinants of the population at the national level [23].

The period of observation we chose was from the last trimester of 2013 ("t_0") to the last trimester of 2014 ("t_{+1}"). We selected a subset of individuals (as described below) and obtained a longitudinal subsample to calculate the AETR and conduct statistical analysis.[1] The inclusion criteria for the subsample were (1) any IAW aged 15 or older at time "t_0", (2) who declared having access to healthcare through their current job at time "t_0", and (3) who completed the survey across the five visits between t_0 and t_{+1}. IAW were excluded from the subsample if they did not meet these criteria. Our final subsample was an IAW cohort of 8347 individuals that had access to IMSS healthcare services at time "t_0".

It is important to note that, for each trimester, ENOE asks respondents to report their employment status within the previous week. This might result in an underestimation of turnover intensity, as the individual could have experienced several turnover cycles within the three-month period. Thus, turnover rates may actually be higher than observed. Given that no information is provided about access to healthcare in the last three months, we assume that the turnover entails no healthcare access during the period.

Employment turnover for IMSS patients diagnosed with T2DM was obtained from the IMSS affiliation department database containing dates of affiliation and disaffiliation across year 2014, for 11,045 workers with T2DM identified through electronic medical records in six IMSS Family Medicine Clinics (FMCs) in Mexico City. The sample frame to identify the six clinics consisted of the 53 FMCs in Mexico City with 10 or more examining rooms (23 FMCs in the south and 20 FMCs in the north of the city). The FMCs were categorised according to geographic location (south and north) and the number of examining rooms (10–19, 20–29, and ≥ 30 examining rooms). One FMC was chosen from each category through simple random selection. The affiliation data for all workers with a T2DM diagnosis was requested to IMSS using their affiliation number as key.

The inclusion criteria for this analysis were (1) having healthcare access to IMSS as an insured worker and (2) being a T2DM patient. The exclusion criteria were (1) having healthcare access to IMSS with less or equal to 15 days of insurance, (2) having IMSS student insurance, (3) having a voluntary family IMSS insurance, (4) being an IMSS pensioner or IMSS pensioner beneficiary, or (5) being a beneficiary of an insured worker.

Statistical analysis

Our analysis of both ENOE and electronic medical records included a description of the IAW annual turnover and turnover intensity, analysing the associations with sociodemographic characteristics. We calculated the general AETR and $AETIR_n$ by sex, age groups, daily minimum wage, and educational level. We analysed the sociodemographic factors associated with employment turnover by fitting a binary logistic regression model. Employment turnover as a dependent dichotomous variable (individual experiences turnover vs. does not experience turnover) was analysed with the variables of sex, highest educational level attained, marital status, age group, and daily income in minimum wages. Education and marital status were not available from the electronic medical records and were thus not included in this analysis.

Finally we described the access to other healthcare services for the workforce that lost IMSS affiliation due to employment turnover. We estimated the distribution of access to healthcare for the IAW that experienced employment turnover at the last trimester of 2014. If access was gained to another social security institution, the name of the institution was provided. The distribution includes also IAW that did not regain right to access to healthcare as employment benefit, or became economically not active or unemployed. The distribution was described according to the same sociodemographic characteristics used for AETR and $AEITR_n$. We used IBM-SPSS statistical package version 22 for all mentioned analysis.

Results

Employment turnover and employment turnover intensity (AETR and $AETIR_n$) rates for the general IAW are shown in Table 1. The AETR was 38.3% in general and 39.2% for women and 37.8% for men. By age group, the employment turnover was higher among the youngest (15–19) and oldest age (60+) groups, at 65.4 and 62.4%, respectively.

A total of 33% of the IAW at national level experienced employment turnover once, and only 5.3% experienced it at least twice during the observed period. Employment turnover was much more intense for the 60 or over age group ($AETIR_1$ = 52.8%). The 15–19 age group experienced similar levels of turnover as the oldest group, as 53.3% of the youngest IAW reported having at least one employment turnover event during the calendar year 2014, and 12.1% experienced it at least twice. T2DM patients followed this age-related turnover pattern (Table 2), but employment turnover was experienced less often, not reaching 30% in any age group (28% for ages 20–39, and 26% for 60 or over).

Employment turnover intensity and daily minimum wage levels among IAW showed an inverse proportional relation as the employment turnover decreased with the number of daily minimum wages earned. However, it is worth noting that differences between categories of number of minimum wages became statistically significant only after earning more than three minimum wages. T2DM patients followed the same relation, but employment turnover was also experienced less often (Table 2). Finally, educational level (Table 1) showed a similar pattern to income, except for the upper-middle and upper levels, where there was a slightly higher employment turnover than complete secondary level for all intensity levels.

Sociodemographic factors associated to employment turnover

Table 3 shows the sociodemographic factors associated to employment turnover of IAW. The characteristics associated with less risk of employment turnover were having higher schooling grade (upper-middle, OR = 0.761; upper, OR = 0.835) and earning 3–5 daily minimum wages (OR = 0.852) or higher than 5 minimum wages (OR = 0.726). Being single and younger were associated with higher risk of employment turnover (single, OR = 1.413).

The sociodemographic factors associated to employment turnover of T2DM patients are shown in Table 4. Being in the 40–59 age group (OR = 0.655) and having a higher income than three or more daily minimum wages

Table 1 Annual employment turnover rate (AETR) and annual employment turnover intensity rate ($AETIR_n$) by sociodemogaphic characteristics of IMSS-affiliated workers, Mexico, 2014 ($N = 8347$)

	Continuous affiliation to IMSS (Turnover events = 0)	Test of equality of proportions[a]	AETR (Percentage)	Test of equality of proportions[a]	$AETIR_1$ (Percentage)	Test of equality of proportions[a]	$AETIR_2$ (Percentage)	Test of equality of proportions[a]
General	61.7		38.3		33.0		5.3	
Sex								
Male	62.2	*a*	37.8	*a*	32.7	*a*	5.1	*a*
Female	60.8	*a*	39.2	*a*	33.7	*a*	5.5	*a*
Age group								
15–19	34.6	*a*	65.4	*a*	53.3	*a*	12.1	*a*
20–39	61.4	*b*	38.6	*b*	33.6	*b*	5.0	*b*
40–59	66.2	*c*	33.8	*c*	29.0	*c*	4.8	*b*
60 or over	37.6	*a*	62.4	*a*	52.8	*a*	9.6	*a*
Daily minimum wage[b]								
Less or equal than 3	59.0	*a*	41.0	*a*	35.4	*a*	5.6	*a*
Greater than 3 and up to 5	64.8	*b*	35.2	*b*	30.6	*b*	4.6	*a*
Greater than 5	68.7	*b*	31.3	*b*	26.1	*c*	5.2	*a*
Highest educational level attained								
Incomplete elementary	51.4	*a*	48.6	*a*	40.1	*a*	8.5	*a*
Completed elementary	57.7	*a,c*	42.3	*a*	35.6	*a*	6.7	*a,b*
Completed secondary[c]	64.5	*b*	35.5	*b*	30.9	*b*	4.6	*b*
Completed upper-middle[d] *and upper*	61.3	*c*	38.7	*a,b*	33.6	*a,b*	5.1	*a,b*

Source: Own calculations based on National Survey of Occupation and Employment (ENOE). Trimesters: IV 2013 to IV 2014
[a]Values for the same variable and column not sharing the same subscript are significantly different at $P < 0.05$ in the two-sided test of equality for proportions
[b]Minimum wage in 2013: $64.76 MXN (US$3.37, exchange rate 2017). Minimum wage in 2014: $67.29 MXN (US$3.50, exchange rate, third trimester, 2017)(Servicio de Administración Tributaria, 2017)
[c]Equivalent to 9 years of formal schooling
[d]Equivalent to 12 years of formal schooling

Table 2 Annual employment turnover intensity rate by sociodemogaphic characteristics of T2DM patients at FMC, Mexico City, 2014 ($N = 11,045$)

	Continuous affiliation to IMSS (Turnover events = 0)	Test of equality of proportions[a]	$AETIR_1$[b](Percentage)	Test of equality of proportions[a]
General	77.5		22.5	
Sex				
Male	77.1	*a*	22.9	*a*
Female	78.0	*a*	22.0	*a*
Age group				
20–39	72.0	*a*	28.0	*a*
40–59	79.5	*b*	20.5	*b*
60 or over	74.0	*a*	26.0	*a*
Daily minimum wage[c]				
Less or equal than 3	72.5	*a*	27.5	*a*
Greater than 3 and up to 5	78.7	*b*	21.3	*b*
Greater than 5	86.5	*c*	13.5	*c*

Source: Own calculations based on IMSS electronic medical records, 2014
[a]Values for the same variable and column not sharing the same subscript are significantly different at $P < 0.05$ in the two-sided test of equality for proportions
[b]Note that only AETR was calculated for T2DM patients, thus $AETR = AETIR_1$
[c]Minimum wage in 2013: $64.76 MXN (US$3.37, exchange rate 2017). Minimum wage in 2014: $67.29 MXN (US$3.50, exchange rate, third trimester, 2017) (Servicio de Administración Tributaria, 2017)

Table 3 Sociodemogaphic factors associated to employment turnover of IMSS-affiliated workers, Mexico, 2014 ($N = 8347$)

Sociodemographic factor[a]	Category	Odds ratio
Age group	*15–19*	Reference category
	20–39	0.399***
	40–59	0.347***
	60 or over	1.032
Daily minimum wage	*Less or equal than 3*	Reference category
	Greater than 3 and up to 5	0.852**
	Greater than 5	0.726***
Highest schooling grade attained	*Elementary*	Reference category
	Upper-middle	0.761***
	Upper	0.835*
Marital status	*Married or consensual union*	Reference category
	Divorced or separated	1.013
	Widowed	0.830
	Single	1.413***

Source: Own calculations based on National Survey of Occupation and Employment (ENOE). Trimesters: IV 2013 to IV 2014
[a]Sex was not statistically significant ($P \geq 0.05$)
*$P < 0.05$
**$P < 0.01$
***$P < 0.001$

were associated with less risk of turnover; (3–5 daily minimum wages, OR = 0.691; higher than 5 minimum wages, OR = 0.401). Male T2DM patients experienced a higher risk of employment turnover than female T2DM patients (OR = 1.166).

Access to job-related healthcare services associated to turnover events

Out of the total turnover events reported in the last semester, 61.7% led to another job, however almost 89% of them failed to access job-related health services (Table 5).

Table 4 Sociodemogaphic factors associated to employment turnover of T2DM patients at FMC, Mexico, 2014 ($N = 11,045$)

Sociodemographic factor	Category	Odds ratio
Sex	*Female*	Reference category
	Male	1.166***
Age group	*20–39*	Reference category
	40–59	0.655***
	60 or over	0.818*
Daily minimum wage	*Less or equal than 3*	Reference category
	Greater than 3 and up to 5	0.691***
	Greater than 5	0.401***

Source: Own calculations based on IMSS electronic medical records, 2014
*$P < 0.05$
***$P < 0.001$

The ISSSTE was the most frequent source of job-related health services. More men than women remain employed (71.3% vs.46.6%). However, when employed, a higher proportion of women gained job-related healthcare services than men (16.4% vs. 9.3%). It is worth noting that 13.8% of women acquired healthcare services by ISSSTE.

Age makes an important difference in the outcome of turnover events. Among workers between 15 and 19 years of age, 47.7% remain employed as against 68% of those 40 to 59 years of age. Up to 87.4% of workers 40 to 59 years of age that remained employed failed to gain access to job-related health services, and all of the youngest lost this type of access. Regarding income, lowest earners fail to gain job-related health service access in a proportion as high as 92.4% against 83.5% among the lowest earners. Education levels and continuous employment show small differences between categories, but this sociodemographic factor is the largest differentiator with respect to job-related health service access. For instance the gap in access to ISSSTE between the least and the most educated is 16%.

Discussion

To our knowledge, this is the first study to analyse employment turnover across the formal and informal labour markets as defined by social security affiliation, as well as the loss of access to healthcare services within vertically integrated health systems and the labour market dynamics affecting it. The study was able to utilise large samples from both the ENOE and IMSS medical records, obtaining reliable estimates.

With a general annual turnover rate of 38.3 per 100 affiliated workers, social security seems to be failing to fully protect its beneficiaries on a continuous basis. Furthermore, 88.6% of turnover events lead to informal jobs that fail to provide access to health services. This situation is of much greater concern among those aged 60 and above, for whom AETR is as high as 62.4% and where 54.2% leave the economically active population or become unemployed. Among the population in the oldest age group that remain employed, 95.5% fail to gain access to job-related health services.

Employment turnover among workers with T2DM in Mexico City was 22.5%, a rate 41% lower with respect to general workers nationwide. This result can be interpreted as a strategy by workers with greater healthcare needs to retain their source of medical care. However, this assumption has to be carefully interpreted as the labour market in Mexico City may be more stable, away from seasonal agro-industrial work undertaken elsewhere.

Table 5 Access to job-related healthcare services of IMSS-affiliated workers that experienced turnover events, Mexico, last trimester, 2014. Percentage frequency distribution, ($N = 1913$)

	Employment situation		Access to job-related health services among the employed		
	Employed	Unemployed or not economically active	ISSSTE	Another social security institution	Without job-related access*
General	61.7	38.3	9.1	2.3	88.6
		Sex			
Male	71.3	28.7	7.1	2.2	90.8
Female	46.6	53.4	13.8	2.6	83.6
Age group					
15–19	47.7	52.3	0.0	0.0	100.0
20–39	60.9	39.1	9.3	2.6	88.1
40–59	68.0	32.0	10.3	2.3	87.4
60 or over	45.8	54.2	4.5	0.0	95.5
Daily minimum wage[a]					
Less or equal than 3	58.9	41.1	5.6	2.0	92.4
Greater than 3 and up to 5	66.7	33.3	10.8	1.7	87.5
Greater than 5	62.7	37.3	11.6	5.0	83.5
Highest educational level attained					
Completed elementary	67.6	32.4	2.9	1.0	96.2
Completed secondary or upper-middle[b]	60.7	39.3	6.4	2.1	91.5
Upper or more	60.2	39.8	18.9	3.5	77.6

Source: Own calculations based on National Survey of Occupation and Employment (ENOE). Trimesters: IV 2013 to IV 2014
[a]Minimum wage in 2013: $64.76 MXN (US$3.37, exchange rate 2017). Minimum wage in 2014: $67.29 MXN (US$3.50, exchange rate, third trimester, 2017)(Servicio de Administración Tributaria, 2017)
[b]Equivalent to 12 years of formal schooling
*Difference in extreme value proportions are statistically significant at $p < 0.05$

A 22.5% yearly turnover among T2DM patients is of particular concern, as this may reflect a loss of continuity of care for diabetes-control among workers exposed to relatively frequent disaffiliation. Additionally, the fact that elderly workers are much more prone to employment turnover suggests an even greater vulnerability [24], both in the general population and among those with T2DM. Further research needs to be undertaken across more comparable populations to ascertain the extent to which chronic diseases induce job stability, or if they hinder the capacity to maintain employment in the formal labour market.

We now have robust evidence demonstrating an association between employment turnover and chronic disease care in Mexico. Members or our team led by Doubova undertook a three-year follow-up study of 27,217 IMSS patients with a diagnosis of diabetes in Mexico City, assessing the relationship between quality of diabetes care processes and control [19]. The mean duration of disaffiliation to IMSS in the study period was of 120 days, not including the two-month grace period that IMSS provides to patients that lose affiliation. Study results show that patients experiencing employment turnover decreased their quality of diabetes care by 43.2%, measured as patients receiving less than 50% of standard disease control interventions. While such interventions could have been provided by alternative health providers while the patient was disaffiliated to IMSS, employment turnover had –in itself– a measurable and large impact on diabetes control, as evidenced by the fact that it was associated with a 19.2% reduction in the attainment of a standard set of physiological indicators.

Our estimates of employment turnover, specifically the AETR, are higher than those estimated by Levy-Algazi [5] for 2005–2006 (approximately 20%), likely due to methodological differences. Levy-Algazi reported data for only a four trimesters period, thus missing the situation of affiliation at the beginning of the period. Our study assessed affiliation from the last trimester of 2013 which is the initial period where the five visits across year 2014 started, thus covering a complete year of panel data available. The difference may also be due to a major stability in the labour market during the period studied by Levy-Algazi. Furthermore, our findings are different to those of previous studies assessing the stability of employment trajectories, which indicated that these were more stable for older populations [17, 18].

The sociodemographic factors associated to employment turnover are related to the so called "demographic dividend" stemming from a predominantly young population in Mexico, as well as to a phenomenon of a rapidly ageing population [25]. Indeed, employment turnover is more frequently experienced in younger age groups, but resurges among older age groups close to retirement age. Younger groups, specifically those aged 15–19, might be experiencing a more frequent turnover due to the type of work in which they engage (part-time) or due to competing interests in their life course such as pursuing further education. It could also be related to early fertility events, as Mexico has experienced a rise of the adolescent fertility rate in the period 2009–2014 of 7.84 births per 1000 women aged 15–19 (69.2 vs. 77.04) [26].

The loss of IMSS coverage at young ages is critical in the support of reproductive healthcare, among other needs. With regards to chronic diseases in general, the establishment of a trusted, stable relationship with a healthcare provider is critical for their early detection, diagnosis and effective control [24]. For older age groups, periodic social security disaffiliation entails greater costs to formal labour market re-entry and access to healthcare, as well as entitlement to a pension scheme [27].

In order to address employment turnover, innovative labour market policies are urgently required to absorb the growth in the Mexican working-age population. According to García [28], the working-age population in Mexico will reach a maximum of 60 million by 2050, with a subsequent steady decline in the decades to follow. For the period of 2007–2015 an average of 9.5 million jobs should have been created to absorb the Mexican demographic dividend of working-age cohorts. Yet, recent labour market policies have been unable to reach this goal. During the period 2007–2012 the net growth of formal labour market jobs registered by IMSS and the National Institute of Statistics and Geography (INEGI) was 1.6 million, with 32% being temporary jobs. For the first semester period of January 2012 to the first semester period of June of 2017, 2.1 million formal labour market jobs were created, with 17% being temporary [29]. The current Mexican president's administration (Enrique Peña-Nieto) claims to have created 2 million additional jobs between 2013 and 2016, a figure higher than previous administrations [30], yet still far below national needs.

Several policies have been implemented in the last ten years to support the formalisation of the labour market. During Calderon's administration, the "First Employment Program" was implemented between 2006 and 2012, subsidising social security contributions for first-time employees. Yet, the uptake of the programme was low, with only 83,000 workers registered in its first 3 years [31] and the programme has ceased to exist. The Peña Nieto administration is currently implementing a programme to promote the formalisation of small businesses through the Fiscal Incorporation Programme (*Régimen de incorporación fiscal*; RIF), including full healthcare and pension coverage for both employers and employees with the incentive of a 10-year period of federal fiscal and IMSS affiliation subsidies. In parallel, however, labour legislation enacted in November 2012 enabled greater contractual flexibility through outsourcing, seasonal employment, hourly wage rates and traineeships, thus challenging labour stability and the continuity of employment [32].

Policies to bolster labour market formalisation have thus far failed to meet the expectations to promote the growth of needed formal sector jobs, while policies favouring labour flexibility may in fact be working against formalisation as currently defined. Furthermore, these policies ignore the high permeability across the formal and informal labour markets, with the loss of access to social security benefits. Small firms perceive RIF as a barrier to formalisation and, along with opposition parties, are seeking legislation to promote formalisation based exclusively on income tax and fiscal simplification, possibly excluding subsidies for social security benefits. Recent RIF reforms enabled the deduction of private medical expenditures in tax declarations, which could signal an alternative to IMSS subsidies [33]. Proposals are also emerging to substitute RIF with increased value-added taxation in order to increase the financing of social services for informal sector workers and their families [34].

Study limitations

Most of the limitations of the study stem from the specialised nature of each source of information. As the focus of ENOE is on the labour market, it was not possible to assess the actual use of IMSS healthcare services by respondents, but only their access. In the same way, ENOE does not specifically register if IAW keep access to healthcare as part of their previous job under the eight-week grace period, but it is relevant to know how this benefit is acted upon by IAW in order to provide more evidence about its adequacy to the labour market dynamics. Furthermore, workers could have lost access to IMSS directly, but could have retained it if they remained as a dependent of an IAW as the spouse or a child.

Although ENOE panel data allowed for a refined approach to track employment trajectories of IAW to inactivity, informality or to public employment, we focused solely on the loss of access to IMSS services and the immediate access to other job-related health services. Such

trajectories need to be further investigated to have a more complete picture of the impact of employment turnover on job-related healthcare access.

Regarding T2DM patients estimates from IMSS electronic medical records, one limitation lies in the difficulty of measuring employment turnover of T2DM patients and making it comparable to the general IAW. The aim of the study was to assess the level of turnover within each population (National level and Mexico City), rather than comparing the two samples. Further research is required to analyse the role of chronic diseases, such as T2DM, as a cause or a consequence of employment turnover.

Another important limitation of this study is the lack of qualitative data to ascertain the extent to which employment turnover is associated to actual health service utilization, and to the perception of the quality of care, particularly in comparison to services provide by IMSS. This limitation is of concern given that a small but significant proportion of turnover events is associated to accessing ISSSTE services, while private and public assistance health services are widely available and could well offer an alternative to care for the majority of continuously employed workers that fail to access job-related health services.

Finally, as the majority of turnover events led to informal jobs without access to healthcare services, it is important to conduct further research in order to obtain more evidence in the context of our findings that points to a large impact of employment turnover on health indicators.

Conclusions

Turnover from employment providing affiliation to IMSS to unemployment without direct IMSS affiliation is a frequent event in the Mexican labour market as attested by IMSS national level data, the largest formal sector insurer. Furthermore, the majority of turnover events are associated to the informal labour market and to the loss of job-related health care. High turnover rates reduce the effectiveness of social security, leading to frequent loss of access to benefits such as healthcare and to a reduced impact of health interventions. The most vulnerable population groups to employment turnover of IAW are the youngest and the oldest, the less educated, and those with the lowest income. Yet, these are precisely the groups that should be fully covered by social protection schemes.

Thus, employment turnover as a determinant of health is a consequence of the labour market dynamics, affecting continuity of access to health services in Mexico and challenging the quality of care. It is questionable whether reforms to labour market regulations as currently formulated and implemented can contribute to extending continuous access to trusted health providers. Alternatives must be sought to ensure universal access to essential, person-centred primary healthcare services, regardless of the source of funding or the position of individuals within the labour market. IAW losing this source of funding could retain access to IMSS primary care providers funded by Ministry of Health assistance programmes such as *Seguro Popular*, which already funds services at similar levels of healthcare on a per-affiliate basis.

Other options could include extending the right of access to healthcare beyond the current eight week period after loss of affiliation to social security institutions, thus enabling workers, and particularly those with chronic diseases or the elderly, to maintain continuity of care within IMSS, regardless of employment situation. Funding for such a scheme could be provided within IMSS through the permanent disability insurance fund, thus avoiding the disability that could be incurred from the documented loss of quality of care stemming from employment turnover.

Endnotes

[1]The National Survey of Occupation and Employment (ENOE) question number "6d" from the basic questionnaire: As part of your current job, do you have access to medical care at? 1) IMSS; 2) Pemex, navy or army hospital/clinic; 3) Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE); 4) State ISSSTE; 5) other; 6) no access; 9) Does not know. This question allowed us to select the cohort of all individuals that met the criteria, and answered "IMSS" (option 1).

Abbreviations

AETIR: Annual employment turnover intensity rate; AETR: Annual employment turnover rate; ENOE: National Survey of Occupation and Employment; FMCs: Family Medicine Clinics; IAW: IMSS-affiliated workers; IMSS: Mexican Institute of Social Security; INEGI: National Institute of Statistics and Geography; ISSSTE: Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado; RIF: Fiscal Incorporation Programme; T2DM: Type 2 diabetes mellitus

Acknowledgments

We thank Svetlana Doubova for their valuable input to the draft versions of this manuscript. Finally, the authors thank the useful comments and careful observations from reviewer James Vardaman.

Funding

All research activities of this work were possible by the funding of the National Council for Science and Technology of Mexico (CONACyT) [grant number 249041].

Availability of data and materials

The datasets generated and analysed for T2DM patients during the current study are not publicly available as confidentiality and anonymity of the T2DM patients must be preserved. The datasets analysed for IAW during the current study are available in the INEGI repository: http://www.beta.inegi.org.mx/proyectos/enchogares/regulares/enoe/

Authors' contributions

GG and MAGB sketched the first outline of this article. EGC obtained data form ENOE, built panel datasets, and conducted statistical analysis with GG.

VHBA provided the data for T2DM IMSS patients and supported the process of dataset building. With these inputs GG and MAGB drafted the first version of the article and turned it to the rest of the co-authors. NSS and AMV deepened and provided further input on the background and discussion sections. A second version was drafted by GG and turned to the rest of the authors. Minor contributions to the second version by all authors were considered and included in the final version, which was approved by all of authors.

Ethics approval and consent to participate

The research protocol entitled *"La rotación laboral entre la economía formal e informal como determinante social de la calidad de atención y resultados de salud de los pacientes con diabetes en México"* was reviewed and approved by two ethics committees: a) Health Sciences Faculty at Universidad Anáhuac, and; b) Centro Médico Siglo XXI at IMSS. Consent to participate was not applicable for the research activities of this project.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Author details

[1]National Institute of Public Health, Centre for Health Systems Research, Av. Universidad 655. Col. Santa María Ahuacatitlán, CP 62100 Cuernavaca, Morelos, Mexico. [2]Independent consultant, Barranca del Muerto 231. Col. San José Insurgentes, CP 03900 Mexico City, Mexico. [3]Unidad de Atención Primaria a la Salud, Instituto Mexicano del Seguro Social, Hamburgo 18. Col. Juárez, Cuauhtémoc, CP 06600 Mexico City, Mexico. [4]Secretaría de Salud, Lieja 7, Colonia Juárez, CP 06600 Mexico City, Mexico. [5]Universidad Anahuac Mexico, Av. Universidad 46. Col. Lomas Anáhuac, CP 52760 Huixquilucan, Edomex, Mexico.

Received: 16 October 2017 Accepted: 6 June 2018
Published online: 15 June 2018

References

1. World Health Organization. Closing the gap in a generation: health equity through action on the social determinants of health. Final report of the commission on social determinants of health. Geneva: World Health Organization; 2008.
2. Filgueira C, Filgueira F. Models of welfare and models of capitalism: the limits of transferability. In: Huber E, editor. Models of capitalism: lessons for Latin America. Pennsylvania: University Park; 2002. p. 127–52.
3. Schrecker T. Labor markets, equity, and social determinants of health. In: Schrecker T, Labonté R, Packer C, Runnels V, editors. Globalization and health: pathways, evidence and policy. New York: Routledge; 2009. p. 81–104.
4. INEGI. Sector formal. In: Glosario. http://www.beta.inegi.org.mx/app/glosario/default.html?p=EHENOE15mas. Accessed 13 May 2017.
5. Levy-Algazi S. Universalización de la salud o de la seguridad social? Gac Med Mex. 2011;147:455–68.
6. VanGarde A, Yoon J, Luck J, Mendez-Luck CA. Racial/ethnic variation in the impact of the affordable care act on insurance coverage and access among young adults. Am J Public Health. 2018;108:544–9.
7. Organisation for Economic Co-operation and Development. OECD Reviews of Health Systems. Mexico 2016. In: OECD publishing; 2016.
8. Hadley J. Sicker and poorer-the consequences of being uninsured: a review of the research on the relationship between health insurance, medical care use, health, work, and income. Med Care Res Rev 2003; suppl 60:3S–75S; discussion 76S–112S.
9. Institute of Medicine. Coverage matters: insurance and health care. Washington (DC): National Academy Press; 2001.
10. INEGI. Tasa de informalidad laboral. In: Glosario. http://www.beta.inegi.org.mx/app/glosario/default.html?p=ENOE15. Accessed 13 May 2017.
11. INEGI. Encuesta Nacional de Ocupación y Empleo. Indicadores estratégicos. Segundo trimestre de 2016. http://www.beta.inegi.org.mx/contenidos/proyectos/enchogares/regulares/enoe/tabulados/15ymas/indicadores_estrategicos_15ymas_2016_trim2_xls.zip. Accessed 13 May 2017.
12. Moctezuma Barragán J. Artículo 123. In: Rabasa E, editor. Ochenta Años de Vida Constitucional en México. Mexico: Instituto de Investigaciones Jurídicas de la UNAM; 1998. p. 70–1.
13. González-Block MÁ. Access policies and utilization patterns in prenatal and child delivery care in Mexico. Health Policy Plan. 1994;9:204–12.
14. González-Block MÁ. El traslape de la demanda institucional en el Sistema Nacional de Salud de México: limitaciones en la integración sectorial. Salud Publica Mex. 1988;30:804–14.
15. González-Block MÁ, Sauceda-Valenzuela AL, Ana-Téllez YS. Factores asociados a la demanda de servicios para la atención del parto en México. Salud Publica Mex. 2010;52:416–23.
16. Institute for Health Metrics and Evaluation. GBD Compare, Visualization Hub: DALYS per 100000. Both sexes. All ages. https://vizhub.healthdata.org/gbd-compare/. Accessed 1 Aug 2017.
17. Parker S, Pacheco E. Labor market entries, exits and unemployment: longitudinal evidence from urban Mexico. In: Hill K, Morelos JB, Wong R, editors. Las consecuencias de las transiciones demográficas en América Latina: Memoria del seminario internacional. México: El Colegio de México, Centro de Estudios Demográficos y de Desarrollo Urbano; 1999. p. 323–42.
18. Pacheco E, Parker S. Movilidad en el mercado de trabajo urbano: evidencias longitudinales Para dos periodos de crisis en México (mobility in the urban labor market: longitudinal evidence for two periods of crisis in Mexico). Rev Mex Sociol. 2001:3–26.
19. Doubova SV, Borja-Aburto VH, Guerra-y-Guerra G, Salgado-de-Snyder VN, González-Block MÁ. Loss of job-related right to healthcare is associated with reduced quality and clinical outcomes of diabetic patients in Mexico. Int J Qual Health Care. February 2018;
20. Short JR. Population turnover: problems in analysis and an alternative method. Area. 1978:231–5.
21. Robertson IM. The measurement of population turnover: a new approach by coordinate references in a Scottish City. Town Planning Review. 1982;53:79.
22. Organisation for Economic Co-operation and Development Labour turnover. In: Glossary of statistical terms. https://stats.oecd.org/glossary/detail.asp?ID=3538. Accessed 13 May 2017.
23. INEGI. Encuesta Nacional de Ocupación y Empleo. Objetivo General. http://www.beta.inegi.org.mx/contenidos/proyectos/enchogares/regulares/enoe/tabulados/15ymas/indicadores_estrategicos_15ymas_2016_trim2_xls.zip. Accessed 13 May 2017.
24. Barr VJ, Robinson S, Marin-Link B, Underhill L, Dotts A, Ravensdale D, Salivaras S. The expanded chronic care model: an integration of concepts and strategies from population health promotion and the chronic care model. Healthcare Quarterly. 2003;7
25. Hernández M, López R, Velarde S. La situación demográfica en México. Panorama desde las proyecciones de población. In: Consejo Nacional de Población, editor. La situación demográfica de México 2013. Mexico City; 2013. p. 11–9.
26. Consejo Nacional de Población. Tasa Global de Fecundidad y Tasa de Fecundidad Adolescente, 2009 y 2014. http://www.conapo.gob.mx/es/CONAPO/Tasa_Global_de_Fecundidad_y_Tasa_de_Fecundidad_Adolescente_2009_y_2014. Accessed 25 Aug 2017.
27. Montoya-Arce BJ, Montes-de-Oca-Vargas H. Situación laboral de la población adulta mayor en el Estado de México. Papeles de población. 2009;15:193–238.
28. García B. Población económicamente activa: evolución y perspectivas. In: García B, Ordorica M, editors. Los grandes problemas de México. Mexico City: El Colegio de México; 2010. p. 363–92.
29. Martínez MP. Primer semestre del 2016, histórico para empleo formal. In El Economista. Mexico; 2017. https://www.eleconomista.com.mx/empresas/Primer-semestre-del-2016-historico-para-empleo-formal-20170712-0106.html. Accessed 26 July 2017.
30. Presidencia de la República. En lo que va de la administración se han generado más de 2 millones de empleos; es cifra histórica: Enrique Peña Nieto: Presidencia de la República; 2016 [cited 2017 July, 25]. Available from: https://www.gob.mx/presidencia/prensa/en-lo-que-va-de-la-administracion-se-han-generado-mas-de-2-millones-de-empleos-es-cifra-historica-enrique-pena-nieto.
31. Comisión Representativa ante Organismos de Seguridad Social. Programa del Primer Empleo. Reporte. Mexico City: Comisión Representativa ante Organismos de Seguridad Social; 2012.

32. Miranda S, Salgado M. La nueva Ley Federal del Trabajo en México formaliza la flexibilidad laboral. Revista Trimestral de Análisis de Coyuntura Económica. 2013;IV:17–20.
33. Diario Oficial de la Federación. Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley del Impuesto sobre la Renta, de la Ley del Impuesto al Valor Agregado, del Código Fiscal de la Federación y de la Ley Federal del Impuesto sobre Automóviles Nuevos. Mexico; 2017. http://dof.gob.mx/nota_detalle.php?codigo=5463187&fecha=30/11/2016. Accessed 25 Aug 2017.
34. Albarrán E. El Régimen de Incorporación Fiscal no sirve: Bettinger. Mexico: El Economista; 2016. https://www.eleconomista.com.mx/economia/Regimen-de-Incorporacion-Fiscal-no-sirve-Bettinger-20160303-0171.html. Accessed 26 July 2017.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

BMC

Research

Measuring the adequacy of antenatal health care: a national cross-sectional study in Mexico

Ileana Heredia-Pi,[a] Edson Servan-Mori,[a] Blair G Darney,[a] Hortensia Reyes-Morales[b] & Rafael Lozano[a]

Objective To propose an antenatal care classification for measuring the continuum of health care based on the concept of adequacy: timeliness of entry into antenatal care, number of antenatal care visits and key processes of care.

Methods In a cross-sectional, retrospective study we used data from the Mexican National Health and Nutrition Survey (ENSANUT) in 2012. This contained self-reported information about antenatal care use by 6494 women during their last pregnancy ending in live birth. Antenatal care was considered to be adequate if a woman attended her first visit during the first trimester of pregnancy, made a minimum of four antenatal care visits and underwent at least seven of the eight recommended procedures during visits. We used multivariate ordinal logistic regression to identify correlates of adequate antenatal care and predicted coverage.

Findings Based on a population-weighted sample of 9 052 044, 98.4% of women received antenatal care during their last pregnancy, but only 71.5% (95% confidence interval, CI: 69.7 to 73.2) received maternal health care classified as adequate. Significant geographic differences in coverage of care were identified among states. The probability of receiving adequate antenatal care was higher among women of higher socioeconomic status, with more years of schooling and with health insurance.

Conclusion While basic antenatal care coverage is high in Mexico, adequate care remains low. Efforts by health systems, governments and researchers to measure and improve antenatal care should adopt a more rigorous definition of care to include important elements of quality such as continuity and processes of care.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

Introduction

Optimizing maternal and infant health requires, but is not limited to, the provision of available and accessible health care delivered by skilled health personnel throughout the antenatal period.[1] Besides offering the interventions recommended by the World Health Organization (WHO), it is essential to guarantee universal coverage of services within a framework of continued care throughout pregnancy.[2–8]

Any assessment of maternal care needs to be performed within the framework of human rights.[9] Strategies towards ending preventable maternal mortality are aimed at the achievement of millennium development goals (up to 2015) and now sustainable development goals in the area of maternal mortality. These goals seek to eliminate inequalities in access to health care and to ensure women receive universal coverage of sexual and reproductive health services that are responsive to women's needs.[10]

Improving maternal and neonatal health outcomes involves the provision and uptake of antenatal services that are timely (first visit during the first three months of pregnancy), sufficient (at least four antenatal visits) and adequate (with appropriate content). Rarely, however, have these conditions been studied together in the context of low- and middle-income countries.[11] The majority of studies including these indicators have measured coverage independently – thus reporting high average levels – but have failed to reflect the individual dimension of services provided (women who received comprehensive care and coverage in all indicators).[12–14]

Efforts to develop indicators to measure the adequacy of antenatal care and the continuum of care throughout the lifecycle[5] have been continuing for over four decades. Among these, an index to measure the timeliness of the initial antenatal care intervention was proposed in 1973.[15] However, it overlooked content, thereby ruling out the possibility of evaluating antenatal care through process measures. Impractical for assessing the clinical relevance of care, it has been classified as an indicator of service use only.[15] Other authors have proposed combining several antenatal health-care indicators,[16–20] but have as yet been unable to offer a fully comprehensive solution. In omitting components of the content of care, such indices measure the use of services and not the processes of care that are a necessary condition for evaluating adequacy. Since 2006[21] numerous studies have been published which include the procedures implemented during antenatal visits. Complex indicators, combining the content of visits with other variables across the continuum of care,[5] have been developed.[13,22] Again, however, none have as yet achieved a fully comprehensive approach to the measurement of antenatal care continuity and adequacy. Some studies have even used local indicators, thus limiting international comparisons, while others have overlooked the usefulness of measuring conditional rather than independent probabilities: that is, measuring the coverage of an indicator conditional on the coverage of another one.[13,14,21,22]

Based on our previous research,[12] and drawing on population-based data from the most recent health and nutrition survey in Mexico, we propose an antenatal care classification that allows the continuum of services to be measured according to four dimensions of the health care process: access to care delivered by skilled health personnel that is timely, sufficient and with appropriate content. In particular, this study aimed to describe the adequacy of antenatal care for women in the context of the population and geography of Mexico. Using our conditional classification we also aimed to identify the indi-

[a] Center for Health System Research, National Institute of Public Health, Av. Universidad #655, 62100, Cuernavaca, Morelos, Mexico.
[b] Research Department, Federico Gomez Children's Hospital, Mexico City, Mexico.
Correspondence to Edson Servan-Mori (email: eservan@insp.mx).
(*Submitted: 16 December 2015 – Revised version received: 17 February 2016 – Accepted: 21 February 2016*)

Heredia-Pi I, Serván-Mori E, Darney B, Reyes-Morales H, Lozano R. Measuring the adequacy of antenatal health care: a national cross-sectional study in Mexico. Bull World Health Organ. 2016;94(6):452-461. http://dx.doi.org/10.2471/BLT.15.168302

vidual factors associated with the type of antenatal care received by women during their most recent pregnancy, at both the household and community levels.

Methods

Study design and data source

We report a retrospective analysis of data from the Mexican National Health and Nutrition Survey done in 2012 (Spanish acronym: ENSANUT). This was a cross-sectional, population-based household survey, based on a national population of 115 170 278, with sampling representative at the state level (Mexico has 32 states) and by rural/urban stratum. The survey was designed to estimate the prevalence and proportions of health and nutrition conditions, access to services, health determinants, as well as coverage of health-care services for specific and distinct groups of the Mexican population.[23] Survey data (available to the general public[24]) were collected in a single interview after obtaining the informed consent of each participant and the approval of the ethics, research and biosecurity committees of the National Institute of Public Health in Mexico.

We used data from the survey's reproductive health module, which had been applied to a random subsample of 23 056 women aged 12–49 years. From these, we selected women who had delivered their last live birth from 2006 onwards and who had been asked a series of questions about their use of antenatal care and obstetric services. We excluded those who had provided incomplete information on the relevant variables. A comparison of the sociodemographic and health-related characteristics of women who did and did not participate in the analytical sample yielded no statistically significant differences.

The dependent variables, i.e. the four dimensions of continuity and adequacy of antenatal care, were: (i) skilled health care (antenatal care provided by a nurse or a physician); (ii) timely (initial antenatal care visit during the first trimester of pregnancy); (iii) sufficient (at least four antenatal care visits during the pregnancy); and (iv) appropriate in content (an indicator summarizing the procedures and processes of care provided during antenatal care).

For the indicator of appropriate content we selected eight of the 12 procedure items used in the survey: weight; height; blood pressure; general urine analysis; blood analysis; tetanus vaccination; prescription of folic acid; and prescription of vitamins iron or dietary supplements. We excluded human immunodeficiency virus testing (since the official guidelines are that this test should be applied only to high-risk women[25] and we were unable to ascertain this information); ultrasound examination (because this is not considered a required procedure by the authorities in Mexico[25] and because of the inconsistencies in scientific evidence regarding its importance); and glucose and syphilis testing (because these tests were grouped together in the survey item and we could not distinguish between them). The previous literature has not been able to identify a single cut-off to classify antenatal care content as adequate or not; studies have considered cut-offs from 60% to 80% of the total of procedures measured.[14,21,22,26–28] We classified women in the highest quintile of received procedures as having received an adequate content of care (appropriate in content). This corresponded to seven out of eight of the procedure items received. In line with previous methods,[12] all interventions or procedures provided during antenatal care visits were weighted equally.

We divided the study sample into three outcome categories: received adequate antenatal care (delivered by skilled health personnel, timely, sufficient and with appropriate content); received inadequate antenatal care (services which did not fully comply with these criteria); or received no antenatal care from a health facility.

Covariates

We included individual and household-level covariates. At the individual level we recorded data on the women's sociodemographic characteristics and utilization of health-care services (antenatal and obstetric care). These were: woman's age (12–19, 20–29 or 30–49 years at the time of her last live birth), education (0, 1–6, 7–9, 10–12 or ≥ 13 years of schooling completed), previous parity (0, 1 or ≥ 2 live births), history of infant death (stillbirth or death within the first year of life), history of miscarriage or induced abortion (we were unable to distinguish between spontaneous and induced abortion), and year of the index live birth (2006–2007, 2008–2009 or 2010–2012). Type of health insurance was classified as: none, Social Security, or *Seguro Popular de Salud* (an employment-based health insurance for people working in the informal sector or without other access to insurance); women with private health insurance were excluded as they were a very small percentage. In addition to our definition of adequacy described above, we classified the type of health facility where the majority of antenatal care was received as: social security, ministry of health, private or other (midwife or home). We included six binary indicators (scored yes/no) for diagnosis of a health problem during pregnancy (high blood pressure, vaginal bleeding, threat of miscarriage, pre-eclampsia or eclampsia, gestational diabetes or infections).

At the household level, we created binary (yes/no) indicators for indig-

Table 1. **Independent and conditional analyses of the coverage of the dimensions of antenatal care among pregnant women in a national retrospective study, Mexico, 2012**

Dimension of antenatal care[a]	% (95% CI)	
	Independent coverage	Conditional coverage
Skilled	98.4 (98.1 to 98.8)	98.4 (98.1 to 98.8)
Timely	83.2 (81.8 to 84.6)	83.2 (81.8 to 84.6)
Sufficient	91.4 (90.3 to 92.5)	79.9 (78.4 to 81.4)
Appropriate	84.7 (83.3 to 86.2)	71.5 (69.7 to 73.2)

CI: confidence interval.

[a] Skilled (antenatal care provided by a nurse or a physician); timely (initial antenatal care visit during first trimester of pregnancy); sufficient (≥ 4 antenatal care visits during pregnancy); appropriate (visits included at least 7/8 of recommended basic care procedures: measurement of height, weight, and blood pressure, urine analysis, blood examination, tetanus vaccine, and prescription of folic acid as well as vitamin/iron/food supplements.

Note: Sample $n = 6494$; sample weighted to population $n = 9\,052\,044$. Independent coverage was the percentage of the population receiving an intervention, measuring the coverage of each indicator separately. Conditional coverage refers to full compliance with antenatal care indicators, measuring the coverage of each indicator conditional on the coverage of the previous one.

enous status (a household in which the head of the family, a spouse or an older relative self-identifies as indigenous or speaks an indigenous language[29]), and whether the household was a beneficiary from the *Oportunidades* social programme (now called *Prospera*). We included an asset and housing index as a measure of socioeconomic status based on assets and household infrastructure, developed using polychoric correlation matrices (range: −5.9 to 1.8),[30,31] and collapsed into terciles (low, middle or high), whereby higher values denoted a greater number of assets and better housing conditions. We also included an indicator for the location of the household, based on community and state-level indicators and population: rural (< 2500 residents), urban (2500–100 000 residents) or metropolitan (> 100 000 residents). Finally, we included the level of marginalization (low or high), which is a community-level index based on lack of access to education, inadequate housing and perceived insufficient income.[32]

Analysis

The data were analysed using the Stata package version 13.2 (StataCorp LP, College Station, United States of America). First, we estimated the consecutive independent and conditional probabilities for each dimension of antenatal care. Independent coverage was the percentage of the population receiving an intervention, measuring the coverage of each indicator separately. Conditional coverage refers to full compliance with antenatal care indicators, measuring the coverage of each indicator conditioned on the coverage of the previous one. The socioeconomic, demographic and health profiles of the women surveyed were then characterized by type of antenatal care received (adequate, inadequate or none). We then estimated adequate antenatal care coverage in the different states of Mexico. Finally, we produced population estimates for all results by the individual sampling weights and accounting for the complex survey design.

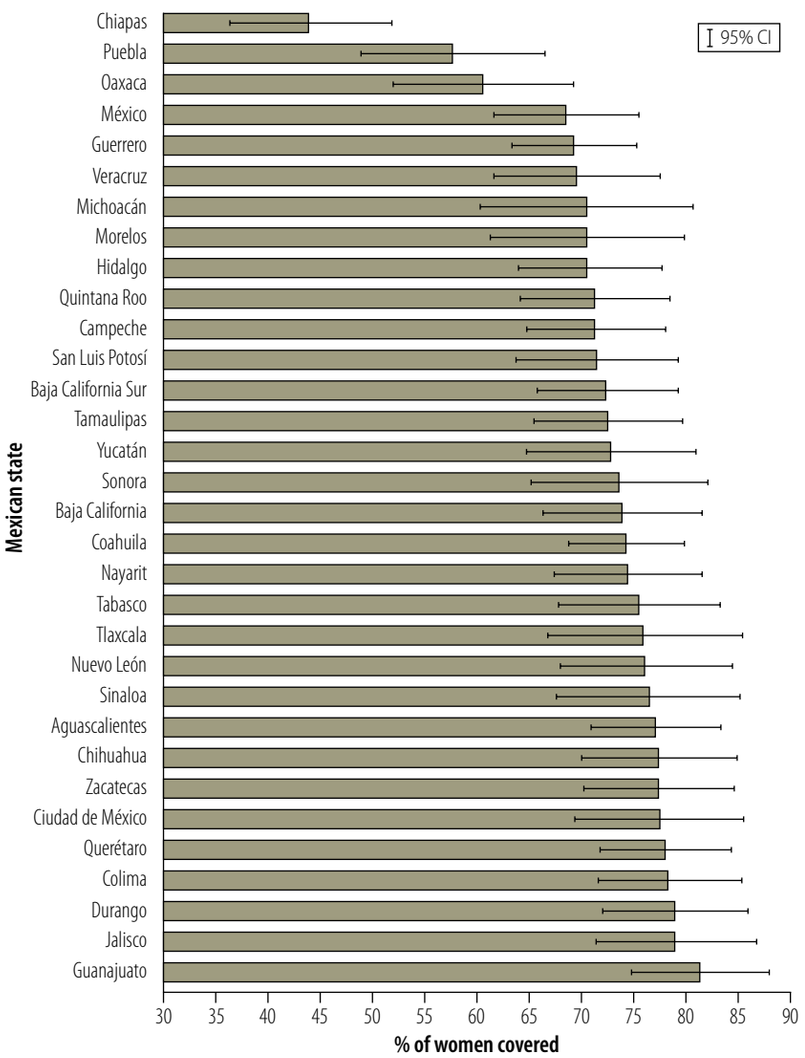
To identify the key sociodemographic factors associated with the antenatal care services used, we next used an ordinal logistic regression model[33] for the categorical outcome (none = 0, inadequate = 1, adequate = 2). All covariates previously mentioned were included in this model, except diagnosis of a health condition during pregnancy, because this is a time-dependent confounder that can be an effect of adequate antenatal care as well as a cause of more frequent subsequent antenatal care.

For ease of interpretation we calculated marginal effect probabilities and the corresponding 95% confidence intervals (CI). Marginal effects are multivariables predicted for each category of the outcome, holding all other covariates at their median levels. Marginal effects measure discrete change for binary independent variables and measure the instantaneous rate of change for continuous variables. These analyses were implemented using the *mfx* command in Stata.

Results

We selected 7206 women and after excluding 712 (9.8%) respondents with incomplete data, the sample for analysis was 6494 (90.1%) women (population-weighted sample: 9 052 044). Of these women, 4630 received adequate antenatal care, 1718 inadequate antenatal care and 146 reported having no antenatal care. Based on population-weighted

Fig. 1. **Percentage of women by state with adequate antenatal care in a national retrospective study, Mexico, 2012**



CI: confidence interval.
Note: Data values are shown for the three highest and six lowest states ($P < 0.001$). Adequate antenatal care was skilled (provided by a nurse or a physician); timely (initial visit during first trimester of pregnancy); sufficient (≥ 4 visits during pregnancy); and appropriate (visits included at least 7/8 of recommended basic care procedures).

Table 2. **Individual and household characteristics of women by access to and adequacy of antenatal care in a national retrospective study, Mexico, 2012**

Characteristic	% (95% CI)			*P*[b]
	No antenatal care	Inadequate antenatal care	Adequate antenatal care[a]	
Individual				
No. of years in school				
0	22.3 (13.6 to 34.3)	6.4 (5.0 to 8.1)	3.2 (2.4 to 4.4)	< 0.001
1–6	34.3 (24.4 to 45.8)	25.1 (22.1 to 28.3)	20.3 (18.5 to 22.3)	
7–9	31.5 (22.3 to 42.6)	41.6 (38.0 to 45.3)	36.8 (34.4 to 39.2)	
10–12	10.1 (3.8 to 24.2)	20.2 (17.3 to 23.4)	26.4 (24.2 to 28.8)	
≥ 13	1.7 (0.4 to 7.8)	6.7 (5.0 to 9.0)	13.2 (11.6 to 15.1)	
Age at time of last delivery, years				
12–19	22.6 (15.0 to 32.5)	25.3 (22.2 to 28.7)	18.0 (16.4 to 19.9)	< 0.001
20–29	48.6 (37.7 to 59.7)	51.0 (47.5 to 54.6)	54.5 (52.3 to 56.7)	
30–49	28.8 (20.6 to 38.7)	23.6 (20.9 to 26.7)	27.4 (25.6 to 29.4)	
No. of children at the time of last delivery				
0	35.1 (23.4 to 48.8)	35.5 (31.8 to 39.5)	31.3 (29.3 to 33.5)	0.001
1	22.3 (14.9 to 32.1)	27.3 (24.1 to 30.7)	33.9 (31.8 to 36.0)	
≥ 2	42.6 (31.5 to 54.5)	37.2 (33.5 to 41.1)	34.8 (32.7 to 36.9)	
Year of obstetric episode				
2006–2007	23.6 (16.1 to 33.2)	28.3 (25.0 to 31.8)	26.8 (25.0 to 28.8)	< 0.05
2008–2009	41.8 (31.0 to 53.5)	32.0 (28.5 to 35.6)	38.6 (36.3 to 41.0)	
2010–2012	34.6 (25.4 to 45.1)	39.7 (36.2 to 43.3)	34.6 (32.3 to 36.8)	
Infant death (stillbirth or death within the first year of life)	13.8 (7.1 to 24.9)	3.6 (2.7 to 4.8)	3.9 (3.1 to 4.8)	< 0.001
At least one miscarriage or abortion	20.5 (12.9 to 31.0)	13.1 (10.9 to 15.6)	15.1 (13.7 to 16.6)	0.138
Health insurance				
Social security	12.1 (6.0 to 23.1)	19.9 (16.9 to 23.2)	34.2 (31.9 to 36.6)	< 0.01
Seguro popular de salud	57.7 (46.4 to 68.2)	52.0 (48.0 to 55.9)	44.5 (42.2 to 46.8)	
None	30.2 (21.7 to 40.3)	28.2 (24.6 to 32.0)	21.3 (19.0 to 23.8)	
Frequent antenatal care provider				
Social security	NA	21.1 (18.2 to 24.2)	32.2 (29.9 to 34.6)	< 0.001
Ministry of health	NA	52.2 (48.5 to 56.0)	42.7 (40.1 to 45.4)	
Private	NA	23.5 (20.2 to 27.1)	22.8 (20.7 to 25.1)	
Other	NA	3.2 (2.3 to 4.4)	2.2 (1.7 to 2.9)	
Health problem diagnosed during pregnancy[c]	NA	55.2 (51.3 to 59.1)	60.4 (58.0 to 62.7)	0.027

(*continues. . .*)

(. . .*continued*)

Characteristic	% (95% CI)			p^b
	No antenatal care	Inadequate antenatal care	Adequate antenatal care[a]	
Household				
Indigenous	43.8 (31.9 to 56.5)	12.1 (10.1 to 14.4)	7.9 (6.7 to 9.4)	< 0.001
Oportunidades beneficiary	41.4 (30.1 to 53.6)	26.8 (23.7 to 30.1)	20.9 (19.2 to 22.7)	< 0.001
Asset and housing index (tercile)				
Low	72.4 (60.5 to 81.8)	42.5 (38.6 to 46.4)	29.9 (27.9 to 32.1)	< 0.001
Middle	17.8 (11.5 to 26.7)	33.4 (29.6 to 37.4)	32.8 (30.7 to 35.0)	
High	9.7 (3.7 to 23.4)	24.1 (20.9 to 27.8)	37.2 (34.7 to 39.8)	
Area of residence				
Rural	47.9 (36.2 to 59.8)	25.5 (22.6 to 28.6)	21.6 (20.0 to 23.2)	< 0.001
Urban	15.4 (9.6 to 23.8)	23.3 (20.3 to 26.6)	19.2 (17.8 to 20.6)	
Metropolitan	36.7 (25.2 to 49.9)	51.2 (47.3 to 55.2)	59.3 (57.2 to 61.4)	
Marginalization index				
Low	56.5 (44.6 to 67.6)	72.7 (69.4 to 75.7)	77.6 (76.0 to 79.1)	< 0.001
High	43.5 (32.4 to 55.4)	27.3 (24.3 to 30.6)	22.4 (20.9 to 24.0)	

CI: confidence interval; NA: data not applicable.

[a] Adequate: antenatal care that was skilled (provided by a nurse or a physician); timely (initial visit during first trimester of pregnancy); sufficient (≥ 4 visits during pregnancy); and appropriate (visits included at least 7/8 of recommended basic care procedures).

[b] *P*-values refer to the test of equality or similar distributions across the three groups; values below 0.05 signify that distributions were statistically different with 95% confidence. Estimates included the effect of the survey design.

[c] Problems included high blood pressure, vaginal bleeding, threat of miscarriage, pre-eclampsia or eclampsia, gestational diabetes or infections.

Notes: No antenatal care: sample $n = 146$; weighted sample $n = 142\,117$. Inadequate antenatal care: sample $n = 1718$; weighted sample $n = 2\,439\,526$. Adequate antenatal care: sample $n = 4630$; weighted sample $n = 6\,470\,401$.

numbers, the independent analysis of the probabilities of coverage estimated that 98.4% of women received antenatal care by skilled health personnel, 83.2% received care that was timely, 91.4% care that was sufficient and 84.7% received care with the appropriate number of antenatal care processes (Table 1). However, the conditional analysis showed that only 71.5% women (95% CI: 69.7 to 73.2) with access to services delivered by skilled health personnel received adequate antenatal care (population-weighted number: 6 470 401 women); 1.6% (95% CI: 1.2 to 2.0) received no antenatal care (population-weighted number: 2 439 526) and 27.0% (95% CI: 25.3 to 28.7) received inadequate antenatal care (population-weighted number: 142 117).

Fig. 1 shows the crude levels of adequate antenatal care coverage in the 32 Mexican states. Three states had very low coverage levels: Chiapas (44.2%), Puebla (57.9%) and Oaxaca (60.8%). The coverage in these states was significantly lower (non-overlapping CI, $P < 0.001$) compared with the six states with the highest coverage: Guanajuato (81.6%), Jalisco (79.6%), Durango (79.2%), Colima (78.7%), Querétaro (78.3%) and Mexico City (77.7%).

When comparing across the three groups (no antenatal care, inadequate care and adequate care), we observed overall socioeconomic disparities. Women who received antenatal care had had more years of schooling, were older and had fewer children at the time of their last delivery ($P < 0.001$; Table 2). A smaller percentage of women receiving antenatal care had experienced previous stillbirths, were from indigenous families and were benefiting from the *Oportunidades* social programme ($P < 0.001$). Women who received antenatal care lived primarily in households with more assets and better housing conditions, located in less marginalized metropolitan areas (all $P < 0.001$).

The results of the multivariate ordered logit model confirmed the bivariate analyses (Table 3). The covariates most highly correlated with receipt of adequate antenatal care were mother's education, health insurance, indigenous status and household wealth (all $P < 0.001$). For women with ≥ 13 years of education the probability of having adequate antenatal care was 28.2 percentage-points (95% CI: 15.3 to 41.0) higher compared with those

with no education. The probability of having adequate antenatal care was 15.7 percentage points (95% CI: 9.2 to 22.3) higher for women having health insurance via social security and was 6.9 percentage points (95% CI: 1.3 to 12.5) higher for those with *Seguro Popular de Salud* compared with women without health insurance. Adequate antenatal care was 8.3 percentage points (95% CI: −14.2 to −2.4) lower among indigenous women than non-indigenous women, and was 13.1 percentage points (95% CI: 6.5 to 19.7) higher among women in the highest tertile of socioeconomic status compared with those in the lowest socioeconomic status tertile. The type of facility where most antenatal care was received was not a statistically significant variable and was therefore deleted from the models).

Discussion

We offer an approach to measuring the adequacy of antenatal care services in Mexico that was skilled, timely, sufficient and appropriate. The study is based on nationally representative data, and we believe it contributes a more comprehensive classification of antenatal care received than those proposed by previous studies.[11–14] Only 71.5% of women attended by skilled health personnel in Mexico received adequate antenatal care during their last pregnancy and the probabilities of receiving adequate care were higher among women with more years of schooling, health insurance and higher socioeconomic status.

Previous efforts to evaluate prenatal care through indicators of antenatal care have not considered the content of care,[15–20] but only the opportunity and/or frequency of care. Additionally, those studies were based on estimating coverage of each indicator separately or considering different thresholds for each of the components (for example, the number of antenatal care visits recommended), which represents a barrier for international comparisons. Our approach is more comprehensive and patient-centred and combines all the indicators we used into a measure that is internationally comparable and that allows the identification of women who receive timely, frequent, sufficient and appropriate care. This approach focuses on continuity, process and context of care, instead of more narrowly on access and frequency of care. By identifying women who receive each type of antenatal care, this measure can be used to identify which specific components of the antenatal process are not being received, and to show gaps in coverage among population groups. The approach allows the adequacy of antenatal care to be monitored globally, nationally and at the health facility level. To achieve better maternal and neonatal health outcomes, decision-makers and policy developers can use this relatively simple approach as a proxy for the performance of antenatal care programmes and identify gaps in adequacy of antenatal care services.[22]

Our estimates of the likelihood of receiving antenatal care from skilled providers and evaluations of the adequacy of care show that inequities persist in Mexico, with both indicators more likely to be met for women of higher socioeconomic status. Our results revealed that 1.6% of women (142 117 at the population level) reported having no antenatal care at all during their last pregnancy. Most of these women had none or few years of schooling, low socioeconomic status and no health insurance. They also belonged to indigenous households and resided in highly marginalized rural areas. It was not possible to evaluate the continuity and adequacy of care for these women; we were only able to identify the gap that persists in antenatal

Table 3. **Ordered logit model of access to and adequacy of antenatal care among women in a national retrospective study, Mexico, 2012**

Characteristic	Marginal effects % (95% CI)[a]		
	No antenatal care	Inadequate antenatal care	Adequate antenatal care[b]
Individual			
No. of years in school			
0	Ref	Ref	Ref
1–6	−2.7 (−5.0 to −0.4)	−13.0 (−20.8 to −5.2)	15.6 (5.9 to 25.4)
7–9	−2.7 (−5.1 to −0.3)	−12.9 (−20.8 to −5.0)	15.6 (5.6 to 25.6)
10–12	−3.5 (−6.0 to −1.0)	−19.9 (−28.5 to −11.2)	23.4 (12.7 to 34.0)
≥ 13	−3.9 (−6.6 to −1.2)	−24.2 (−35.0 to −13.4)	28.2 (15.3 to 41.0)
No. of children at time of last delivery			
0	Ref	Ref	Ref
1	−1.5 (−2.9 to −0.2)	−6.1 (−10.8 to −1.4)	7.6 (1.9 to 13.3)
≥ 2	−0.8 (−2.2 to 0.7)	−2.7 (−7.9 to 2.4)	3.5 (−3.0 to 10.0)
Health insurance			
None	Ref	Ref	Ref
Social security	−2.7 (−4.3 to −1.1)	−13.0 (−18.9 to −7.2)	15.7 (9.2 to 22.3)
Seguro popular de salud	−1.4 (−2.7 to −0.1)	−5.5 (−10.1 to −0.8)	6.9 (1.3 to 12.5)
Household			
Indigenous			
No	Ref	Ref	Ref
Yes	2.5 (0.1 to 4.9)	5.8 (1.4 to 10.2)	−8.3 (−14.2 to −2.4)
Asset and housing index (tercile)			
Low	Ref	Ref	Ref
Middle	−1.1 (−2.3 to 0.03)	−4.3 (−8.7 to 0.1)	5.4 (0.1 to 10.7)
High	−2.3 (−3.9 to −0.8)	−10.7 (−16.5 to −4.9)	13.1 (6.5 to 19.7)

CI: confidence interval; Ref: reference group.

[a] Values are marginal effects expressed as percentage points. Estimates included the effect of the survey design. Models were also adjusted by age at the time of last delivery (years), children dead at childbirth or during the first year, at least one miscarriage or abortion, *Oportunidades* beneficiary, the year of obstetric episode, and characteristics of place of residence (shown in Table 2). Covariates were not statistically significant.

[b] Adequate: antenatal care that was skilled (provided by a nurse or a physician); timely (initial visit during first trimester of pregnancy); sufficient (≥ 4 visits during pregnancy); and appropriate (visits included at least 7/8 of recommended basic care procedures).

Notes: Sample $n = 6494$; weighted sample $n = 9\,052\,044$. Post-estimation test showed that the regression model was correctly specified: _hat $P < 0.001$, _hatsq $P = -0.63$.

care access among certain population groups: those who are the most vulnerable. Our findings are consistent with those of other studies which indicated coverage gaps among specific populations and demonstrated that pregnant women younger than 25 years, who had fewer years of schooling, resided in rural areas and belonged to households and communities with low socioeconomic status, were at greater risk of receiving inadequate antenatal care.[12,14,22] Similarly, our results are congruent with a study from Zambia showing gaps in the continuity and adequacy of care received by pregnant women, with a very low percentage of these women receiving adequate antenatal care.[26]

There are several limitations to our proposed comprehensive indicator of quality of antenatal care. Clearly, the prerequisites for providing women with quality services are that antenatal care is available and is accessible. However, supplies and medical teams must also be available at health facilities, together with adequate information systems to ensure a continuum of information on the women's past events, general background and relevant characteristics.[34] The present study was unable to evaluate structural elements of health care quality proposed by the Donabedian conceptual framework: structure, processes and outcomes.[35,36]

We took into account some features related to the supply of antenatal care services, although these were self-reported by the women. Nevertheless, our analysis did not allow us to evaluate the additional quality dimensions of services proposed by other theoretical frameworks, such as technical quality, interpersonal quality and amenities[37] or efficacy, effectiveness, acceptability, efficiency, environment and empathy.[38–40] This highlights the need to follow-up patients to incorporate some of these features into future health surveys and patient administrative registries and to incorporate quality dimensions in future studies.

Another limitation is that the data analysis may have been affected by recall bias regarding the processes of care, because women may have been unable to remember the functions or names of all the processes received and therefore underreported or reported their experiences inadequately. There may also be an effect due to inaccurate weighting of the processes of care: with no literature available on prioritizing the care processes, we chose to weight them all equally.

To validate the proposed metric, future studies in Mexico can consider different approaches. These might include: consulting maternal health-care experts (for example, using Delphi methods[41]) about proposed quality measures and their assessment; a rigorous review of hospital, clinic or other types of administrative records; benchmarking our results against those of countries with a similar demographic, social and economic profile; and comparing our estimates with population surveys that are similar in timing and design.

Our analysis was an attempt to define an effective antenatal care coverage indicator for Mexico by combining effective access to the required health services with other dimensions, specifically the timeliness, sufficiency and appropriate content or procedures of antenatal care. Future studies will need to focus on generating more comprehensive indicators for measuring quality of antenatal care, including patient and provider-centred indicators,[1,7] and aligning the information obtained from administrative sources and clinical records with population and patient surveys. Our study has shown that important challenges still prevent Mexican women from receiving antenatal care services that meet WHO recommendations for equity in access and a continuum of maternal care.[7] To confront these challenges, the Mexican health sector needs to strengthen its response capacity by not only guaranteeing women access to antenatal care, but also ensuring sufficient antenatal care interventions and a high quality in all aspects of care. ■

Acknowledgements
Rafael Lozano is also affiliated with the Institute for Health Metrics and Evaluation, Seattle, Washington, United States of America.

Competing interests: None declared.

ملخص

قياس مدى كفاية الرعاية الصحية المقدمة فيما قبل الولادة: دراسة وطنية متعددة القطاعات في المكسيك

الغرض اقتراح تصنيف لخدمات الرعاية فيما قبل الولادة من أجل قياس مدى تواصل تقديم الرعاية الصحية بناءً على مفهوم الكفاية: البدء في تلقي خدمات الرعاية فيما قبل الولادة في الوقت المناسب، وعدد الزيارات التي يتم فيها تقديم الرعاية فيما قبل الولادة، والإجراءات الرئيسية لتقديم الرعاية.

الطريقة استخدمنا البيانات المستمدة من الدراسة الاستقصائية الوطنية بشأن الصحة والتغذية في المكسيك (ENSANUT) التي تم إجراؤها في عام 2012، وذلك من خلال دراسة بأثر رجعي متعددة القطاعات. وقد تضمنت البيانات معلومات وردت عن أصحابها بشأن استفادة عدد من النساء يبلغ 6494 امرأة من خدمات الرعاية فيما قبل الولادة أثناء آخر فترة حمل مررن بها أثمرت عن مولود على قيد الحياة. وتم اعتبار الرعاية فيما قبل الولادة رعاية كافية إذا ما قامت المرأة بالزيارة الأولى لها في الثلاثة أشهر الأولى من الحمل، ثم قامت بأربع زيارات كحد أدنى لتلقي الرعاية فيما قبل الولادة، مع الخضوع لسبعة إجراءات على الأقل من الإجراءات الثمانية الموصى بها أثناء تلك الزيارات. واستخدمنا التحوف اللوجيستي الترتيبي متعدد المتغيرات لتحديد العوامل المرتبطة فيما بينها والمتعلقة بالرعاية الكافية فيما قبل الولادة والتغطية المتوقعة لهذه الرعاية.

النتائج وفقًا لما تم التوصل إليه من خلال عينة مرجحّة بعدد السكان يبلغ عدد أفرادها 9 052 044، تلقت 98.4٪ من النساء الرعاية فيما قبل الولادة خلال آخر فترة حمل مررن بها، إلا أن 71.5٪ فقط (بنسبة أرجحية مقدارها 95٪: من 69.7 إلى 73.2) من الرعاية الصحية المقدمة للأمهات تم تصنيفها كرعاية كافية. وتم تحديد بعض الفروق الجغرافية الهامة في التغطية المتعلقة بخدمات الرعاية بين الولايات. وزاد احتمال تلقي الرعاية الكافية فيما قبل الولادة بين النساء اللاتي تتمتعن بمستوى أعلى من الوضع الاجتماعي الاقتصادي، واللاتي تلقين التعليم المدرسي على مدى عدد أكبر من السنوات، واللاتي يتوفر لهن التأمين الصحي.

الاستنتاج رغم ارتفاع مستوى التغطية المتعلقة بتقديم الرعاية الأساسية فيما قبل الولادة في المكسيك، ظلت الرعاية الكافية منخفضة المستوى. ويجب أن يشمل الجهد المبذول من جانب

الجهات المسؤولة عن الأنظمة الصحية، والحكومات، والباحثين لقياس خدمات الرعاية فيما قبل الولادة والعمل على تحسينها تطبيقًا لمفهوم يتناول خدمات الرعاية بأسلوب أكثر دقة بما يشمل العناصر الهامة المتعلقة بمستوى الجودة مثل الاستمرارية والإجراءات المتبعة لتقديم الرعاية.

摘要

衡量产前保健的充分性：一项在墨西哥进行的全国性横断面研究

目的 旨在基于充分性的概念提出一种衡量保健持续性的产前保健分类依据：产前保健时效性、接受产前检查的次数和关键的保健流程。

方法 在一项横断面回溯式研究中，我们采用了 2012 年墨西哥国家健康和营养调查 (ENSANUT) 数据。其中包含 6494 名顺利生产的女性自行报告的信息，这些信息均与她们在怀孕期间的产前保健有关。如果孕妇在怀孕的前三个月进行第一次检查，孕期至少进行四次产前检查，并且在检查过程中至少进行八项推荐程序中的七项程序，那么我们认为该产前保健是充分的。我们采用了多元有序逻辑回归确定充分产前保健和预测覆盖率之间的相关性。

结果 基于 9 052 044 份人口加权样本，98.4% 的孕妇在其上次怀孕期间接受过产前保健，但是仅 71.5% (95% 置信区间：接受的产前保健可归为充分保健。已确定各州之间在保健覆盖率方面存在显著的地区差异。社会经济地位更高、接受教育年限更长且享有医疗保险的女性，接受充分产前保健的可能性更高。

结论 尽管墨西哥地区基本产前保健覆盖率很高，但是充分保健覆盖率却依然很低。医疗系统、政府和调查机构应努力采取一种更为严格的保健定义以将重要的质量因素（例如持续性和保健流程）包括在内，进而衡量和改进产前保健。

Résumé

Mesurer le caractère adéquat des soins prénataux: une étude transversale nationale au Mexique

Objectif Proposer une classification des soins prénataux afin de mesurer la continuité des soins et leur caractère adéquat: date de début des soins prénataux, nombre de consultations prénatales et principaux processus de soins.

Méthodes Lors de notre étude rétrospective transversale, nous avons utilisé les données de l'enquête nationale sur la santé et la nutrition (ENSANUT) réalisée au Mexique en 2012. Celle-ci contenait des informations sur le recours aux soins prénataux déclaré par 6494 femmes lors de leur dernière grossesse ayant abouti à une naissance vivante. Les soins prénataux ont été considérés adéquats lorsqu'une femme avait eu sa première consultation au cours du premier trimestre de grossesse, s'était rendue au minimum à quatre consultations prénatales et avait bénéficié d'au moins sept des huit procédures recommandées lors des consultations. Nous avons utilisé une régression logistique ordinale multivariée pour identifier les corrélations entre soins prénataux adéquats et prévisions de la couverture de soins.

Résultats Sur un échantillon pondéré en fonction de la population de 9 052 044 femmes, 98,4% avaient reçu des soins prénataux lors de leur dernière grossesse, mais seulement 71,5% (intervalle de confiance de 95%: 69,7 à 73,2) avaient reçu des soins jugés adéquats. D'importantes différences géographiques ont été observées entre les États au niveau de la couverture de soins. La probabilité de bénéficier de soins prénataux adéquats était plus forte pour les femmes au statut socioéconomique plus élevé, celles ayant eu une scolarité plus longue et celles disposant d'une assurance maladie.

Conclusion Au Mexique, si la couverture en matière de soins prénataux de base est élevée, les soins adéquats restent limités. Les systèmes de santé, les gouvernements et les chercheurs, dans leurs efforts pour mesurer et améliorer les soins prénataux, devraient adopter une définition plus rigoureuse de ce type de soins afin d'y inclure d'importants aspects qualitatifs comme la continuité et les processus de soins.

Резюме

Оценка адекватности дородовой медицинской помощи: национальное одномоментное поперечное исследование в Мексике

Цель Предложить классификацию дородовой медицинской помощи для оценки процесса непрерывного оказания помощи, в основу которой заложена концепция адекватности. Адекватность определяется своевременностью начала оказания дородовой медицинской помощи, количеством посещений в рамках дородовой помощи и основными процедурами, составляющими медицинскую помощь.

Методы В ходе одномоментного поперечного ретроспективного исследования были использованы данные Мексиканского национального исследования в области здравоохранения и питания (ENSANUT) 2012 года. Эти данные содержали сообщения 6494 женщин о личном опыте получения дородовой медицинской помощи в течение их последней беременности, закончившейся рождением живого ребенка. Дородовая медицинская помощь считалась адекватной, если женщина впервые посетила учреждение дородовой помощи в течение первого триместра беременности, совершила как минимум четыре таких визита и в ходе этих визитов была подвергнута по меньшей мере семи из восьми рекомендованных процедур. Взаимосвязь между адекватной дородовой медицинской помощью и прогнозируемым охватом была определена с помощью мультиномиальной порядковой логистической регрессии.

Результаты Из 9 052 044 человек, включенных во взвешенную выборку из генеральной совокупности, 98,4% женщин получали дородовую помощь в течение последней беременности, но только для 71,5% (95%-й доверительный интервал: 69,7–73,2) матерей эта медицинская помощь могла быть классифицирована как адекватная. Между штатами были выявлены значительные различия в оказании медико-санитарной помощи. Адекватную

дородовую медицинскую помощь с большей вероятностью получали женщины более высокого социально-экономического статуса, более образованные и имеющие медицинскую страховку.
Вывод Несмотря на высокий охват базовой дородовой медицинской помощью в Мексике, доля адекватной помощи по-прежнему мала. При реализации мер, предпринимаемых участниками систем здравоохранения, должностными лицами и исследователями для оценки и совершенствования дородовой медицинской помощи, следует пользоваться более точным определением помощи, которое включает такие важные элементы качества, как непрерывность оказания помощи и проводимые в ее рамках процедуры.

Resumen

Medición de la idoneidad de la atención sanitaria prenatal: un estudio transversal nacional en México

Objetivo Proponer una clasificación de atención prenatal para medir la continuidad de la atención sanitaria según su idoneidad: momento en que se empieza a recibir atención prenatal, número de visitas de atención prenatal y procesos básicos de atención.
Métodos En un estudio transversal y retrospectivo se utilizaron datos de la Encuesta Nacional de Salud y Nutrición (ENSANUT) realizada en México en 2012, que contenía información autodeclarada acerca del uso de atención prenatal de 6 494 mujeres durante su último embarazo con nacidos vivos. Se consideró que la atención prenatal era adecuada si una mujer realizaba su primera visita durante el primer trimestre de embarazo, hacía al menos cuatro visitas de atención prenatal y recibía al menos siete de los ocho procedimientos recomendados durante las visitas. Se utilizó una regresión logística ordinal multivariable para identificar las correlaciones de la atención prenatal adecuada y la cobertura prevista.
Resultados Según una muestra ponderada de la población de 9 052 044 personas, el 98,4% de las mujeres recibieron atención prenatal durante su último embarazo, pero únicamente el 71,5% (intervalo de confianza del 95%: 69,7 a 73,2) recibieron atención sanitaria prenatal clasificada como adecuada. Se identificaron importantes diferencias geográficas en la cobertura de la atención sanitaria entre los estados. La probabilidad de recibir una atención prenatal adecuada era mayor entre mujeres con una mejor situación socioeconómica, más años de escolarización y seguro médico.
Conclusión Aunque la cobertura básica de atención prenatal es alta en México, su idoneidad sigue siendo escasa. Los esfuerzos realizados por sistemas sanitarios, gobiernos e investigadores para medir y mejorar la atención prenatal deberían adoptar una definición más rigurosa de la misma para incluir elementos importantes de calidad, como la continuidad y los procesos de atención.

References

1. Austin A, Langer A, Salam RA, Lassi ZS, Das JK, Bhutta ZA. Approaches to improve the quality of maternal and newborn health care: an overview of the evidence. Reprod Health. 2014 Sep 4;11 Suppl 2:S1. doi: http://dx.doi.org/10.1186/1742-4755-11-S2-S1 PMID: 25209614
2. Villar J, Ba'aqeel H, Piaggio G, Lumbiganon P, Miguel Belizán J, Farnot U, et al. WHO Antenatal Care Trial Research Group. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. Lancet. 2001 May 19;357(9268):1551–64. doi: http://dx.doi.org/10.1016/S0140-6736(00)04722-X PMID: 11377642
3. WHO statement on antenatal care: January 2011 (WHO/RHR/11.12). Geneva: World Health Organization; 2011. Available from: http://whqlibdoc.who.int/hq/2011/WHO_RHR_11.12_eng.pdf [cited 2013 April 9].
4. Bhutta ZA, Darmstadt GL, Haws RA, Yakoob MY, Lawn JE. Delivering interventions to reduce the global burden of stillbirths: improving service supply and community demand. BMC Pregnancy Childbirth. 2009;9 Suppl 1:S7. doi: http://dx.doi.org/10.1186/1471-2393-9-S1-S7 PMID: 19426470
5. Kerber KJ, de Graft-Johnson JE, Bhutta ZA, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. Lancet. 2007 Oct 13;370(9595):1358–69. doi: http://dx.doi.org/10.1016/S0140-6736(07)61578-5 PMID: 17933651
6. Souza JP, Gülmezoglu AM, Vogel J, Carroli G, Lumbiganon P, Qureshi Z, et al. Moving beyond essential interventions for reduction of maternal mortality (the WHO multicountry survey on maternal and newborn health): a cross-sectional study. Lancet. 2013 May 18;381(9879):1747–55. doi: http://dx.doi.org/10.1016/S0140-6736(13)60686-8 PMID: 23683641
7. Tunçalp, Were WM, MacLennan C, Oladapo OT, Gülmezoglu AM, Bahl R, et al. Quality of care for pregnant women and newborns – the WHO vision. BJOG. 2015 Jul;122(8):1045–9. doi: http://dx.doi.org/10.1111/1471-0528.13451 PMID: 25929823
8. Quality of care: a process for making strategic choices in health systems. Geneva: World Health Organization; 2006.
9. Human rights indicators: a guide to measurement and implementation. New York: United Nations Human Rights, Office of the High Commissioner; 2012. Available from: http://www.ohchr.org/Documents/Publications/Human_rights_indicators_en.pdf [cited 2016 Feb 7].
10. Strategies toward ending preventable maternal mortality (EPMM). Geneva: World Health Organization; 2015. Available from: http://www.everywomaneverychild.org/images/EPMM_final_report_2015.pdf [cited 2016 Feb 7].
11. van den Broek NR, Graham WJ. Quality of care for maternal and newborn health: the neglected agenda. BJOG. 2009 Oct;116 Suppl 1:18–21. doi: http://dx.doi.org/10.1111/j.1471-0528.2009.02333.x PMID: 19740165
12. Heredia-Pi I, Serván-Mori E, Reyes-Morales H, Lozano R. [Gaps in the continuum of care during pregnancy and delivery in Mexico]. Salud Publica Mex. 2013;55 Suppl 2:S249–58. Spanish. PMID: 24626705
13. Mohamed AA, Gadir EO, Elsadig YM. Quality of antenatal care provided for pregnant women in Ribat university hospital, Khartoum. Sudanese J Public Health. 2011;6(2):51–5.
14. Tran TK, Gottvall K, Nguyen HD, Ascher H, Petzold M. Factors associated with antenatal care adequacy in rural and urban contexts – results from two health and demographic surveillance sites in Vietnam. BMC Health Serv Res. 2012;12(1):40. doi: http://dx.doi.org/10.1186/1472-6963-12-40 PMID: 22335834
15. Kessner DM, Singer J, Kalk CE, Schlesinger ER, editors. Infant death: an analysis by maternal risk and health care. Washington: Institute of Medicine and National Academy of Sciences; 1973.
16. Alexander GR, Cornely DA. Prenatal care utilization: its measurement and relationship to pregnancy outcome. Am J Prev Med. 1987 Sep-Oct;3(5):243–53.doi: http://dx.doi.org/10.1016/j.jclinepi.2008.08.001 PMID: 3452362
17. Kotelchuck M. The adequacy of prenatal care utilization index: its US distribution and association with low birthweight. Am J Public Health. 1994 Sep;84(9):1486–9. doi: http://dx.doi.org/10.2105/AJPH.84.9.1486 PMID: 8092377
18. Kogan MD, Martin JA, Alexander GR, Kotelchuck M, Ventura SJ, Frigoletto FD. The changing pattern of prenatal care utilization in the United States, 1981–1995, using different prenatal care indices. JAMA. 1998 May 27;279(20):1623–8. doi: http://dx.doi.org/10.1001/jama.279.20.1623 PMID: 9613911
19. Koroukian SM, Rimm AA. The "adequacy of prenatal care utilization" (APNCU) index to study low birth weight: is the index biased? J Clin Epidemiol. 2002 Mar;55(3):296–305.doi: http://dx.doi.org/10.1001/jama.279.20.1623 PMID: 9613911
20. VanderWeele TJ, Lantos JD, Siddique J, Lauderdale DS. A comparison of four prenatal care indices in birth outcome models: comparable results for predicting small-for-gestational-age outcome but different results for preterm birth or infant mortality. J Clin Epidemiol. 2009 Apr;62(4):438–45. doi: http://dx.doi.org/10.1016/j.jclinepi.2008.08.001 PMID: 18945589

21. Trinh LTT, Michael John D, Byles J. Antenatal care adequacy in three provinces of Vietnam: Long An, Ben Tre, and Quang Ngai. Public Health Rep. 2006 Jul-Aug;121(4):468–75. PMID: 16827450
22. Hodgins S, D'Agostino A. The quality-coverage gap in antenatal care: toward better measurement of effective coverage. Glob Health Sci Pract. 2014 May;2(2):173–81. doi: http://dx.doi.org/10.9745/GHSP-D-13-00176 PMID: 25276575
23. Romero-Martínez M, Shamah-Levy T, Franco-Núñez A, Villalpando S, Cuevas-Nasu L, Gutiérrez JP, et al. [National health and nutrition survey 2012: design and coverage]. Salud Pública de México. 2013;55 Suppl 2:S332–40. Spanish.
24. Encuesta nacional de salud y nutrición 2012. Mexico City: Instituto Nacional de Salud Pública; 2012. Available from: http://ensanut.insp.mx/basesdoctos.php [cited 2016 Mar 17].
25. Atención a la mujer durante el embarazo, parto y puerperio a recién nacidos. Criterios y procedimientos para la prestación del servicio. (Norma Oficial Mexicana, NOM-007-SSA2-1993). Mexico City: Secretaría de Salud; 1995. Available from: http://www.salud.gob.mx/unidades/cdi/nom/007ssa23.html [cited 2016 Mar 12].
26. Kyei NN, Chansa C, Gabrysch S. Quality of antenatal care in Zambia: a national assessment. BMC Pregnancy Childbirth. 2012;12(1):151. doi: http://dx.doi.org/10.1186/1471-2393-12-151 PMID: 23237601
27. Ikeoluwapo OA, Osakinle DC, Osakinle EO. Quality assessment of the practice of focused antenatal care (FANC) in rural and urban primary health centres in Ekiti state. Open J Obstet Gynecol. 2013;3:319–26. doi: http://dx.doi.org/10.4236/ojog.2013.33059
28. Beeckman K, Louckx F, Putman K, Beeckman K. Content and timing of antenatal care: predisposing, enabling and pregnancy-related determinants of antenatal care trajectories. Eur J Public Health. 2013 Feb;23(1):67–73. doi: http://dx.doi.org/10.1093/eurpub/cks020 PMID: 22628457
29. Indicadores socioeconómicos de los pueblos indígenas de México. Mexico City: Comisión Nacional de Desarrollo de los Pueblos Indígenas; 2002. Available from: http://www.cdi.gob.mx/ [cited 2016 Mar 12].
30. Kolenikov S, Angeles G. The use of discrete data in PCA: theory, simulations, and applications to socioeconomic indices. Chapel Hill: Carolina Population Center, University of North Carolina; 2004.
31. McKenzie DJ. Measuring inequality with asset indicators. J Popul Econ. 2005;18(2):229–60. doi: http://dx.doi.org/10.1007/s00148-005-0224-7
32. Índice de marginación por localidad 2010. Mexico City: Consejo Nacional de Población; 2010. Available from: http://www.conapo.gob.mx/en/CONAPO/Indice_de_Marginacion_por_Localidad_2010 [cited 2016 Mar 12].
33. Long JS, Freese J. Regression models for categorical and limited dependent variables using Stata. 2nd ed. College Station: Stata Press; 2006.
34. Haggerty JL, Reid RJ, Freeman GK, Starfield BH, Adair CE, McKendry R. Continuity of care: a multidisciplinary review. BMJ. 2003 Nov 22;327(7425):1219–21. doi: http://dx.doi.org/10.1136/bmj.327.7425.1219 PMID: 14630762
35. Donabedian A. The quality of medical care. Science. 1978 May 26;200(4344):856–64. doi: http://dx.doi.org/10.1126/science.417400 PMID: 417400
36. Donabedian A. Evaluating the quality of medical care. 1966. Milbank Q. 2005;83(4):691–729. doi: http://dx.doi.org/10.1111/j.1468-0009.2005.00397.x PMID: 16279964
37. Donabedian A. The quality of care. How can it be assessed? JAMA. 1988 Sep 23-30;260(12):1743–8. doi: http://dx.doi.org/10.1001/jama.1988.03410120089033 PMID: 3045356
38. Morestin F, Bicaba A, Sermé JD, Fournier P. Evaluating quality of obstetric care in low-resource settings: building on the literature to design tailor-made evaluation instruments – an illustration in Burkina Faso. BMC Health Serv Res. 2010;10(1):20. doi: http://dx.doi.org/10.1186/1472-6963-10-20 PMID: 20089170
39. Maxwell RJ. Prospectus in NHS management: quality assessments in health. BMJ. 1984;288:148–72.
40. Mosadeghrad AM. A conceptual framework for quality of care. Mater Sociomed. 2012;24(4):251–61. doi: http://dx.doi.org/10.5455/msm.2012.24.251-261 PMID: 23922534
41. Hsu CC, Sandford BA. The Delphi technique: making sense of consensus. Pract Assess Res Eval. 2007;12(10). Available from http://pareonline.net/getvn.asp?v=12&n=10 [cited 2016 Mar 12]

ARTÍCULO ORIGINAL

Brechas en la cobertura de atención continua del embarazo y el parto en México

Ileana Heredia-Pi, MC, M en C, D en C,[1] Edson Serván-Mori, M en C,[1]
Hortensia Reyes-Morales, MC, M en C, Dr en C,[1] Rafael Lozano, MC, M en C.[1,2]

Heredia-Pi I, Serván-Mori E, Reyes-Morales H, Lozano R. Brechas en la cobertura de atención continua del embarazo y el parto en México. Salud Publica Mex 2013;55 supl 2:S249-S258.

Resumen

Objetivo. Construir un índice compuesto para medir la cobertura de atención continua durante el embarazo y el parto, e identificar la magnitud de las brechas entre distintas poblaciones de embarazadas en México. **Material y métodos**. Con información de la Encuesta Nacional de Salud y Nutrición 2012, que incluyó a 5 766 mujeres, se construyó un índice de cobertura de atención continua (Cobac), integrando cinco indicadores de cobertura de intervenciones durante el embarazo, parto y puerperio. **Resultados**. Las residentes en área metropolitana, afiliadas a la seguridad social, tuvieron la mejor Cobac (0.879; IC95%:0.867-0.891). Menores índices de Cobac se encontraron en mujeres de área rural con menor nivel socioeconómico (NSE-I) (0.722; IC95%: 0.700-0.745), sin aseguramiento (0.735; IC95%: 0.700-0.770) y de condición indígena (0.759; IC95%: 0.740-0.779). **Conclusiones**. La Cobac durante el embarazo y el parto presenta diferencias importantes al interior del país, identificándose áreas en donde hay que focalizar esfuerzos para avanzar hacia la cobertura universal de salud.

Palabras clave: salud materna; continuación de la atención; cobertura universal; México

Heredia-Pi I, Serván-Mori E, Reyes-Morales H, Lozano R. Gaps in the continuum of care during pregnancy and delivery in Mexico. Salud Publica Mex 2013;55 suppl 2:S249-S258.

Abstract

Objective. To develop a composite index for coverage of antenatal and delivery continuum of care, and use it to measure the gaps among different populations of pregnant women in Mexico. **Materials and methods**. Based in the information of 5 766 women from the National Health and Nutrition Survey 2012, a composite index of coverage of continuum of care (Cobac in spanish) was developed, integrating five interventions for antenatal, delivery, and puerperium periods. **Results**. Women living in metropolitan areas who were affiliated to social security had the best Cobac (0.879; IC95%:0.867-0.891); the worst were found in women living in rural areas, with the lower socio-economic level (NSE-I), (0.722; IC95%: 0.700-0.745), women without health insurance (0.735; IC95%: 0.700-0.770), and indigenous women (0.759; IC95%: 0.740-0.779). **Conclusions**. The Cobac during pregnancy and childbirth has important differences within the country, which allows for the identification of areas where we must focus efforts to move towards universal health coverage.

Key words: maternal health; continuum of care; universal coverage; Mexico

(1) Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
(2) Institute for Health Metrics and Evaluation. Seattle WA, EUA.

Fecha de recibido: 12 de marzo de 2013 • **Fecha de aceptado:** xxxxxxxxx
Autor de correspondencia: Mtro. Rafael Lozano. Instituto Nacional de Salud Pública. Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
Correo electrónico: rafael.lozano@insp.mx

Heredia-Pi I, Serván-Mori E, Reyes-Morales H. Brechas en la cobertura de atención continua del embarazo y el parto en México. Salud Publica Mex. 2013;55(supl 2):S249-S258. https://doi.org/10.21149/spm.v55s2.5122

La idea de promover la atención continua a los pacientes no es reciente,[1] pero vuelve a cobrar importancia a partir de la difusión de los informes de la Organización Mundial de la Salud (OMS) en 2005[2] y del Secretario General de la Organización de las Naciones Unidas (ONU) en 2010,[3] que establecen que para cumplir con los compromisos de los Objetivos de Desarrollo del Milenio (ODM) 4 y 5: "cada niño y cada mujer cuentan". En ambos casos, existe la convicción de que al fortalecer los sistemas de salud en los países es posible garantizar mayor acceso a los servicios de salud y una mejora en la atención continua desde el embarazo hasta el puerperio, pero además, la integración ordenada de estas intervenciones definitivamente puede salvar vidas de mujeres.[4-6]

En México, las políticas de salud en la última década[7] han establecido líneas de acción para que las embarazadas puedan acceder al sistema de salud y ahí recibir el mejor cuidado posible durante el embarazo, parto y puerperio, independientemente de su condición social o geográfica.[8] Se identifica un fuerte componente normativo que establece los criterios técnicos para garantizar una atención de calidad antes y durante el parto;[9] un componente legal que le otorga a las mujeres embarazadas el derecho a recibir la atención obstétrica sin importar su condición de aseguramiento;[10] y un componente político que ubica en el sistema de salud la responsabilidad de cumplir los compromisos adquiridos tanto a nivel internacional como nacional en materia de salud materna.[11] La publicación de la Encuesta Nacional de Salud y Nutrición (ENSANUT) 2012 permite actualizar el conocimiento sobre la situación de la atención materna continua en el país, sobre la inclusión de las poblaciones vulnerables y sobre la brecha que existe en México para cumplir con el compromiso adquirido en la 58a Asamblea Mundial de Salud de lograr la Cobertura Universal de Salud.[12]

El objetivo de este estudio es construir un índice compuesto de cobertura de atención continua durante el embarazo y el parto, y posteriormente, usando el índice, medir las brechas que existen entre distintas poblaciones de embarazadas en México, según el área geográfica donde viven, su nivel socioeconómico y su condición de aseguramiento.

Material y métodos

Fuente de información

Se trata de un análisis transversal que utiliza información recolectada por la ENSANUT 2012.[13] Es una encuesta de naturaleza probabilística y, por su diseño, representativa del nivel nacional, estatal y por estratos urbano/rural. En particular, se analizaron las secciones de salud reproductiva de los cuestionarios aplicados a mujeres adolescentes y adultas. Sólo se incluyeron aquellas mujeres que reportaron información sobre su último embarazo en el cual el producto había sido un nacido vivo a partir del año 2006. La figura 1 muestra el procedimiento seguido para seleccionar los casos incorporados al análisis. La muestra final estuvo constituida por 5 766 mujeres (685 adolescentes y 5 081 adultas). Para asegurar que la muestra seleccionada no estuviera sesgada, se compararon las mujeres incluidas con las que no lo fueron por deficiente calidad de los datos (344 adolescentes y 1 259 adultas), en relación con las principales variables de interés, y no se identificaron diferencias significativas entre ambos grupos.

Estrategia de análisis

Análisis exploratorio

Se realizó un análisis exploratorio de las variables de interés: edad al momento del último embarazo, años de escolaridad (variable numérica continua), hogar indígena, adscripción a algún seguro de salud (seguridad social, seguro popular y ninguno); quintil (Q) de nivel socioeconómico (NSE; I-V), aproximado por un índice continuo construido mediante análisis de componentes principales con matrices de correlación policórica, incluyendo la posesión de diferentes tipos de activos, servicios y características de infraestructura de los hogares;[14,15] y tipo de localidad de residencia: rural (<2 500 habitantes), urbana (localidades con 2 500 o más habitantes, pero menos de 100 000, no incluidas en el estrato metropolitano) y metropolitana (100 000 habitantes o más, capitales de los estados o áreas metropolitanas).

También se incluyó la variable morbilidad en el último embarazo, definida a partir de las preguntas 2.22 (cuestionario de adolescentes) y 8.22 (cuestionario de adultos) en las que se obtiene información sobre complicaciones obstétricas u otras enfermedades durante el embarazo.

Indicadores analizados

Contenido de la consulta prenatal

Se trata de un indicador que resume los procedimientos seguidos por parte del personal de salud durante la atención de las embarazadas en el periodo prenatal. El contenido de la consulta prenatal se expresa como la proporción de procedimientos cumplidos de 11 de los 12 activos que capta la encuesta, y que incluyen: medición de peso, talla, presión arterial, realización de examen

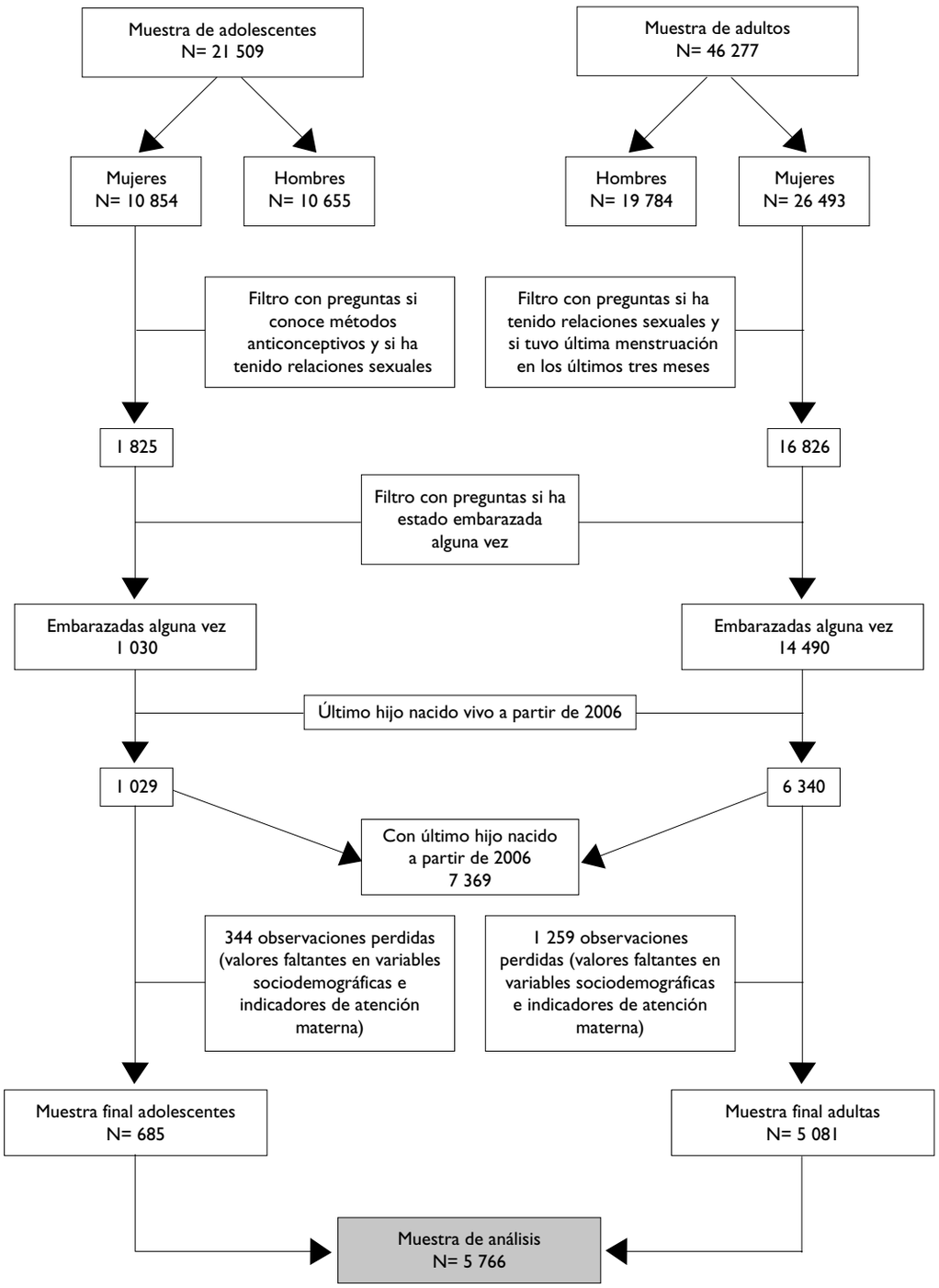


FIGURA 1. DEFINICIÓN DE LA MUESTRA DE ANÁLISIS. COBERTURA DE ATENCIÓN CONTINUA DURANTE EL EMBARAZO Y EL PARTO. MÉXICO, ENSANUT 2012

general de orina, exámenes de sangre, determinación de glucemia, realización de prueba serológica para la sífilis de ultrasonido, inmunización con toxoide tetánico y prescripción de ácido fólico de vitaminas, hierro o suplemento alimenticio.

Se eliminó la información sobre la detección de virus de la inmunodeficiencia humana debido a que la Norma Oficial Mexicana para la Atención a la mujer durante el embarazo, parto y puerperio[9] estipula que esta prueba sólo se realice a mujeres de alto riesgo, información que no se incluyó al momento de levantar la encuesta.

Coberturas crudas de las intervenciones de salud en la atención continua del embarazo, parto y postparto.

En la construcción de este indicador se consideraron: a) primera consulta prenatal en el primer trimestre del embarazo; b) haber tenido al menos cinco consultas prenatales durante el embarazo; c) contenido de la atención prenatal; d) atención institucionalizada del parto, y e) anticoncepción postparto. Para cada uno de estos indicadores se estimaron, considerando el efecto de diseño de la encuesta, las coberturas crudas y sus respectivos intervalos de confianza (IC95%) para diferentes subgrupos poblacionales.

Cobertura de atención continua a nivel poblacional

A partir de las estimaciones de las coberturas individuales para cada indicador, se reescalaron los valores para calcular la cobertura a nivel agregado. Para tal efecto, se asignó un valor máximo de 0.2 asumiendo una cobertura total esperada igual a 1. La suma de los valores reescalados de cada indicador se consideró como la cobertura de atención continua (COBAC) en cada subpoblación analizada.

Brecha en la continuidad de la atención materna

La brecha se calcula por diferencia entre la cobertura alcanzada con el valor esperado. Todas las estimaciones realizadas consideran el efecto de diseño de la encuesta. Los análisis se realizaron utilizando el paquete estadístico STATA 12.1.*

Resultados

Las características generales de la muestra analizada, según el tipo de localidad de residencia, se presentan en el cuadro I. Las mujeres procedentes de áreas urbanas reportan mayor morbilidad durante el embarazo ($p < 0.01$). Por otro lado, las residentes en áreas rurales tienen, significativamente, menos años de escolaridad, menor edad y una menor proporción de filiación a la seguridad social que las residentes en áreas urbanas y metropolitanas ($p < 0.05$); aunque la proporción de afiliadas al Seguro Popular es mayor. Una proporción de 0.809 de las mujeres residentes de áreas rurales se concentra en los tres quintiles más bajos de NSE.

La figura 2 muestra la cobertura de los procedimientos realizados durante la atención prenatal. Según lo que reportan las embarazadas, la mayor cobertura es en la prescripción de ácido fólico (97.4%; IC95%: 96.7-98.0) y en los procesos de exploración clínica a la embarazada. Le siguen en importancia la realización de ultrasonidos (92.8% (IC95%: 91.8-93.8), prescripción de vitaminas, hierro o suplemento alimenticio (92.1%; IC95%: 90.9-93.3) y la inmunización con toxoide tetánico para la prevención de tétanos neonatal (89.9%; IC95%: 88.6-91,3). Los menos reportados por las entrevistadas fueron la realización de exámenes de orina (88.5%; IC95%: 87.0-89.9) y de sangre (87.6%; IC95%: 86.1-89.0), la determinación de glucemia (72.2%; IC95%: 70.2-74.2) y la prueba de detección de sífilis (43.2%; IC95%: 41.0-45.3).

En el cuadro II se muestran las estimaciones de coberturas crudas para cada uno de los cinco indicadores utilizados, asimismo, la cobertura de atención continua y la brecha estimada. El grupo de mujeres residentes en área metropolitana y que refirieron estar afiliadas a la seguridad social fue el que presentó la mejor COBAC, con una cobertura de 0.879; IC95%: 0.867-0.891. En contraste, los grupos de mujeres que presentaron la menor COBAC fueron las residentes en área rural pertenecientes al Q-I de NSE (0.722; IC95%:0.700-0.745); en estas mismas localidades, aquellas sin ningún seguro médico (0.735; IC95%: 0.700-0.770), las mujeres del Q-I, en general (0.741; IC95%: 0.722-0.760), con Seguro Popular (0.745 IC95%: 0.722-0.768); residentes en áreas urbanas (0.751; IC95%: 0.706-0.797) y las mujeres indígenas (0.759; IC95%: 0.740-0.779) (figura 3).

Discusión

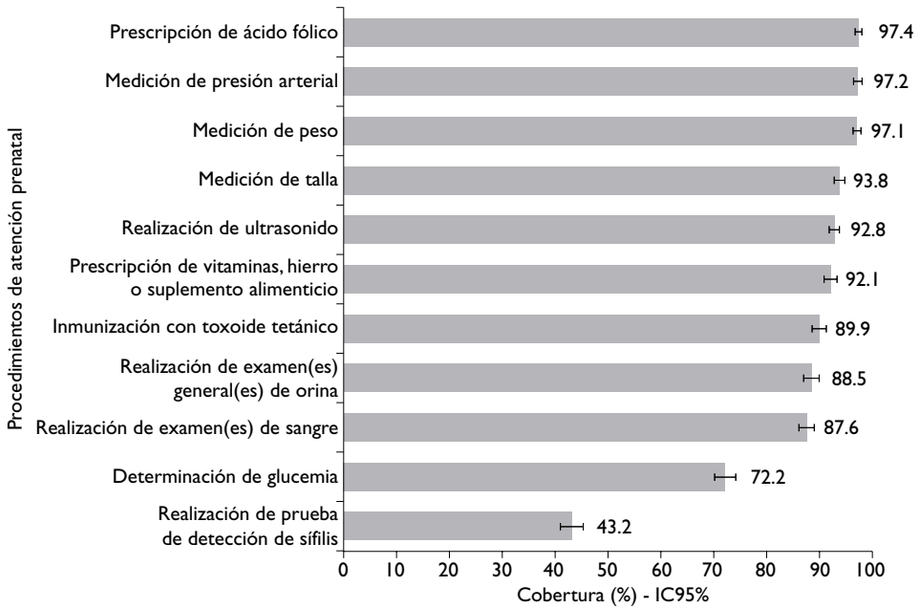
Es evidente que en los últimos años se observa en México una mejoría en la cobertura de los servicios de atención materna. Comparando con estudios similares, la cobertura de las intervenciones aisladas se está incrementando con el paso del tiempo. Lozano y cols.[16] reportaron que, a nivel nacional, la cobertura efectiva de atención prenatal en 2006 era de 67.6% y el presente estudio muestra que, combinando la proporción de mujeres que reciben al menos cinco consultas

* Stata Corp LP. Stata / SE 11.0 for Windows XP 64 bits. College Station, Texas, EUA: Stata Corp LP, 2009.

Cuadro I
PRINCIPALES CARACTERÍSTICAS SOCIODEMOGRÁFICAS DE MUJERES CON ÚLTIMO HIJO NACIDO VIVO EN LOS CINCO AÑOS PREVIOS A LA ENCUESTA. MÉXICO, ENSANUT 2012

	Nacional	*Tipo de localidad*			
		Rural	*Urbana*	*Metropolitana*	
N	*6 143*	*2 074*	*1 435*	*2 634*	
N	*8 598 144*	*1 952 638*	*1 756 601*	*4 888 904*	*Valor p de tendencia*
%	*100*	*22.64*	*20.45*	*56.91*	
		Media [Error estándar-IC 95%]			
Morbilidad en el último embarazo	0.589 [0.569 - 0.610]	0.526 [0.494 - 0.558]	0.601 [0.566 - 0.636]	0.611 [0.579 - 0.642]	0.001
Años de escolaridad	9.197 [9.021 - 9.374]	7.601 [7.334 - 7.867]	8.949 [8.614 - 9.285]	9.921 [9.668 - 10.18]	0.000
Años de edad al momento del último embarazo*	25.37 [25.12 - 25.62]	25.02 [24.68 - 25.35]	25.15 [24.74 - 25.56]	25.59 [25.21 - 25.97]	0.025
Hogar indígena	0.093 [0.080 - 0.106]	0.203 [0.165 - 0.241]	0.110 [0.081 - 0.139]	0.043 [0.029 - 0.056]	0.000
Esquema de aseguramiento de la salud					
Seguridad social	0.302 [0.281 - 0.323]	0.133 [0.107 - 0.160]	0.226 [0.196 - 0.256]	0.397 [0.363 - 0.431]	0.000
Seguro Popular	0.471 [0.451 - 0.492]	0.681 [0.641 - 0.721]	0.568 [0.531 - 0.605]	0.353 [0.324 - 0.382]	0.000
Ninguno	0.226 [0.206 - 0.247]	0.186 [0.153 - 0.219]	0.206 [0.168 - 0.243]	0.250 [0.219 - 0.281]	0.005
Quintil de nivel socioeconómico					
I	0.139 [0.126 - 0.153]	0.361 [0.325 - 0.397]	0.136 [0.106 - 0.167]	0.052 [0.039 - 0.065]	0.000
II	0.170 [0.156 - 0.183]	0.253 [0.225 - 0.281]	0.223 [0.194 - 0.252]	0.117 [0.100 - 0.135]	0.000
III	0.192 [0.175 - 0.209]	0.195 [0.165 - 0.225]	0.232 [0.202 - 0.261]	0.177 [0.152 - 0.203]	0.183
IV	0.209 [0.191 - 0.228]	0.127 [0.104 - 0.150]	0.218 [0.185 - 0.250]	0.239 [0.211 - 0.268]	0.000
V	0.289 [0.266 - 0.312]	0.064 [0.050 - 0.079]	0.191 [0.155 - 0.227]	0.414 [0.378 - 0.450]	0.000

* Se refiere a la edad que reportó la mujer tener al momento del embarazo de su último hijo nacido vivo, quien seguía vivo al momento de la encuesta



Nota: Estimaciones realizadas considerando el efecto de diseño de la encuesta, IC95%

FIGURA 2. PROCEDIMIENTOS REALIZADOS DURANTE LA ATENCIÓN PRENATAL. MÉXICO, ENSANUT 2012

Cuadro II
Cobertura y brecha estimadas en la continuidad de la atención materna. México, ENSANUT 2012

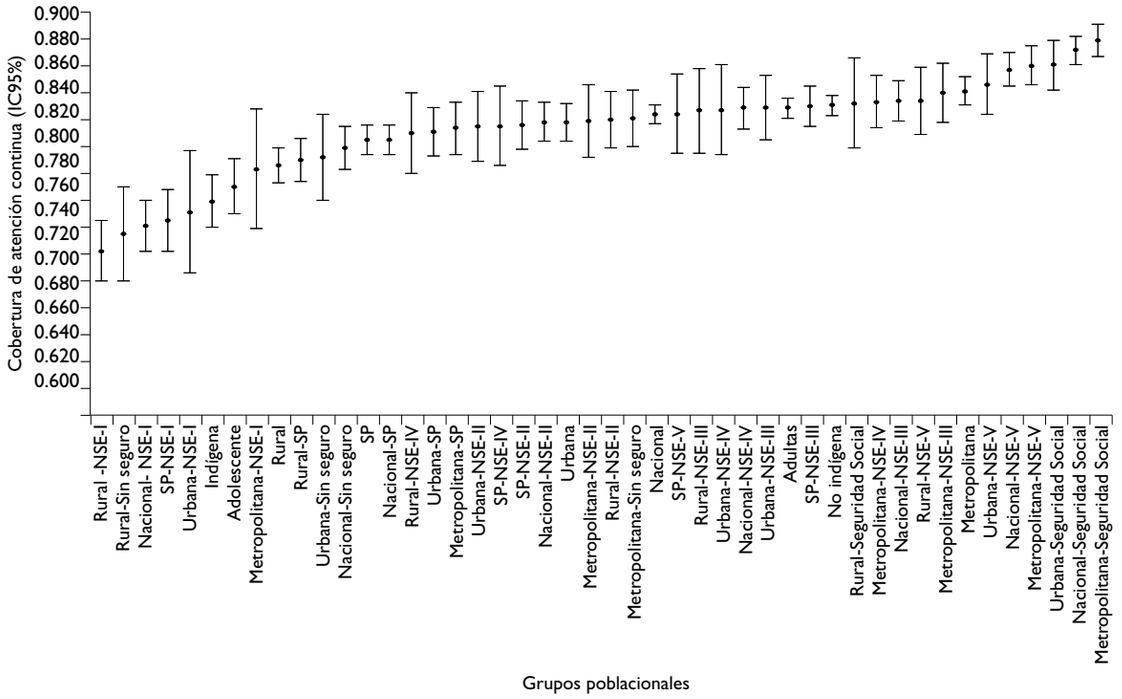
	Indicadores de continuidad en la atención materna					*Cobertura de atención continua (Cobac)*	*Brecha en la atención continua (1 - Cobac)*
	Primera consulta en el primer trimestre de embarazo	*Al menos cinco visitas prenatales*	*Contenido de la consulta prenatal*	*Atención del parto institucional*	*Anticoncepción post-parto*		
		Media [IC95%]					
Nacional	0.844 [0.829-0.858]	0.886 [0.873-0.899]	0.865 [0.858-0.872]	0.951 [0.944-0.959]	0.574 [0.554-0.595]	0.824 [0.817-0.831]	0.176
NSE I	0.751 [0.714-0.789]	0.790 [0.754-0.826]	0.809 [0.792-0.827]	0.850 [0.821-0.879]	0.504 [0.462-0.546]	0.741 [0.722-0.760]	0.259
NSE II	0.830 [0.799-0.861]	0.850 [0.817-0.883]	0.870 [0.856-0.884]	0.965 [0.953-0.978]	0.577 [0.535-0.618]	0.818 [0.804-0.833]	0.182
NSE III	0.828 [0.796-0.861]	0.898 [0.873-0.923]	0.870 [0.855-0.884]	0.965 [0.949-0.981]	0.611 [0.571-0.650]	0.834 [0.819-0.849]	0.166
NSE IV	0.839 [0.804-0.874]	0.887 [0.854-0.920]	0.871 [0.854-0.887]	0.965 [0.947-0.982]	0.582 [0.541-0.624]	0.829 [0.813-0.844]	0.171
NSE V	0.909 [0.884-0.934]	0.945 [0.926-0.964]	0.882 [0.871-0.893]	0.974 [0.961-0.987]	0.577 [0.533-0.621]	0.857 [0.845-0.870]	0.143
Rural	0.818 [0.790-0.845]	0.859 [0.838-0.880]	0.850 [0.839-0.861]	0.900 [0.881-0.920]	0.501 [0.470-0.531]	0.786 [0.773-0.799]	0.214
NSE I	0.764 [0.720-0.809]	0.817 [0.779-0.855]	0.801 [0.780-0.822]	0.802 [0.762-0.843]	0.427 [0.377-0.476]	0.722 [0.700-0.745]	0.278
NSE II	0.854 [0.812-0.895]	0.868 [0.825-0.910]	0.870 [0.849-0.891]	0.975 [0.959-0.991]	0.534 [0.481-0.587]	0.820 [0.799-0.841]	0.180
NSE III	0.833 [0.765-0.900]	0.887 [0.827-0.948]	0.881 [0.858-0.905]	0.941 [0.896-0.987]	0.589 [0.522-0.657]	0.827 [0.795-0.858]	0.173
NSE IV	0.830 [0.788-0.873]	0.857 [0.794-0.920]	0.879 [0.860-0.899]	0.959 [0.932-0.985]	0.524 [0.446-0.603]	0.810 [0.780-0.840]	0.190
NSE V	0.905 [0.836-0.974]	0.980 [0.957-1.002]	0.896 [0.868-0.923]	0.921 [0.844-0.997]	0.468 [0.337-0.599]	0.834 [0.809-0.859]	0.166
Urbano	0.840 [0.810-0.870]	0.877 [0.850-0.903]	0.852 [0.837-0.868]	0.961 [0.946-0.976]	0.562 [0.525-0.598]	0.818 [0.804-0.832]	0.182
NSE I	0.749 [0.670-0.827]	0.768 [0.680-0.857]	0.815 [0.767-0.862]	0.873 [0.803-0.944]	0.552 [0.457-0.647]	0.751 [0.706-0.797]	0.249
NSE II	0.848 [0.804-0.892]	0.867 [0.809-0.924]	0.867 [0.842-0.891]	0.962 [0.939-0.984]	0.533 [0.457-0.610]	0.815 [0.789-0.841]	0.185
NSE III	0.820 [0.757-0.883]	0.882 [0.834-0.930]	0.847 [0.820-0.874]	0.981 [0.966-0.996]	0.615 [0.553-0.677]	0.829 [0.805-0.853]	0.171
NSE IV	0.852 [0.772-0.932]	0.887 [0.829-0.944]	0.861 [0.826-0.895]	0.975 [0.956-0.993]	0.563 [0.484-0.642]	0.827 [0.794-0.861]	0.173
NSE V	0.907 [0.849-0.964]	0.949 [0.904-0.994]	0.860 [0.832-0.889]	0.981 [0.962-1.000]	0.535 [0.451-0.619]	0.846 [0.824-0.869]	0.154
Metropolitana	0.855 [0.835-0.875]	0.900 [0.880-0.919]	0.876 [0.866-0.885]	0.968 [0.959-0.978]	0.608 [0.578-0.639]	0.841 [0.831-0.852]	0.159
NSE I	0.718 [0.617-0.820]	0.736 [0.631-0.841]	0.829 [0.794-0.863]	0.960 [0.923-0.997]	0.673 [0.581-0.766]	0.783 [0.739-0.828]	0.217
NSE II	0.798 [0.734-0.862]	0.823 [0.759-0.887]	0.873 [0.848-0.897]	0.960 [0.935-0.984]	0.643 [0.564-0.722]	0.819 [0.792-0.846]	0.181
NSE III	0.830 [0.784-0.877]	0.909 [0.877-0.942]	0.875 [0.852-0.898]	0.967 [0.945-0.990]	0.618 [0.555-0.680]	0.840 [0.818-0.862]	0.160
NSE IV	0.837 [0.793-0.881]	0.893 [0.848-0.938]	0.872 [0.850-0.895]	0.963 [0.937-0.988]	0.600 [0.545-0.656]	0.833 [0.814-0.853]	0.167
NSE V	0.909 [0.881-0.938]	0.942 [0.920-0.964]	0.885 [0.872-0.898]	0.976 [0.961-0.991]	0.591 [0.539-0.642]	0.860 [0.846-0.875]	0.140
Hogar Indígena							
No indígena	0.848 [0.833-0.864]	0.893 [0.879-0.907]	0.870 [0.863-0.877]	0.960 [0.952-0.968]	0.582 [0.561-0.604]	0.831 [0.823-0.838]	0.169
Indígena	0.797 [0.756-0.837]	0.817 [0.772-0.862]	0.822 [0.801-0.843]	0.864 [0.835-0.893]	0.496 [0.445-0.548]	0.759 [0.740-0.779]	0.241
Grupo etario							
Adolescentes	0.735 [0.684-0.786]	0.823 [0.780-0.867]	0.870 [0.854-0.886]	0.945 [0.915-0.975]	0.479 [0.430-0.527]	0.770 [0.750-0.791]	0.230
Adultas	0.853 [0.838-0.868]	0.891 [0.877-0.905]	0.865 [0.857-0.872]	0.952 [0.944-0.960]	0.583 [0.562-0.604]	0.829 [0.821-0.836]	0.171
Seguro Popular	0.816 [0.794-0.838]	0.859 [0.838-0.879]	0.859 [0.850-0.868]	0.935 [0.923-0.948]	0.558 [0.531-0.584]	0.805 [0.794-0.816]	0.195
NSE I	0.751 [0.710-0.793]	0.796 [0.752-0.839]	0.813 [0.792-0.833]	0.844 [0.809-0.878]	0.521 [0.473-0.569]	0.745 [0.722-0.768]	0.255
NSE II	0.819 [0.777-0.860]	0.866 [0.832-0.899]	0.868 [0.850-0.885]	0.962 [0.945-0.978]	0.566 [0.517-0.616]	0.816 [0.798-0.834]	0.184
NSE III	0.834 [0.795-0.873]	0.901 [0.874-0.928]	0.867 [0.851-0.884]	0.947 [0.919-0.976]	0.601 [0.555-0.647]	0.830 [0.815-0.845]	0.170
NSE IV	0.826 [0.764-0.889]	0.817 [0.756-0.878]	0.874 [0.853-0.896]	0.980 [0.968-0.992]	0.579 [0.516-0.642]	0.815 [0.786-0.845]	0.185
NSE V	0.859 [0.807-0.911]	0.912 [0.865-0.959]	0.880 [0.859-0.901]	0.954 [0.918-0.990]	0.516 [0.444-0.588]	0.824 [0.795-0.854]	0.176

(Continúa)

(Continuación)

Nacional							
Seguridad Social	0.902 [0.876-0.927]	0.949 [0.935-0.964]	0.890 [0.881-0.898]	0.985 [0.977-0.994]	0.633 [0.596-0.669]	0.872 [0.861-0.882]	0.128
Seguro Popular	0.816 [0.794-0.838]	0.859 [0.838-0.879]	0.859 [0.850-0.868]	0.935 [0.923-0.948]	0.558 [0.531-0.584]	0.805 [0.794-0.816]	0.195
Ninguno	0.823 [0.787-0.860]	0.858 [0.823-0.892]	0.845 [0.825-0.865]	0.940 [0.922-0.958]	0.531 [0.484-0.578]	0.799 [0.783-0.815]	0.201
Rural							
Seguridad Social	0.799 [0.699-0.899]	0.893 [0.838-0.949]	0.893 [0.876-0.910]	0.982 [0.968-0.996]	0.595 [0.506-0.683]	0.832 [0.799-0.866]	0.168
Seguro Popular	0.825 [0.794-0.855]	0.869 [0.844-0.894]	0.851 [0.838-0.865]	0.896 [0.872-0.920]	0.510 [0.476-0.543]	0.790 [0.774-0.806]	0.210
Ninguno	0.806 [0.736-0.876]	0.797 [0.733-0.862]	0.814 [0.785-0.844]	0.858 [0.805-0.911]	0.400 [0.313-0.487]	0.735 [0.700-0.770]	0.265
Urbano							
Seguridad Social	0.904 [0.864-0.944]	0.939 [0.905-0.973]	0.883 [0.866-0.900]	0.994 [0.984-1.003]	0.584 [0.507-0.661]	0.861 [0.842-0.879]	0.139
Seguro Popular	0.833 [0.796-0.871]	0.871 [0.839-0.902]	0.847 [0.828-0.866]	0.945 [0.923-0.968]	0.559 [0.513-0.604]	0.811 [0.793-0.829]	0.189
Ninguno	0.789 [0.702-0.875]	0.825 [0.752-0.899]	0.834 [0.800-0.869]	0.967 [0.944-0.990]	0.544 [0.456-0.632]	0.792 [0.760-0.824]	0.208
Metropolitana							
Seguridad Social	0.915 [0.888-0.942]	0.959 [0.943-0.976]	0.891 [0.880-0.901]	0.984 [0.974-0.995]	0.648 [0.603-0.693]	0.879 [0.867-0.891]	0.121
Seguro Popular	0.799 [0.760-0.839]	0.843 [0.802-0.884]	0.872 [0.857-0.887]	0.959 [0.940-0.979]	0.594 [0.545-0.643]	0.814 [0.794-0.833]	0.186
Ninguno	0.839 [0.791-0.886]	0.885 [0.839-0.931]	0.857 [0.829-0.885]	0.956 [0.934-0.979]	0.566 [0.500-0.632]	0.821 [0.800-0.842]	0.179

Nota: Estimaciones realizadas considerando el efecto de diseño de la encuesta, IC95%



NSE: nivel socioeconómico
SP: Seguro Popular

FIGURA 3. COBERTURA DE ATENCIÓN CONTINUA DEL EMBARAZO Y PARTO POR GRUPOS POBLACIONALES. MÉXICO, ENSANUT 2012

(0.844; IC95%: 0.873-0.899) con el contenido óptimo de las mismas (0.865; IC95%: 0.858-0.872), la cobertura es de 0.824 (IC95%: 0.817-0.831). Lo mismo sucede con la atención del parto en medio hospitalario que los mismos autores reportaron con 93.3% para 2006, y que para 2012 se observa una cobertura de 0.951 (IC95%: 0.944-0.959) en los partos atendidos en el hospital.

Como se esperaba, la atención prenatal en el primer trimestre es elevada a nivel nacional (0.844; IC95%: 0.829-8.58), pero sólo una proporción de 0.574 (IC95%: 0.554-0.595) recibió anticoncepción posparto. Llama la atención que en la ENSANUT 2012 no se haya incluido ninguna pregunta sobre la atención en el puerperio, pues como indica la NOM-007-SSA2-1993[9] "…las mujeres deben recibir al menos tres consultas en los 30 días posteriores al parto, además de la revisión inmediata después del parto…". La ENADID 2009 reporta que 62.3% de las mujeres que tuvieron un embarazo de 2004 a 2009 se realizaron una revisión en los primeros quince días después de ocurrido el parto,[17] y el Boletín de Información Estadística refiere que, en 2011, se otorgaron en promedio 1.8 consultas en la etapa de puerperio, pero sólo a 54.7% de las mujeres que se atendieron en alguna institución del sector público.[18] La ausencia de información en la ENSANUT 2012 resulta relevante puesto que ese año, en México, una de cada seis muertes maternas sucedió en el puerperio mediato y tardío,[19] además de la importante cantidad de morbilidad materna en esta etapa.

La cobertura de atención continua, además de expandir el tiempo en el cuidado del embarazo hasta el posparto inmediato, es más sensible a la forma como el sistema de salud en México está interactuando con la población que debe ser beneficiada.[20,21] Por ejemplo, las adolescentes están menos protegidas que las mujeres mayores de 20 años; el riesgo de no recibir atención materna continua es 34% más alto en las menores de edad. Además, la cobertura de la atención continua durante el embarazo y el parto es consistente con los indicadores propuestos a nivel internacional. Para la Alianza para la Salud Materna, Neonatal e Infantil (PMNCH, por sus siglas en inglés) el concepto de "Continuum de Atención" emerge como un nuevo paradigma al integrar la dimensión temporal –la atención de la mujer debe comenzar antes del embarazo, preferiblemente durante la adolescencia, continuar en el embarazo, el nacimiento y después del parto; asegurando además la atención de los niños y adolescentes en los años cruciales de sus vidas– con la dimensión espacial, es decir, los cuidados que se ofrecen en la comunidad y en el hogar deberán estar integrados a los servicios de salud en todos sus niveles de atención.[22]

El presente estudio identifica, a través del análisis de la cobertura de la atención materna continua, comparando poblaciones vulnerables según condición de aseguramiento, nivel socioeconómico y área de residencia, que las mujeres residentes en áreas rurales o urbanas y que pertenecían al primer quintil de NSE, con residencia en el área rural sin ningún seguro médico, con afiliación al Seguro Popular y con NSE más bajo, y las mujeres indígenas, no superan una cobertura de atención continua durante el embarazo, parto y postparto de 0.759; (IC95%: 0.740-0.779). En contraste, las mujeres residentes en zonas metropolitanas y que cuentan con seguridad social tienen una cobertura de atención continua de 0.879; (IC95%: 0.867-0.891). Una de las críticas al diseño de los ODM es que al reportar resultados nacionales se ocultan las desigualdades al interior de los países, y con ello se dejan fuera de la agenda política las acciones de equidad en salud. Incorporar este tipo de análisis está en consonancia con el manifiesto propuesto en la 2ª Conferencia Mundial sobre Salud Materna realizada en enero de 2013 en Arusha, Tanzania,[23] que establece en uno de sus puntos "…poner mayor énfasis en llegar a las mujeres invisibles que están socialmente excluidas debido a elementos culturales, geográficos, educativos, de discapacidad y a otros motores de la invisibilidad…".* En México, el Programa Nacional de Salud 2007-2012 incorpora, como una sus metas, la reducción de la brecha de la mortalidad materna de los 125 municipios de más bajo índice de desarrollo humano (IDH) y los Informes de Rendición de Cuentas en Salud dan seguimiento al cumplimiento de esta meta, que presenta resultados muy pobres.[24] Otros estudios muestran que al comparar la razón de mortalidad materna en los 100 municipios de más bajo IDH, y de los 50 de más alto IDH en 2010, se observa que el riesgo de morir por causas maternas en los municipios más pobres es 3.4 veces mayor que en los municipios ricos, y éste sube a 9.9 si se trata de muertes por sepsis puerperal.[25]

El estudio de las brechas en la cobertura de atención continua muestra áreas específicas del país en donde hay que focalizar esfuerzos. La diferencia entre la cobertura de atención materna continua alcanzada por las distintas poblaciones de mujeres y la máxima cobertura lograda marca la primera distancia que hay que cerrar en el país en búsqueda de la cobertura esperada. Sin embargo, la distancia que hay que recorrer para alcanzar la cobertura universal en salud[26] es aún mayor.

* The Global Maternal Health Conference 2013. Disponible en: http://maternalhealthaskforce.org/conference/conference.

Finalmente, se ha mostrado que México va cubriendo etapas para aspirar a la universalización[27] de los servicios propuesta por la OMS, sin embargo, la imperiosa agenda es cubrir a la población que reconoce no tener acceso a ningún seguro médico, y disminuir las brechas entre éstas y las mujeres que tienen acceso a los servicios de salud y gozan de un sistema de seguro. Cerrar las brechas en materia de cobertura definitivamente disminuirá las desigualdades en salud en México. No se debe perder de vista que la cobertura universal no es sólo salud: también apunta hacia el desarrollo económico[28] y a la cohesión social asegurando que todos, incluyendo los grupos vulnerables, puedan ejercer su derecho a la protección a la salud.[29,30]

Limitaciones

Es importante reconocer que este estudio toma la información disponible en la ENSANUT 2012 y con ello sólo logra cubrir de manera parcial lo que se entiende por atención continua de la mujer, motivo de este trabajo, aunque el concepto también incluye la salud del niño. También es importante mencionar que el diseño de la encuesta no persigue evaluar los contenidos de la atención continua; para eso es conveniente realizar estudios prospectivos usando los registros rutinarios y paneles de hogares que permitan integrar ambas perspectivas. Asimismo, y más importante aún es construir un sistema de monitoreo con la visión de atención continua de la mujer y el niño con el fin de observar más de cerca el progreso en el logro de los ODM 4 y 5.

Recomendaciones

Establecer en las unidades médicas un monitoreo sistemático del número de consultas de atención prenatal y de las acciones realizadas en las mismas, asegurando el cumplimiento de los criterios de calidad a lo largo del embarazo; el índice de cobertura de atención continua propuesto en este trabajo puede ser una herramienta valiosa para la evaluación rutinaria, aún en unidades con escasos recursos de registro, por la sencillez de los indicadores.

Fortalecer los programas de capacitación del personal de salud para integrar la atención continua como un componente fundamental en los servicios; la identificación y seguimiento de las mujeres en edad reproductiva, desde la etapa previa al embarazo, durante la atención prenatal, el parto y el postparto, incorporando el seguimiento del recién nacido y el niño en los primeros años de vida, es una estrategia fundamental para el acceso efectivo a la atención.

Agradecimientos

Los autores expresan su agradecimiento a la maestra Angélica Castro Ríos por su valiosa colaboración en la revisión bibliográfica.

Declaración de conflicto de intereses: Los autores declararon no tener conflicto de intereses.

Referencias

1. Evashwick C. Creating the continuum of care. Health Matrix 1989;7(1):30-39
2. Organización Mundial de la Salud. Informe sobre la salud en el mundo 2005: ¡Cada madre y cada niño contarán! Ginebra, Suiza: OMS, 2005.
3. Ki-moon B. Estrategia Mundial de Salud de las Mujeres y niños. ONU, 2010. [Consultado: 2013 marzo 1]. Disponible en: http://www.un.org/spanish/sg/pdf/Global%20StategySP.pdf.
4. Kerber KJ, de Graft-Johnson JE, Bhutta ZA, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. Lancet 2007; 370(9595): 1358-1369.
5. PMNCH /WHO 2010 Annual Report. From hope to action. The Partnership for Maternal, Newborn and Child Health. World Health Organization. Geneva 2011. [Consultado: 2013 marzo 1] Disponible en: http://www.who.int/pmnch/topics/part_publications/201103_pmnchannualreport/en/index.html.
6. Countdown to 2015 Decade Report (2000-2010): Taking stock of maternal, newborn and child survival. World Health Organization. 2010. [Consultado: 2013 marzo 4] Disponible en: http://www.Countdown2015mnch.org/documents/2010report/CountdownReportAndProfiles.pdf.
7. Secretaría de Salud. Programa Nacional de Salud 2001-2006. La democratización de la salud en México. Hacia un sistema universal de salud. México: SSa, 2001. [Consultado: 2013 marzo 2]Disponible en: http://www.salud.gob.mx/docprog/Pns-2001-2006/PNS-completo.pdf
8. Programa de Acción Específico 2007-2012. Arranque Parejo en la Vida. México: SSa, 2008. [Consultado: 2013 marzo 2] Disponible en: http://nuevelunas.org.mx/Leyes,%20Normas%20e%20Iniciativas/Programa.pdf.
9. Secretaría de Salud. Norma oficial mexicana, NOM-007-SSA2-1993, Atención a la mujer durante el embarazo, parto y puerperio a recién nacidos. Criterios y procedimientos para la prestación del servicio. México: Diario Oficial, 1995. [Consultado: 2013 marzo 2] Disponible en: http://www.salud.gob.mx/unidades/cdi/nom/007ssa23.html.
10. Tercera Sección. Poder Ejecutivo. Secretaría de Salud. Decreto por el que se reforman y adicionan diversas disposiciones a la Ley General de Salud. México: Diario Oficial, 2012. [Consultado: 2013 marzo 2] Disponible en: http://www.diputados.gob.mx/LeyesBiblio/ref/lgs/LGS_ref65_07jun12.pdf.
11. Secretaría de Salud. Programa Sectorial de Salud 2007-2012. Por un México sano: construyendo alianzas para una mejor salud. México: SSa, 2008. [Consultado: 2013 marzo 2] Disponible en: http://www.imss.gob.mx/transparencia/Focalizada/Documents/PNDSalud.pdf.
12. 58ª Asamblea Mundial de la Salud. Resoluciones y Decisiones. Financiación sostenible de la salud, cobertura universal y seguro social de enfermedad. WHA58.33. Novena sesión plenaria, 25 de mayo de 2005 -Comisión A, Octavo Informe. [Consultado: 2013 marzo 2] Disponible en: http://apps.who.int/iris/bitstream/10665/23111/1/WHA58_33-sp.pdf.
13. Gutierrez JP, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L, *et al.* Encuesta Nacional de Salud y Nutrición 2012. Resultados Nacionales. Cuernavaca, México: Instituto Nacional de Salud Pública, 2012.

14. Kolenikov S, Angeles G. The use of discrete data in PCA: theory, simulations, and applications to socioeconomic indices. Chapel Hill: Carolina Population Center, University of North Carolina, 2004.
15. McKenzie DJ. Measuring Inequality with Asset Indicators. J Popul Econ 2005(2):229.
16. Lozano R, Soliz P, Gakidou E, Abbott-Klafter J, Feehan D, Vidal C, *et al*. Benchmarking Performance of Mexican States Using Effective Coverage. Lancet 2006; 368 (9548) : 1729-1741.
17. Instituto Nacional de Estadística y Geografía. Encuesta Nacional de Dinámica Demográfica 2009. Panorama sociodemográfico de México: principales resultados. México: Instituto Nacional de Estadística y Geografía/Consejo Nacional de Población, 2011.
18. SSa/DGIS. Boletín de Información estadística. Servicios otorgados y Programas sustantivos, 2011. Vol III, núm. 31). [Consultado: 2013 marzo 12] Disponible en: http://www.sinais.salud.gob.mx/publicaciones/bie.html.
19. Secretaría de Salud. Sistema Nacional de Información en Salud. [Consultado: 2013 marzo 12] Disponible en: http://www.sinais.salud.gob.mx/muertesmaternas/index.html.
20. Tanahashi T. Health service coverage and its evaluation. Bull World Health Organ 1978; 56 (2): 295-303.
21. Shengelia B, Tandon A, Adams O, Murray CJL. Access, utilization, quality and effective coverage: an integrated conceptual framework and measurement strategy. Soc Sci Med 2005; 61: 97-109.
22. PMNCH. Conceptual and Institutional Framework. Geneva, Switzerland: Partnership for Maternal, Newborn and Child Health, 2006. [Consultado: 2013 enero 18] Disponible en: http://www.who.int/pmnch/activities/cif/conceptualandinstframework.pdf
23. Langer A, Horton R, Chalamilla G. A manifesto for maternal health post-2015. Lancet 2013; 381(9867):601-602. DOI: 10.1016/S0140-6736-(13)60259-7.
24. SSa/DGED. Rendición de Cuentas en Salud 2010. Secretaría de Salud. Subsecretaría de Integración y Desarrollo del Sector Salud. Dirección General de Evaluación del Desempeño 2011. [Consultado: 2013 marzo 12]. Disponible en: http://www.dged.salud.gob.mx/contenidos/dedss/descargas/rcs/RCS2010.pdf.
25. Lozano R. La carga de la enfermedad y las desigualdades en salud de las mujeres en México. Género y Salud en cifras 2012; 10(1): 11-20.
26. WHO. The World Report 2010. Health Systems financing: the path to universal coverage. Geneva: WHO, 2010.
27. Knaul FM, González-Pier E, Gómez-Dantés O, García-Junco D, Arreola-Ornelas H, Barraza-Lloréns M, *et al*. The quest for universal health coverage: achieving social protection for all in Mexico. Lancet 2012; 380: 1259-1279.
28. Evans DB, Marten R, Etienne C. Universal health coverage is a development issue. Lancet 2012; 380:864-865.
29. Diario Oficial de la Federación. Decreto por el que se reforma y adiciona la ley general de salud. Publicado en el Diario Oficial de la Federación el 15 de mayo de 2003. [Consultado: 2013 marzo 4] Disponible en: http://www.salud.df.gob.mx/ssdf/seguro_popular/index/pdf/01.pdf
30. SSa. Sistema de Protección en Salud: Hacia un sistema universal de salud. Firma del decreto por el que se reforma y adiciona la Ley General de Salud. México: Diario Oficial de la Federación, 15 de mayo de 2003.

Capítulo 7.
El camino hacia la atención primaria de salud

La atención primaria (AP) es el eje conductor y un componente fundamental de un sistema de salud. Constituye la puerta de entrada a los servicios y, en las condiciones ideales, ofrece una respuesta integradora para la mayoría de las necesidades de salud y expectativas de las personas. La AP representa la vía más sólida para el logro del acceso universal y la protección social en salud, ya que incorpora una orientación hacia la salud de la familia y la comunidad, con una visión de comprensión de los determinantes sociales para la atención centrada en la persona. Además, basada en el enfoque de curso de vida, busca otorgar servicios a todos los estratos etarios de la población con calidad técnica e interpersonal, disponibles estratégicamente mediante redes integradas de atención y equipos multidisciplinarios de salud.

La implementación de un modelo eficaz de AP en México sigue siendo un reto. La segmentación y la fragmentación del sistema de salud han sido, desde su inicio, un obstáculo para lograrlo. Asimismo, el predominio del paradigma biomédico curativo hace que la atención de primer contacto se limite a la respuesta episódica ante la demanda. Una demanda que se deriva, principalmente, de condiciones de enfermedad y, en consecuencia, se otorga de manera aislada y sin coordinación entre el personal de salud de las distintas disciplinas, tanto en las unidades de salud de primer contacto como entre los distintos niveles de atención.

Lo anterior sustenta la necesidad de evidencia científica que, desde la perspectiva de la investigación en sistemas de salud, establezca de manera precisa las condiciones que limitan la implementación de la AP en el contexto de México. Lo cual requiere estudios que definan la situación del modelo vigente en términos de la respuesta a las necesidades y expectativas como sustento para la propuesta de estrategias factibles dirigidas a la conformación de un modelo sólido de AP.

En la última década, el CISS ha desarrollado productos científicos valiosos que presentan evidencia aplicable para la generación de políticas de salud dirigidas a la transformación de los servicios del primer nivel de atención de las instituciones públicas de salud en verdaderos servicios de AP. Como muestra de ello, se presenta una selección de artículos que brindan un panorama diverso en el tema y que incluyen un abordaje conceptual, la identificación de la resiliencia de los equipos de salud de primer contacto ante la crisis sanitaria de la Covid-19, las alternativas de elección en el trayecto para la obtención de servicios de primer contacto, la carencia de recursos humanos para avanzar en el otorgamiento de un paquete básico de servicios en el primer nivel de atención y un ejemplo de políticas para atender poblaciones vulnerables mediante un abordaje de AP.

Artículo

La atención primaria como eje del sistema nacional de salud

Hortensia Reyes-Morales, M en CM, D en C,[1] María del Carmen García-Peña, M en CM, D en Pol de Salud,[2] Eduardo Lazcano-Ponce, M en CM, D en C.[3]

Reyes-Morales H, García-Peña MC, Lazcano-Ponce E. La atención primaria como eje del sistema nacional de salud. Salud Publica Mex. 2024;66:631-636.
https://doi.org/10.21149/15744

Resumen

El sistema de salud mexicano es motivo frecuente de debate y discusión académica y política. En un contexto de inequidad, rezago social, necesidades de salud crecientes y un proceso de envejecimiento acelerado, es indispensable reconsiderar la estructura del sistema de salud en México. El objetivo de este artículo es presentar los conceptos actuales de la atención primaria, algunos elementos del sistema de salud y algunas consideraciones para su implementación. Reino Unido presentó por primera vez el concepto de atención primaria a la salud (APS) en 1920. Desde entonces, diversos reportes internacionales han colocado el tema como prioritario. La Conferencia Mundial sobre APS de 2018 renueva el compromiso político, enfatiza el papel central de la APS en todo el mundo y ubica a la APS como el nivel del sistema de salud que coordina la respuesta de todos los niveles de atención. En ese sentido, la salud pública, con su enfoque poblacional, se enlaza en diferentes dimensiones con la atención primaria en su enfoque individual, las cuales no deberían ser vistas como estrategias contradictorias sino complementarias. El sistema de salud en México inicia una nueva reformulación de estrategias para alcanzar la tan ansiada universalidad. Es indispensable que los dilemas que se enfrentan para lograrlo se resuelvan para conseguir una reorientación hacia la atención primaria a la salud como la más importante perspectiva para lograr el mayor nivel de salud posible de toda la población.

Palabras clave: atención primaria de salud; cobertura universal; equidad en salud; acceso efectivo

Reyes-Morales H, García-Peña MC, Lazcano-Ponce E. Primary care as the axis of the national health system. Salud Publica Mex. 2024;66:631-636.
https://doi.org/10.21149/15744

Abstract

The Mexican health system is a frequent source of academic and political debate and discussion. In the context of inequality, social backwardness, growing health needs, and an accelerated aging process, it is essential to reconsider the structure of the health system in Mexico. This article aims to present the current concepts of primary care, some elements of the health system, and some considerations for its implementation. The United Kingdom first presented the concept of primary health care (PHC) in 1920. Since then, various international reports have prioritized the topic. The 2018 World Conference on PHC renews political commitment, emphasizes the central role of PHC around the world, and positions PHC as the level of the health system that coordinates the response of all levels of care. In that sense, at a population level, public health is linked in different dimensions with primary care in its individual focus and they should not be seen as contradictory but complementary strategies. The health system in Mexico is beginning a new reformulation of strategies to achieve the long-awaited universality; it is essential that the dilemmas faced in this endeavor are resolved to reach a reorientation towards primary health care as the essential perspective to achieve the most significant possible level of health of the entire population.

Keywords: primary health care; universal coverage; health equity; effective access

(1) Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
(2) Dirección General, Instituto Nacional de Geriatría. Ciudad de México, México.
(3) Dirección General, Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.

Fecha de recibido: 6 de marzo de 2024 • **Fecha de aceptado:** 3 de junio de 2024 • **Publicado en línea:** 17 de septiembre de 2024
Autor de correspondencia: Dr. Eduardo Lazcano Ponce. Dirección General, Instituto Nacional de Salud Pública.
Av. Universidad 655, col. Santa María Ahuacatitlán. 62100, Cuernavaca, Morelos, México.
Correo electrónico: elazcano@insp.mx

Licencia: CC BY-NC-SA 4.0

Reyes-Morales H, García-Peña MC, Lazcano-Ponce E. La atención primaria como eje del sistema nacional de salud. Salud Publica Mex. 2024;66(5):631-636. https://doi.org/10.21149/15744

El sistema de salud mexicano es motivo frecuente de debate y discusión académica y política. Las razones de este permanente análisis son diversas, pero es probable que, entre otros motivos, se deba a que el tema de la salud es esencialmente político. No es posible pensar en el desarrollo equilibrado de un país si éste no cuenta con ciudadanos sanos.

Pero el tema de salud es de la mayor relevancia no sólo para México sino a escala global, como consecuencia de necesidades de salud crecientes que se reflejan en la persistencia de enfermedades prevenibles derivadas del rezago social, la sindemia constituida por la combinación de enfermedades crónicas, y el ineludible proceso de envejecimiento de la población. Para responder a estas necesidades, los sistemas de salud cuentan con el avance en tecnología médica como aliado, aunque éste genera presiones para ajustar los presupuestos, mejorar la eficiencia y resolver el balance siempre frágil con efectividad y equidad.

En este contexto, resulta indispensable reconsiderar la estructura vigente en el sistema de salud tradicional, que privilegia el modelo médico hospitalario curativo, para establecer un modelo de servicios de salud que ofrezca una respuesta integradora, oportuna y adecuada al contexto de las personas, ante sus necesidades de salud y a lo largo de su curso de vida. Diversos organismos internacionales han enfatizado la importancia de la atención primaria a la salud (APS) y los beneficios para la salud de un sistema basado en este modelo de atención.[1]

Desde esta perspectiva, la APS se ubica como un modelo central en el que el resto del sistema se sustenta y tiene una connotación transversal. Este artículo presenta los conceptos actuales de la APS como marco para un breve análisis de la situación en México y algunas consideraciones para su implementación como eje fundamental del sistema nacional de salud.

La APS y su evolución conceptual

El concepto de APS se acuñó por vez primera en el Reporte Dawson en el Reino Unido en 1920, el cual estableció la creación de "centros de atención primaria a la salud" para regionalizar los servicios en ese país.[2] Fue hasta medio siglo después que el Instituto de Medicina (IOM) en los Estados Unidos definió la atención primaria como "la provisión de servicios integrados y accesibles por clínicos quienes son responsables de dar respuesta a la gran mayoría de necesidades de salud personales, desarrollando una colaboración sostenida con pacientes durante su práctica en el contexto de la familia y la comunidad".[3] Sin embargo, fue la Declaración de Alma-Ata, que en 1978 surgió como un hito importante del siglo XX, en la que se identificó a la APS como la clave para alcanzar el objetivo de salud para todos, y determinó que este modelo de referencia debía ser parte de un sistema nacional de salud completo y coordinado. En esta emblemática conferencia se estableció el concepto de la APS como la "atención sanitaria esencial, basada en la práctica, en la evidencia científica y en la metodología y la tecnología socialmente aceptables, accesible universalmente a los individuos y las familias en la comunidad a través de su completa participación, y a un costo que la comunidad y el país lo pueden soportar, a fin de mantener cada nivel de su desarrollo, un espíritu de autodependencia y autodeterminación".[4] A lo largo del tiempo y con este enfoque de integración, se han creado y fortalecido sistemas de salud con cobertura universal; ejemplos de ello son el caso de China,[5] donde 1 500 millones de personas son cubiertas por un seguro nacional de salud, y el sistema universal de salud en Alemania,[6] el cual es gratuito, integrado y con cobertura colectiva, por citar sólo dos casos paradigmáticos.

En 2003, la Organización Mundial de la Salud (OMS) refinó el concepto para establecer un enfoque a nivel de

Aspectos destacados

- La APS representa el modelo central en todo sistema de salud y tiene una connotación transversal.
- La atención primaria debe ser el eje que coordine la respuesta en salud en todos los niveles.
- Como primer contacto de acceso al sistema de salud, la atención primaria promueve la atención integrada, continua y coordinada centrada en la persona.
- La salud pública, con su enfoque poblacional, se enlaza en diferentes dimensiones con la atención primaria en su enfoque individual, para dar respuesta integral a las necesidades de salud de la población.
- El fortalecimiento del sistema de salud de México, orientado hacia el acceso universal y la protección social en salud, exige un modelo de atención primaria para el logro de la efectividad en la atención.

los servicios, con cuatro elementos principales de la APS: 1) primer contacto de acceso para cada nueva necesidad de salud; 2) atención de largo plazo enfocada a la persona (no a la enfermedad); 3) atención integrada para la mayoría de las necesidades de salud, y 4) coordinación de la atención para acceso a otros profesionales cuando se requiere.[7] Con este referente, en los años posteriores se evidenció el impacto del modelo propuesto en la prevención y control de enfermedades y en la reducción de muerte evitable, así como su asociación con una mayor equidad en las poblaciones.[8] En el Reporte de Salud en el Mundo de 2008, la OMS reconoció la necesidad de ampliar la visión desde la perspectiva de desempeño de la APS en un sistema de salud, con el propósito de que "reflejara una convergencia entre los valores de la APS, las expectativas de los ciudadanos y los retos comunes del desempeño en salud que son transversales en todos los contextos"; para ello, los sistemas de salud deberían incluir cuatro tipos de reformas que comprendieran avances en: 1) cobertura universal, para asegurar la contribución a la equidad en salud; 2) provisión de servicios, reorganizándolos con base en las necesidades y expectativas de la población y centrando el sistema de salud en la persona; 3) políticas públicas, para integrar acciones de salud pública con la APS mediante intervenciones intersectoriales para protección de las comunidades, y 4) liderazgo inclusivo y participativo para dar respuesta a la complejidad actual de los sistemas de salud. En este modelo se ubica a la APS como el componente del sistema de salud que coordina la respuesta integradora de todos los niveles de atención.[1]

La Conferencia Mundial sobre APS, celebrada en Astana (Kazajstán) en octubre de 2018, aprobó una nueva declaración que enfatiza el papel fundamental de la APS en todo el mundo. La declaración tuvo como objetivo reorientar los esfuerzos en la APS para garantizar que todas las personas, donde quiera que se encuentren, puedan disfrutar del más alto nivel de salud posible. La nueva declaración ha renovado el compromiso político con la APS por parte de gobiernos, organizaciones no gubernamentales, organizaciones profesionales, instituciones académicas y organizaciones mundiales de salud y desarrollo.[9]

Distinción con salud pública. Cómo se integran los abordajes de salud pública y APS

Recientemente, el impacto de la pandemia por Covid-19 en todos los ámbitos de la vida derivó en el análisis de las estrategias que se requiere impulsar para promover sistemas de salud desde el enfoque de la resiliencia. A partir de esta perspectiva, la resiliencia de un sistema de salud se define como "la capacidad de los actores, instituciones de salud y poblaciones para prepararse y responder efectivamente a crisis, mantener sus funciones y reorganizarse con base en las lecciones aprendidas si las condiciones lo requieren".[10] Para ello, se considera que un sistema de salud resiliente debe cumplir características para la identificación de riesgos, para ofrecer servicios que respondan a las necesidades y expectativas de la población, para su autorregulación, integración y adaptación a los cambios.[11] Lo anterior evidencia la necesaria integración de la APS con la salud pública, lo cual había sido uno de los manifiestos propuestos por la OMS desde 2008 como una de las reformas necesarias en las políticas públicas de los sistemas de salud; desde el marco de las funciones esenciales de la salud pública, ésta se define en términos de intervención colectiva o comunitaria, a diferencia de la atención primaria, la cual se enfoca en individuos e incluye tanto al estado como a la sociedad para proteger y mejorar la salud de la población; en ese sentido se definen las propias funciones esenciales.[12] El amplio debate sobre los límites de la salud pública y la atención primaria ha llevado a adoptar el concepto de servicios integrales de salud, entendido como "acciones poblacionales o individuales, cultural, étnica y lingüísticamente apropiadas, con enfoque de género, que toman en consideración las necesidades diferenciadas para promover la salud, prevenir las enfermedades, prestar atención a la enfermedad y ofrecer los cuidados de corto, mediano y largo plazo necesarios".[12] Al conciliar ambos conceptos se logra una armonización dirigida a la conformación de sistemas de salud resilientes, bajo un modelo transversal de APS con el propósito de mantener y proteger los logros de la salud pública[13] y la importancia de integrar en la discusión de la reorganización de los sistemas de salud a las renovadas funciones esenciales de la salud pública, las cuales abarcan desde promoción de la salud y prevención de enfermedad, hasta la búsqueda de evidencia científica en salud pública.

Niveles de atención vs. APS

Por último, en esta revisión es importante mencionar el mal uso indistinto de los conceptos APS y "primer nivel de atención", lo que hace necesario establecer las diferencias entre ambos. En contraparte del concepto de APS ampliamente revisado en los apartados anteriores, el término "niveles de atención" se refiere al ordenamiento y estratificación de los servicios de salud de acuerdo con su grado de complejidad. Sobre todo, se distingue el primer nivel, el cual se refiere a servicios de baja complejidad generalmente ambulatorios, organizados para resolver la demanda de atención

más frecuente y usualmente prestados, de acuerdo con el tipo de demanda, por personal de salud específico (por ejemplo, actividades de promoción de la salud, prevención o atención curativa). El segundo nivel de atención corresponde a hospitales generales y el tercer nivel, a hospitales de alta especialidad.[14]

Situación del sistema de salud de México

El sistema de salud de México está encabezado por la Secretaría de Salud, la cual, desde el Consejo de Salubridad General, funge como órgano rector que dicta las políticas y programas de salud a los dos sectores que lo componen: el público y el privado.

El sector público de salud está integrado por dos subsistemas:

1) Aquel que atiende a población cubierta por la seguridad social, desde varias instituciones que otorgan servicios de salud a trabajadores formales y sus familias, además de prestaciones económicas y sociales. El Instituto Mexicano del Seguro Social (IMSS), como institución pública de seguridad social, es el principal subsistema de salud en México; en 2021 reportó una cobertura para 71.6 millones de personas.[15] Es una institución con organización y financiamiento tripartito entre empleadores, trabajadores de acuerdo con su salario y fondos gubernamentales, cuyas aportaciones permiten la provisión de los beneficios sin costo adicional para la población afiliada. Los servicios de salud del IMSS se encuentran organizados en tres niveles de atención: primer contacto en clínicas denominadas Unidades de Medicina Familiar (UMF); hospitales generales como segundo nivel, y hospitales de alta especialidad en el tercer nivel. Las UMF se han definido como "los espacios en los que se otorgan acciones de primer nivel de atención tales como consulta dental, medicina preventiva, planificación familiar, trabajo social, nutrición y dietética, salud en el trabajo, laboratorio clínico y rayos X".[16] Sin embargo, se carece de un modelo de APS que sustente la atención en este nivel.[17]
2) Aquél dirigido a población sin seguridad social, bajo la responsabilidad de la propia Secretaría de Salud, la cual coordina directamente servicios hospitalarios de alta especialidad y hasta 2023 a los servicios estatales de salud, principalmente mediante la provisión de atención de primer y segundo nivel, con organización propia en cada estado del país y con financiamiento del presupuesto federal y aportaciones de los estados. Adicionalmente, el Programa IMSS-Coplamar (actualmente Programa IMSS-Bienestar) desde 1979 se instauró como un programa de salud del Gobierno Federal administrado por el IMSS para responder a las necesidades de salud de la población, principalmente en áreas rurales del país, la más vulnerable en términos de riesgos y daños a la salud derivados de la pobreza extrema. Este programa lleva a cabo la provisión de servicios mediante el diseño e implementación de estrategias para la atención en unidades de salud y con acciones comunitarias participativas mediante el Modelo de Atención Integral a la Salud, el cual es la base para su operación. Este modelo tiene como fundamento la acción conjunta entre servicios y comunidad con énfasis en la prevención de riesgos y daños, lo que es coherente con los principios de la APS, como la respuesta para la "promoción, prevención, curación y atención conjunta de manera segura, efectiva y socialmente productiva en la interfase

Recomendaciones

- La implementación de un verdadero modelo de APS requiere la reorganización completa de los servicios y un enfoque intercultural de los determinantes sociales de salud, cuyo eje central sea la familia y la comunidad, con un objetivo de promoción y prevención, mediante equipos de salud interdisciplinarios con alta capacidad resolutiva, a través de atención centrada en las personas y las comunidades.
- Para lograrlo, el modelo deberá modernizar la infraestructura incorporando tecnologías en salud, un sistema unificado de información para hacer factible la implementación de redes integradas de servicios y una alta capacidad de gobernanza para el trabajo interinstitucional e intersectorial para la salud.
- Es indispensable, asimismo, garantizar una inversión financiera suficiente, pero mayor a 3% del PIB, e inversión en capital humano para reorientar las competencias profesionales hacia la atención primaria.

entre la población y el sistema de salud". El financiamiento del programa proviene del gobierno como un subsidio federal y los recursos económicos son administrados de manera separada del presupuesto global del IMSS, con independencia en su manejo y operación.[18] A partir de 2024 se estableció un organismo público descentralizado denominado Programa Institucional de Servicios de Salud del Instituto Mexicano del Seguro Social para el Bienestar (IMSS-BIENESTAR) 2023-2024, que centraliza la atención y, entre otros objetivos, establece el modelo MAS-Bienestar basado en los principios de la APS para la atención de las personas sin seguridad social (programa en transición hasta abril de 2024).[19]

En México, durante las últimas administraciones se implementaron servicios de salud adicionales a los ofertados por los servicios estatales de salud, basados en un paquete básico de intervenciones en salud para población carente de seguridad social. Se crearon programas focalizados para resolver problemas de salud específicos, tales como las Unidades de Especialidades Médicas (Unemes) en cáncer de mama, diabetes mellitus y otras. Aunado a lo anterior, no hubo inversión de capital humano con perspectiva poblacional y preventiva y, lo más importante, no se integró el modelo APS en el sistema nacional de salud. Asimismo, el sistema público de salud de México se orientó durante mucho tiempo desde un enfoque desproporcionado en la atención curativa especializada; baste ver la distribución de presupuestos para atención hospitalaria vs. atención primaria.[20]

El sector privado está conformado por proveedores de servicios organizados en consorcios, principalmente hospitalarios, que atienden población con capacidad de pago directo o a través de aseguradoras privadas.[21] Asimismo, existe una amplia oferta de consultorios médicos independientes y, en la última década, una modalidad cada vez más extensa de consultorios adjuntos a farmacias para provisión de servicios de bajo costo, los cuales están mal regulados y no garantizan una calidad de atención adecuada.[22,23]

Dilemas a enfrentar a corto plazo para la implementación de un modelo de APS

El panorama del sistema de salud de México refleja la necesidad y la invaluable oportunidad de dirigirse hacia su transformación con una nueva perspectiva de sistema de salud integrado, universal, gratuito al punto de contacto, de calidad y sostenible, con un compromiso explícito de equidad social y con base en un modelo de APS. Esto tiene como propósito favorecer el ejercicio pleno del derecho universal a la salud. Para alcanzar esta meta, será necesario suprimir un sistema de salud fragmentado y basado en estatus laboral que funciona desde hace 70 años en México, para lo cual se requerirá realizar una inversión financiera suficiente, pero mayor a 3% del producto interno bruto (PIB), y en capital humano para reorientar las competencias profesionales hacia la APS. Debe tenerse en cuenta que esta reorientación es un proceso iterativo, complejo y de largo plazo y que no existe un "modelo ideal", ya que el contexto histórico, político y cultural es único para cada país.

En el horizonte de una integración del sistema de salud en México, éste debe tener un carácter conceptual hacia la equidad para el logro del acceso efectivo. Cuando se discute la necesidad de la universalización, pero particularmente de integración de los servicios de atención a la salud, la perspectiva parte de la promoción de su integralidad desde la APS, independientemente de las necesidades de salud de las personas al inicio del proceso de atención. Un beneficio obtenido recientemente para la población no derechohabiente es la gratuidad, lo que sin duda contribuye a la eliminación de inequidades económicas en el acceso a la salud; en el futuro inmediato se debe incidir en la sostenibilidad del sistema para promover la equidad generacional.

En síntesis, en el contexto de México se requiere seguir trabajando hacia la transformación del sistema orientada al acceso universal y la protección social en salud, con un enfoque intercultural y hacia determinantes sociales de salud, cuyo eje central sea la familia y la comunidad, con un enfoque de promoción y prevención, mediante equipos de salud interdisciplinarios con alta capacidad resolutiva a través de atención centrada en las personas y las comunidades. De igual forma, el modelo deberá apoyarse en una modernización de la infraestructura para cumplir sus objetivos, incorporando tecnologías en salud, un sistema unificado de información para hacer factible la implementación de redes integradas de servicios y alta capacidad de gobernanza para el trabajo interinstitucional e intersectorial para la salud. En toda esta visión, la APS debe ser el eje que coordine la respuesta en salud en todos los niveles. A fin de cuentas, en todo este enfoque la inversión en APS ofrecerá un elevado retorno social.

Conclusión

El enfoque de la APS puede constituirse en un eje conductor para alcanzar finalmente los objetivos de equidad, acceso efectivo y protección financiera. Tiene probada capacidad de mejorar la salud de las poblaciones y fortalecer la resiliencia del sistema. El mayor nivel de salud posible para todas las personas debe ser una realidad.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Word Health Organization. Primary health care: now more than ever. The World Health Report 2008. Ginebra: WHO, 2008 [citado febrero 2024]. Disponible en: https://iris.who.int/handle/10665/43949
2. Dawson Report: sixty years after the high hopes of 1920. Health Soc Serv J. 1980;90(4693):638-40.
3. Scheffler RM, Weisfeld N, Ruby G, Estes EH. A manpower policy for primary health care. New Engl J Med. 1978;298(19):1058-62 https://doi.org/10.1056/NEJM197805112981905
4. World Health Organization, United Nations Children's Fund. Primary Health Care. Report of the International Conference on Primary Health Care. Alma-Ata, USSR, 6-12 September 1978. Ginebra: WHO, Unicef, 1978 [citado febrero 2024]. Disponible en: https://iris.who.int/handle/10665/39228
5. Yip W, Fu H, Jian W, Liu J, Pan J, Xu D, *et al*. Universal health coverage in China part 1: progress and gaps. Lancet Public Health. 2023;8(12):e1025-34. https://doi.org/10.1016/S2468-2667(23)00254-2
6. InformedHealth. Health care in Germany. Colonia, Germany: Institute for Quality and Efficiency in Health Care, 2006 [citado febrero 2024]. Disponible en: https://www.ncbi.nlm.nih.gov/books/NBK298834/
7. World Health Organization. A global review of primary health care: emerging messages: Global Report. Geneva, Switzerland: WHO, 2003 [citado febrero 2024]. Disponible en: https://apps.who.int/iris/bitstream/handle/10665/70199/WHO_MNC_OSD_03.01_eng.pdf
8. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. Milbank Q. 2005;83(3):457-502. https://doi.org/10.1111/j.1468-0009.2005.00409.x
9. World Health Organization. Declaration of Astana. Global Conference on Primary Health Care. Astana, Kazakhstan, 25-26 october 2018. World Health Organization, 2019 [citado febrero 2024]. Disponible en: https://www.who.int/publications/i/item/WHO-HIS-SDS-2018.61
10. Kruk ME, Myers M, Varpilah ST, Dahn BT. What is a resilient health system? Lessons from Ebola. Lancet. 2015;385(9980):1910-2. https://doi.org/10.1016/S0140-6736(15)60755-3
11. Kruk ME, Ling EJ, Bitton A, Cammett M, Cavanaugh K, Chopra M, *et al.* Building resilient health systems: a proposal for a resilience index. BMJ. 2017;357:j2323. https://doi.org/10.1136/bmj.j2323
12. Organización Panamericana de la Salud. Las funciones esenciales de la salud pública en las Américas. Una renovación para el siglo XXI. Marco conceptual y descripción. Washington, DC: OPS, 2020 [citado febrero 2024]. Disponible en: https://iris.paho.org/bitstream/handle/10665.2/53125/9789275322659_spa.pdf?sequence=1&isAllowed=y
13. Organización Panamericana de la Salud, Organización Mundial de la Salud. 59.º Consejo directivo. 73.ª Sesión del comité regional de la OMS para las Américas. OPS, OMS, 2021 [citado febrero 2024]. Disponible en: https://www.paho.org/es/documentos/cd5911-estrategia-para-establecimiento-sistemas-salud-resilientes-recuperacion-etapa
14. Vignolo J, Vacarezza M, Álvarez C, Sosa A. Niveles de atención, de prevención y atención primaria de la salud. Arch Med Int. 2011;33(1):11-14 [citado febrero 2024]. Disponible en: http://www.scielo.edu.uy/pdf/ami/v33n1/v33n1a03.pdf
15. Instituto Mexicano del Seguro Social. Informe al Ejecutivo Federal y al Congreso de la Unión sobre la situación financiera y los riesgos del Instituto Mexicano del Seguro Social 2021-2022. Ciudad de México: IMSS, 2022 [citado febrero 2024]. Disponible en: https://sntss.org.mx/filesUpdates/presenta-imss-informe-financiero-y-de-riesgos-al-congreso-de.pdf
16. Instituto Mexicano del Seguro Social. Programa Institucional del Instituto Mexicano del Seguro Social 2014-2018. México: IMSS, 2014 [citado febrero 2024]. Disponible en: http://www.imss.gob.mx/sites/all/statics/pdf/PIIMSS_2014-2018_FINAL_230414.pdf
17. Instituto Mexicano del Seguro Social. Programa Institucional del Instituto Mexicano del Seguro Social 2020-2024. México: IMSS, 2020 [citado febrero 2024]. Disponible en: https://www.imss.gob.mx/sites/all/statics/pdf/transparencia/rendicion/PIIMSS-2020-2024-VF.pdf
18. Gobierno de México. Sitio del Programa IMSS-Bienestar. México: Gobierno de México, 2024 [citado febrero 2024]. Disponible en: https://www.imss.gob.mx/imss-bienestar
19. Gobierno de México. Programa Institucional de Servicios de Salud del Instituto Mexicano del Seguro Social para el Bienestar (IMSS-Bienestar) 2023-2024. México: DOF, 2024 [citado febrero 2024]. Disponible en: https://www.dof.gob.mx/nota_detalle.php?codigo=5714544&fecha=17/01/2024&print=true#:~:text=Posteriormente%2C%20el%2029%20de%20mayo,de%20salud%20a%20la%20poblaci%C3%B3n
20. Instituto Nacional de Estadística y Geografía. Cuenta satélite del sector salud de México, 2021. Comunicado de prensa 779/22. México: Inegi, 2022 [citado febrero 2024]. Disponible en: https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2022/CSSS/CSSS2021.pdf
21. Gómez-Dantés O, Sesma S, Becerril VM, Knaul FM, Arreola H, Frenk J. Sistema de salud de México. Salud Publica Mex. 2011;53(supl 2):S220-32 [citado febrero 2024]. Disponible en: https://saludpublica.mx/index.php/spm/article/view/5043/4869
22. Pérez-Cuevas R, Doubova SV, Wirtz VJ, Servan-Mori E, Dreser A, Hernández-Ávila M. Effects of the expansion of doctors' offices adjacent to private pharmacies in Mexico: secondary data analysis of a national survey. BMJ Open. 2014;4(5):e004669. https://doi.org/10.1136/bmjopen-2013-004669
23. Bautista-Arredondo S, Vargas-Flores A, Moreno-Aguilar LA, Colchero MA. Utilización de servicios de salud en México: cascada de atención primaria en 2022. Salud Publica Mex. 2023;65(supl 1):S15-22. https://doi.org/10.21149/14813

Health Policy and Planning, **37**, 2022, 1278–1294
DOI: https://doi.org/10.1093/heapol/czac055
Advance access publication date: 7 July 2022
Original Article

Local health systems resilience in managing the COVID-19 pandemic: lessons from Mexico

Clara Juárez-Ramírez[1], Hortensia Reyes-Morales[2,*], Gaudencio Gutiérrez-Alba[3], Diana L. Reartes-Peñafiel[4], Sergio Flores-Hernández[5], José Alberto Muños-Hernández[3], André Escalante-Castañón[6] and Miguel Malo[7]

[1]Center for Health Systems Research, National Institute of Public Health, 7a privada de Fray Pedro de Gante, Sección XVI, CDMX 14000, México
[2]Center for Health Systems Research, National Institute of Public Health, Av. Universidad 655, Col. Santa María Ahuacatitlán, Cuernavaca, Mor. CP 62100, Mexico
[3]Instituto de Ciencias de la Salud, Universidad Veracruzana, Luis Castelazo Ayala s/n, Col. Industrial Animas, C.P., Xalapa, Veracruz 91190, México
[4]Independent Consultor, 2a cerrada del Observador, Devisadero, Tlalpan, CDMX 14430, México
[5]Dirección de Estadística CIEE, Instituto Nacional de Salud Pública, Av. Universidad 655 Col. Santa María Ahuacatitlán, Cuernavaca, Morelos, CP 62100, México
[6]Independent Consultor, Av. Venustiano Carranza 1115, C.P., San Luis Potosí, Tequisquiapan 78230, México
[7]Pan American Health Organization, Montes Urales 440, Lomas Virreyes. C.P., Ciudad de México 11000, México

*Corresponding author. Center for Health Systems Research, National Institute of Public Health, Av. Universidad 655, Col. Santa María Ahuacatitlán, Cuernavaca, Mor. CP 62100, Mexico. E-mail: hortensia.reyes@insp.mx

Accepted on 6 July 2022

Abstract

The concept of *resilience* was applied to the public health field to investigate the way health systems are impacted by health crises, what conditions allow them to mitigate the blow and how they reorganize once the crisis is over. In 2020, the COVID-19 pandemic caused by the SARS-CoV-2 virus represented a global challenge demanding immediate response to an unprecedented health crisis. Various voices drew attention to the intensity of the crisis in countries with greater inequalities, where the pandemic converged with other social emergencies. We documented the experiences of health personnel who faced the pandemic at the primary care level while simultaneously maintaining the functioning of other areas of medical care. Our results derived from a qualitative study comprising 103 participants from five states of Mexico. We aimed to show through inferential analysis their perspective on what we call 'the resilience of local health systems'. We observed three stages of experience during the crisis: (a) Preparation (official guidelines received to organize care, training and planning of epidemiological surveillance); (b) Adaptation (performance of community-based prevention activities, infrastructure modifications, telehealth); and (c) Learning (participatory governance with city councils, business sector and organized population). The study suggests that the local health systems analysed benefited from the initiatives of health personnel that in some cases positively exceeded their duties. In terms of the resilience analysis, they were able to handle the impact of the crisis and cope with it. Their transformative capacity came from the strategies implemented to adapt health services by managing institutional resources. Their experience represents a lesson on the strengthening of the essential functions of health systems and shows a way to address successfully the increasingly complex health challenges of the present and future times.

Keywords: Health systems resilience, COVID-19, qualitative study, Mexico

Introduction

Resilience is the ability of any material to recover its original shape or state after being subjected to deformation by an external force. In Psychology (Werner, 1989; Cyrulnik, 2001), this concept has been used metaphorically to study the processes whereby people who have endured extremely adverse experiences can return to their normal lives. The experiences lived by those people can be divided into three stages: impact (a shock that causes a crisis), adaptation and learning (Brand and Jax, 2007). The concept of resilience has been applied to the field of public health to study how health systems receive the shock of health crises, what conditions allow them to absorb the blow and how they reorganize once the crisis is over; all this while maintaining the same characteristics of care provision (Giarelli, 2020; Davis, 2021). Although there are some variations in the definition of resilience within the public health field, it is generally understood as the ability of health actors, institutions and the population to prepare and respond effectively to crises, while the health system maintains its essential care functions during the crisis and from the lessons learned reorganizes itself to obtain favourable health results (Kruk *et al.*, 2015).

In the public health context, the concept of resilience has been used to study some epidemics that emerged during the first two decades of the 21st century, namely severe acute respiratory syndrome (SARS), Ebola and Zika, which

© The Author(s) 2022. Published by Oxford University Press in association with The London School of Hygiene and Tropical Medicine. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Health Policy and Planning, 2022, Vol. 37, No. 10 **1279**

Key messages

- The preparedness of health personnel is key in the resilience of local health systems to face health crises and develop strategies to maintain continuity in care.
- The implementation of a variety of responses is necessary to address population needs and problems in different contexts, i.e. social violence, migratory movements, natural disasters, among others.
- The main challenges occur at the local level, such as the need to devise strategies to adapt care and prevention of contagion risk using existing resources in rural areas.
- The collaboration between local health systems and different social actors is essential for the emergence of a participatory governance that must include sustainability mechanisms.

tested health systems in some regions of the world and showed the fragility of some countries to cope with public health emergencies. In 2020, the COVID-19 pandemic caused by the SARS-CoV-2 virus represented a global challenge that demanded immediate response to an unprecedented health crisis through public policies particular to each country according to its context and resources. In 2020, the World Health Organization (WHO) stated that 'building resilience is a key factor in promoting and protecting health and well-being at both the individual and community levels' (World Health Organization, 2021). Highly effective strategies aimed at keeping the essential functions of health systems have been developed, mainly based on four components linked to the concept of resilience, which are (1) activation of governance mechanisms, (2) adaptation of existing resources both on health personnel and on medical products and technology, (3) offering of health services and (4) actions on public health to reduce the vulnerability derived from infection risks (Haldane *et al.*, 2021).

In 2005, the WHO established the International Health Regulations (IHRs) as 'a legal framework for the management of acute public health events of potential or actual national and international concern' (World Health Organization, 2008) The IHR are pertinent as a tool to identify the strengths and weaknesses of a health system response to the COVID-19 pandemic. The IHR have been a reference for the development of evaluation proposals aimed to assess the capacity of health systems to prepare for and respond to health emergencies. One of these regulations is the resilience index, which consists of five requirements: (1) recognition of the strengths and weaknesses of the health system itself with respect to its population context, (2) diversity to respond effectively and with financial protection to the health needs of the population, (3) self-regulation to coordinate between services and adapt care models according to the moment of crisis, (4) integration with a governance approach to achieve social commitment and (5) adaptation for an organized and timely response (Kruk *et al.*, 2017).

Several authors, however, have pointed to the deeper crisis represented by the COVID-19 pandemic in countries with greater social inequalities, such as those in the Latin American region (Etienne *et al.*, 2020; The Lancet Editorial, 2020). There, the pandemic converged with other social emergencies, putting additional pressure on health systems to address complex health issues because of population dynamics, inadequate infrastructure and the diversity of epidemiological contexts.

Mexico has suffered the impact of the COVID-19 crisis with a high cost in human lives. The high prevalence of non-communicable diseases (NCDs) in the country has caused a syndemic rather than a pandemic (Hernández, 2020). From the beginning of the pandemic up to April 2022, more than 400 000 deaths and more than 5 million cumulative cases had been reported, with a mortality rate of 2.2 deaths per thousand inhabitants (National Institute of Public Health, 2022). Furthermore, the percentage increase in total deaths (compared with the average of 2015–2019) represented more than 50% of excess mortality, the highest among the countries from the Organization for Economic Co-operation and Development (OECD, 2021). In Latin America and the Caribbean Region, the case-fatality rate has been averaged at 3.4%, whereas Mexico has reported a lethality of 16.6% (Schwalb *et al.*, 2022).

The emerging response had to be activated from a fragmented health system model in a country with 126 million inhabitants in conditions of socioeconomic disparity. In Mexico's public health system, the population affiliated to social security, represented by formal workers and their families, receive health care services without restriction, funded by employers, employees and the government. On the other hand, the population without this benefit, who constitute almost half of the population with lower income, are served by state and federal government institutions or must resort to private services and bear out-of-pocket expenses (Shamah-Levy *et al.*, 2020). In this context, since the beginning of the COVID-19 pandemic, the Ministry of Health implemented response strategies, which were adapted throughout 2020 and 2021, and based on scientific evidence, international guidelines and weekly epidemiological information on national cases and deaths. Yet, flaws in the decision-making process and in the model for emergency management have been documented, such as inaccuracies of the surveillance system and low rates of proactive testing, case identification and contact tracing (Institute for Global Health Sciences, 2021).

One of the main objectives stated in the COVID-19 response guidelines of the public health system was not to exceed the hospital capacity for the care of cases, given the serious difficulties represented by weak infrastructure and a lack of health personnel. This situation worsened in public services for the population without social security—vulnerable in economic and demographic terms—mainly for residents of marginalized rural communities. In a centralized context of public health policies, the State Health Services (SHS), responsible in each of the 32 states of the country for the care of this population, but with little decision-making capacity to participate in the planning of health programmes, implemented the guidelines established at the federal level. Nevertheless, they designed some local care strategies to address the needs of the population with fewer resources. In this context, health personnel carried out prevention activities, detected and cared for cases of COVID-19 and at the same time kept essential health services working, which represented a great challenge.

Health personnel are the backbone of health systems and are key to achieve service delivery, yet there is a knowledge

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

gap on how they coped with the pandemic while performing at the same time their daily work. This article presents partial results of an extensive study aimed to recover the experience of different types of health personnel who faced the challenge of providing community and ambulatory care during the COVID-19 health crisis. Here we present only findings on the 'resilience' category that emerged from the data inferential analysis. We are interested in contributing to the debate proposed by Saulnier (Saulnier *et al.*, 2021) about the need to build a research agenda on the resilience of post-pandemic health systems, recovering evidence on how the impact of crises is absorbed at the microsocial level, and how health systems adapt and transform.

Material and methods

Study design and population

This is a qualitative, exploratory study (Denzin and Lincoln, 2011).

For this study, a 'local health system' is understood as a health-focused organization of the state government working within a territorial delimitation (states) with its own health service infrastructure and organizational structure. In Mexico, this structure is divided into Health Jurisdictions (HJs), which are technical-administrative departments varying in complexity; they are responsible for the operation of health care programmes at the district level. An HJ can territorially group one or several municipalities in rural and urban areas. The local health system also manages regulations for the provision of public and private health services. It coordinates and allocates health resources for their best use, which are own resources—human, material, financial, information systems—and those coming from the federation.

Initially, seven states from Northern, Central and Southern Mexico were selected because of their diversity of social, environmental and populational contexts (border, sea and mountain regions, including migrant population, indigenous population and itinerant day labourers). Of these, five states agreed to participate in the study, two in the North region, one in the Southeast region, one in the Gulf of Mexico and one in the Yucatan Peninsula (Instituto Nacional de Estadística, Geografía e Informática (INEGI), 2021). Afterwards, a sample of different types of health personnel who worked in public health services and provided care to population not affiliated to social security was selected (Figure 1).

Sample selection

SHS management was contacted to explain to them the objectives of the study and the interest of analysing a variety of health personnel's experiences in both urban and rural areas. Data from the states were reviewed and three HJs from each state were chosen for a total of 15 HJs. Next, a purposive sample of state managers and health workers responsible for HJs was chosen. Likewise, medical units of ambulatory care were selected in rural and urban areas (39 in total; urban area 21, rural 18). In these medical units, different types of health personnel were chosen to have a sufficient variety of viewpoints regarding the care provided to the population during the health emergency. The main inclusion criterion was to be a health worker performing community activities focused on prevention of COVID-19 infection risk, detection of cases (COVID-19 home screening), remote care for uncomplicated cases staying at home and referral of complicated



Figure 1. Map of México

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Health Policy and Planning, 2022, Vol. 37, No. 10 **1281**

Table 1. Type of health personnel interviewed, working profile and area of influence

URBAN AREA	State 1	State 2	State 3	State 4	State 5	Total
URBAN AREA						
Health managers	5	4	3	9	4	25
Medical personnel	7	5	4	2	3	21
Nursing personnel	1	5	2	2	2	12
Promoters	1	7	1	5	[a]	14
RURAL AREA						
Medical personnel	1	2	4	4	5	16
Nursing personnel	[a]	[a]	5	4	2	11
Promoters	[a]	[a]	–	2	2	4
TOTAL	15	23	19	28	18	103

[a]Source: Own elaboration based on interviews according to rural or urban area.

cases to designated hospitals. The sample totalled 103 participants and consisted of health managers, medical staff (responsible for clinical care), nursing personnel (in charge of preventive actions) and health promoters (who carried out community-based health promotion). (Table 1).

Data collection and instrumentation

Data were collected between December 2020 and August 2021. The main technique used to gather information was the semi-structured qualitative interview. Guides were elaborated by type of health worker (health managers, medical personnel, nursing personnel, health promoters), designation (HJs, community health brigades, health centres) and interviewees' place of work (rural or urban area). The guides were organized into two thematic axes. The first axis explored aspects of the reorganization of health care services from the start of the pandemic and included the following topics: coordination for medical care, infrastructure adaptations, prevention activities to avoid the risk of COVID-19 infection, referral of cases, protection equipment for health personnel (masks, sanitation measures), support for health personnel, human resources situation and coordination with other government and civil society sectors to address the pandemic. The second axis explored barriers and challenges to face the pandemic and was disaggregated into the following themes: continuity of priority health care programmes (immunization for children under five years of age, care for chronic diseases, reproductive health), challenges for care during the pandemic and recommendations to keep coping with the pandemic.

All interviews were conducted by video calls due to sanitary restrictions in the states to carry out face-to-face activities. This facilitated the access to very remote rural areas that under normal conditions are difficult to reach, although there were also connectivity limitations. The interviews lasted on average 30 to 90 minutes; all of them were audio-recorded and transcribed verbatim.

Data analysis

The perspective of the Constructivist Grounded Theory was used for the analysis of the data (Charmaz, 2006). From the interview guides, first, two types of information concentrates were elaborated according to the thematic axes, i.e. by interviewee's type of health work and by topic explored. Later, content analysis of the interview transcripts was performed manually. The transcripts were coded by analysing line by line (Glaser and Strauss, 1967; Strauss and Corbin, 1997). Six categories (initial codes) were constructed, from which 19 sub-categories (focused coding) were derived (see description of each thematic category in code tree SM-1). Subsequently, the interconnections between the codes were analysed to construct categories that grouped the experiences narrated by the interviewees according to the coincidences between the situations. In this way, the theoretical category 'resilience' was constructed, which analyses the capacity of the interviewed health care actors to prepare, adapt and respond in a coordinated manner to the challenge of prevention and care for cases of SARS-Cov-2. This category consisted of three codes (theoretical codes): Preparation for the health crisis; Adaptation and Management of the pandemic; and Learning, to which some of the above subcategories were integrated (see description of each thematic category in code tree SM-2).

Ethical aspects

The interviews were conducted after prior verbal informed consent. The principles of research ethics stated in the Declaration of Helsinki (World Medical Association, 2013) were followed. As this is a sensitive matter, the names of the states and villages where the fieldwork was carried out and of the health personnel who agreed to be interviewed have been removed.

Results

The health crisis has not ended. As of the time of closing our study, adjustments were still being made to deal with the pandemic. The health personnel interviewed had the experience of the first wave of infections and the beginning of the second. It has been a heterogeneous learning process that overlaps according to the context of their place of work (rural or urban) and the human and material resources available.

We organized the results of the study into three stages: Preparation, Adaptation and Learning. Tables 2 and 3 show in more detail how the pandemic was addressed and how the situations presented in the rural and urban scenarios were solved, according to the level of responsibility of the actors interviewed. Figure 2 illustrates the dynamic interaction between the three stages, i.e. the circumstances of uncertainty, disruptions and feedback through the flow and movement of the system.

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Preparation for the health crisis

The HJs are organized as follows: the care areas and the number of health staff working in each medical unit of primary care level depend on the population served in a determined territory and the size of the unit. In rural units, there is a single basic nucleus (BN) consisting of a doctor and one or two nurses. In urban units, in cities with a large population, the medical services consist of three doctors and up to 14 NB. Additionally, they may have personnel of health promotion, nutrition, dentistry, psychology or laboratory services, including social service staff for each of these care areas, distributed at different working hours. This is important to note because the planning of services at the managerial level responded to the needs of health personnel in those terms.

The process followed

For explanatory purposes, we defined three stages of preparation according to the narrative of the interviewees at the managerial level to show a part of the process followed. In practice, however, these stages overlapped since the emergency response measures were not taken in all the states at the same time. *First stage:* This was characterized by surprise once the national epidemiological system gave the alert. The states began designing local guidelines to organize care using the existing scientific evidence, but there was no glimpse of what the impact of the virus might be. This occurred around the world during the first months of the pandemic. *Second stage:* From the arrival of the first case to Mexico and the increase in infections, the pandemic was formally recognized in the country. In the states, training for teams of health professionals was intensified, preventive measures were disseminated to the population and medical facilities were prepared. Actions diversified as more evidence-based information was available. *Third stage:* This began in March 2020, when severe cases and deaths from COVID-19 increased. The situation led to lockdown (closure of non-essential economic activities and schools) and made medical care more difficult.

Training

The strategy for the training of medical and nursing personnel, as well as of health promoters, was developed in three directions. They received permanent virtual training through videoconferences on (1) recognition of warning signs to detect symptoms and cases, handling of the disease and follow-up and referral of cases to hospital; (2) adaptation of infrastructure of medical units to prevent infections; and (3) organization of health personnel under their charge to carry out community preventive measures and show them how to use personal protective equipment (PPE), such as face shields, masks, gloves and goggles.

Planning for epidemiological surveillance

States with virtual platforms for epidemiological registration adapted them for the control of COVID-19 cases (State 4); otherwise, they used paper formats and reported via telephone or email (State 2). In both circumstances, responsibilities were appointed to report results daily more efficiently at the national level. Call centres were established; staff were assigned to answer calls and guide people on identification of symptoms and referral to hospitals (State 1, State 3). In all states, mobile health teams were set up to take samples. At the state level, health promoters were assigned to integrate community COVID-19 screening teams during the stage when more infections were detected.

Adoption of measures and adaptation against adversity: 'making more with less'

Supplies for care

At the start of the pandemic, one of the biggest concerns of health personnel was protection from infection. During the first few months, PPE was slow to reach medical units, especially in rural areas. Health personnel reported using their own resources to buy PPE and disinfectant products. Later, PPE was supplied from the state level. For nursing personnel and health promoters, the equipment received consisted of masks and disinfectant products. Doctors, due to close contact with patients, received gowns, goggles or face shields. As cases increased, more PPE was needed, and shortage occurred in rural areas. Health personnel used their own money to buy more PPE, such as three-layer masks.

Community prevention activities for COVID-19

Several actions were carried out depending on the stage of the pandemic. As a first action, educational material was prepared and information on how to prevent infection (handwashing, use of masks and alcoholic gel) was distributed. Health teams were integrated to give prevention information in key places, such as markets, schools, shopping centres and transport hubs. Social networks were also used for dissemination of information on the pandemic. With the increase in cases, other strategies were added. COVID-19 screening stations were installed at state and municipal borders and in bus stations and airports; test samples were taken in some places. After lockdown, health teams reduced the number of prevention activities to avoid infection. In some medical units these activities continued only inside the facilities.

The role of health promoters and nursing personnel was key to COVID-19 prevention and care activities in urban and rural areas. Overall, preventive activities were carried out in urban areas without great difficulty. In rural areas, however, where most of the medical units are small and have few health personnel, the prevention actions underwent some adjustments. For example, administrative staff had to participate in some units. In states with indigenous population, nurses who spoke the indigenous language distributed prevention information. Also, some states prepared educational materials on prevention measures in indigenous languages. In the northern states of the country, prevention work extended to the migrant population, agricultural day labourers and textile factory workers.

Care of COVID-19 cases in outpatient medical units

Once training was received, infrastructure adaptation in medical facilities was the following step. Screening stations were set up to measure body temperature and provide hand sanitizer to each person upon entering the facilities. Entry and exit routes were drawn and spaces were marked to maintain the appropriate distance. The medical units that were able to, allocated an exclusive office for the detection of COVID-19 cases and adapted spaces for the taking of PCR tests. All available spaces were used, and some administrative offices were transformed into consultation rooms. In rural areas, warehouses

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 2. Relevant aspects of health personnel management in urban areas to respond coordinately to the impact of the pandemic, by type of health worker, area of influence and examples of testimonies

Explored topic	URBAN AREAS			
Type of health worker	**How did they prepare for the pandemic?**	**How did they cope with the crisis?**	**Interinstitutional–civil society links and collaborations**	**EXAMPLES OF TESTIMONIES**
Health managers	• They trained all health personnel in 'cascade' in issues of prevention and care of COVID-19 cases. The information changed as new scientific evidence became available. • They set up call centres to provide guidance on symptoms, testing sites and referral hospitals. They designed health care centres solely for COVID cases and referral of complicated cases. • They organized epidemiological brigades to carry out home visits, take samples and follow up positive cases. • They installed modules to perform free COVID testing in urban medical units.	• The health teams included administrative staff, workers from the laboratory area and medical, nursing and promoter staff. All participated in different tasks, making up for the lack of human resources due to COVID-related comorbidities or other illnesses.	• COVID-19 cases were treated by social security hospitals and hospitals set up just for COVID treatment. • Hospitals were adapted to receive only cases from remote areas. • A communication network was established between hospitals and reference centres for COVID cases from different institutions.	How did they prepare? [In medical units] 'We trained, and they trained all their staff … they followed up via telephone the cases that we were reporting to them; likewise, if they found a case … they sent us the data to the epidemiology area, and we filled out the epidemiological study of the case by telephone and assessed the sample taking' (female epidemiologist 1, State 2) How did they adapt? 'When transmission decreased a bit, we focused on the most vulnerable groups, over 65 and under five years old. We adopted some strategies … in cases of chronic patients, we chose to follow up via telephone and asked that a relative came for their medication … especially those patients controlled … we gave them treatment for two or three months so that they would not have to come to the health units, thus protecting them' (male [AQ: Where the sex of the respondent was not specified, 'male' has been added. Please confim if this is correct] health manager, State 3) Links and collaborations 'We were working with some non-governmental and government institutions to give all this type of information; we also had meetings with [social security institutions], the Armed Forces and schoolteachers to do all this dissemination … Also with a committee … an intersectoral committee where the Labor Secretariat and the Secretariat of Education participated … we have been very close to them to support them in these activities' (male health manager, State 1)

(continued)

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 2. (Continued)

Explored topic	URBAN AREAS			
Type of health worker	How did they prepare for the pandemic?	How did they cope with the crisis?	Interinstitutional–civil society links and collaborations	EXAMPLES OF TESTIMONIES
Medical personnel	• They installed COVID modules for PCR sampling and rapid testing. • They made censuses of patients with chronic diseases to have control of possible cases. • They planned to follow up positive cases and their contacts via telephone. • They made maps to identify areas with the highest concentration of positive cases. • They set up a call centre to give information. • They implemented screening procedures. • Medical units in cities received more supplies.	• They set up exclusive consultation rooms to see suspected cases. • They formed teams for home visits to pregnant women, children under five years old and patients with chronic diseases. • They assembled teams to search for positive COVID-19 cases house by house. • Staff at risk obtained work leave. • They increased hours of operation in medical facilities. • When necessary, they used their own economic resources.	• Linking with social security institutions to refer COVID-19 cases. • Collaboration with local councils for ambulance use and transfer of patients with complications. • Integration of mobile teams for the dissemination of preventive measures.	How did they prepare? 'Before the health emergency, they started training us because the epidemiologist was notified that an outbreak had started in Wuhan, China … She told us that we were preparing because we were facing an unknown virus, that we would continue doing our activities but that we should stay aware. We hoped that this would not reach us here in Mexico' (female doctor, State 4) How did they adapt? 'We stopped seeing chronic degenerative patients; for them this was a risk. We were seeing them quarterly or every six months depending on how they were. We refilled prescriptions; if they were controlled their relatives came for medication and the nutritionists and social workers followed up patients by phone … Also, pregnant women were scheduled for visits around every three months instead of having a monthly consultation and had an open appointment in case of any problem or any discomfort … Regarding the staff, there are 93–95 workers. We started working by guards, one day yes, one day not to avoid crowding of personnel … nurses, doctors, social workers, guards, promoters, administrators' (male doctor, State 1) Links and collaborations 'We have respiratory disease monitoring units … where you treat exclusively patients with respiratory symptoms. There I got contract staff, a doctor, a nurse and a chemist … Patients' samples are taken, and the epidemiologist is very attentive to all her patients … The complicated cases are referred to the hospital, upon request of an ambulance to the ambulance centre because the health centre does not have one' (female doctor, State 5)

(continued)

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 2. (Continued)

Explored topic	URBAN AREAS			
Type of health worker	**How did they prepare for the pandemic?**	**How did they cope with the crisis?**	**Interinstitutional–civil society links and collaborations**	**EXAMPLES OF TESTIMONIES**
Nursing personnel	• They received training and remained attentive to international information via TV.	• They enabled spaces in courtyards as waiting rooms. • They took random samples. • They helped with epidemiological surveillance. • They performed triage. • They gave COVID results. • They carried out preventive work. • They coordinated case transfers to hospitals. • They generated protocols to vaccinate children under five years of age.	• Areas of influence were distributed by blocks in the colonies, and neighbourhood committees were asked for support. They collaborated by disseminating information, even in indigenous languages.	How did they prepare? 'We received training; then they asked us to replicate these topics both to patients and at the schools that at the time were still working' (female nurse, State 5) How did they adapt? 'I was in the triage process when people were coming in. We received them and we took a speed reading and recorded their symptoms. Then I switched to screening, where you register people and ask them for information so they can see the doctor … I am currently in the giving of results; they gather the results on the platform, I am the one who tells you if you are positive or negative … Older adults, pregnant women go to consultation; they are given medicine and they are tested. In case they require it, they are sent to the hospital if they see them with advanced symptoms' (female nurse, State 3) Links and collaborations 'We had several WhatsApp groups of young people, pregnant women, patients with chronic degenerative diseases. We divided the community by ailments and affinities and by age groups. Those WhatsApp groups helped us to keep communication alive; they have been a great tool to keep the communication channel open … We rely a lot on social media, Facebook, WhatsApp, radio, local TV channels, megaphoning equipment … We made agreements with the City Council, the Municipal Police and they installed loudspeakers in the vehicles of the police and the Municipality and gave messages to the community' (male nurse, State 5)

(continued)

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 2. (Continued)

Explored topic	URBAN AREAS			
Type of health worker	**How did they prepare for the pandemic?**	**How did they cope with the crisis?**	**Interinstitutional–civil society links and collaborations**	**EXAMPLES OF TESTIMONIES**
Health promoters	• They were the last to receive training and they replicated it to the population. • They carried out information dissemination activities in schools before lockdown. • They received teaching materials for prevention activities. • When they were assaulted, they stopped wearing uniforms on the street. • They performed screening for COVID-19. • They disseminated information on preventive measures in public places, such as markets and bus terminals. • They appointed promoter coordinators to work with the same method in all medical units.	• They used their acquaintance of locals to establish contact with the population and detect positive cases of COVID-19. • They made home visits to identify suspected cases. • They were linked to areas of Epidemiology. • They created mobile brigades. • They followed up positive cases in the call centres. • They followed up contacts of positive cases. • They adapted spaces in medical units with adequate distance for testing. • They informed the population of preventive measures. • They set up temporary consultation rooms for patients with suspected COVID-19. • They organized special days to care for pregnant women. • They treated patients with chronic diseases at home. • They used social networks to establish communications.	• The health workers' union supported with PPE. • City councils sent police to escort them in unsafe neighbourhoods. • A pandemic reaction committee was formed with the Chambers of Commerce. • Municipal presidencies agreed on actions such as closure of commercial areas. • Screening was implemented in shops. • Health committees were activated in the neighbourhoods; the promoters asked them for support to disseminate information.	How did they prepare? 'We started with training from the department; they told us about COVID-19 and the prevention measures so that we could later show them to our patients. By then we accepted patients in the waiting room and there I gave my talks on handwashing techniques, what the disease was like and prevention measures' (female health promoter, State 1) How did they adapt? 'Poor nurses, at first not even the pharmacies let them in, not to talk of the businesses if they came in with their uniform. They had to recommend to the nursing staff that they arrive at their home and change clothes [to avoid people's aggressive behaviour]' (female health promoter, State 1) Links and collaborations 'Sixteen promoters hired by the Health Institute for Welfare were assigned' (female health promoter, State 4)

Source: Authors' elaboration from the collected data.

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 3. Relevant aspects of health personnel management in rural areas to respond coordinately to the impact of the pandemic, by type of health worker, area of influence and examples of testimonies

Explored topic	RURAL AREAS			
Type of health worker	**How did they prepare for the pandemic?**	**How did they cope with the crisis?**	**Interinstitutional-civil society links and collaborations**	**EXAMPLES OF TESTIMONIES**
Medical personnel	• They received training in COVID-19 case identification and preventive measures. • As the pandemic intensified, medical personnel were also trained to take samples, as the demand surpassed the original sampling teams. • Administrative staff were trained to support. • They visited farmworker fields to inform them about preventive measures. • They carried out dissemination of prevention measures on a big scale and house by house.	• External waiting rooms and consultation rooms were adapted outside the medical facilities to avoid crowds and possible infections. • Patients were followed up daily via telephone. • Severe cases were referred to the hospital. • Care was continued to be delivered to people in priority programmes (pregnant women, children under five, persons with chronic conditions).	• They invested in their health, cooperating to buy disinfectant products. • Municipalities supported with supplies, reference of cases, risk prevention activities and PPE. • They held briefings with community leaders in small towns.	How did they prepare? 'You must take care of yourself; you have to invest in your health. We cooperated for the "vaquita"; everyone donated, brought chlorine, soap, brooms, what everyone could donate at the time' (female doctor, State 2) How did they adapt? 'We went hand in hand with the patients, [AQ: Please clarify what is meant by 'We went hand in hand with the patients] getting to know the behaviour of the disease with every patient. The follow-up 24 hours a day gave us that. Whenever they wanted, they talked to us on the phone. Some who were not seriously ill went to the health unit for checking up; we had the commitment to help people, not to let them die' (female doctor, State 2) Links and collaborations 'There is a Regulatory Operation Center that meets every 15 days or every week, depending on whether there is a change in the epidemiological traffic light. There meet the Secretariat of Health, the Municipality, the Armed Forces, the National System for the Integral Development of Families (DIF) .. all institutions, and an analysis is made regarding which places need a prompt assignment of health services. A COVID line has been implemented to give information to people and here we have an institution that brought together groups of people to perform PCR tests in large chunks of the population. People were told whether the test was for monitoring, for symptoms or if they had been in contact with COVID positive people' (male doctor, State 1)

(continued)

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 3. (Continued)

Explored topic	RURAL AREAS			
Type of health worker	How did they prepare for the pandemic?	How did they cope with the crisis?	Interinstitutional-civil society links and collaborations	EXAMPLES OF TESTIMONIES
Nursing personnel	• They were trained to adopt and teach prevention measures and detect signs and symptoms of the disease. They were updated whenever there was new evidence. • They informed people about preventive measures and symptoms in the medical units, by giving workshops, talks, by megaphoning and through social networks, chat groups and the telephone. • They promoted preventive measures among health personnel, such as hand washing, mask wearing and use of face shields and goggles. • Those who spoke an indigenous language were responsible for disseminating prevention measures to indigenous population. • In shelters for migrants, they informed on prevention measures.	• COVID-19 cases were followed up using social media platforms and telephone. • Medical units with a single nurse could not do extramural prevention activities. • They cancelled non-urgent consultations. • They carried out disinfection work in the medical unit. • They avoided crowds by sending medication to chronic controlled patients for 1–3 months each time. • They separated consultation rooms. • They took turns receiving patients and providing information. • People who could get around were sent on their own to be tested for COVID-19. • They delivered positive COVID-19 results at home to give follow-up instructions to the family. • During the dissemination of preventive measures, families without resources were taught only the use of soap and water, not gel. • They coordinated transfers of complicated cases and found them places in nearby hospitals. • They took tests and sent them to laboratories at nearby hospitals or COVID-19 centres.	• Linking with authorities to solve local problems related to COVID-19 outbreaks. • Local councils supported with PPE, disinfectant products and cleaning equipment. Others provided human resources and ambulances. The councils obtained oxygen tanks and oximeters to lend to infected patients who were quarantined at home. They also banned public celebrations and religious services and closed non-essential services. • Linking with the local Red Cross to request ambulances for patient transfers.	How did they prepare? 'Later, with the personnel together with the promoters, it was requested that they replicated these topics, both to the patients and to the schools that at the time still worked' (female nurse, State 1) How did they adapt? 'We are going to watch that it does not fall below 90, it has to be above 90. If you feel that you lack air lie face down, try not to make much effort. You must be isolated in your room, that there they bring you food. If you go out to the bathroom … disinfect … Tell them to make an improvised atomizer with a bottle; put 1 litre of water and 10 ml of chlorine and every time you go out to the bathroom they will sanitize' (female nurse, State 3) Links and collaborations 'Here … it is a place of a lot of traditions, of a lot of religion, so people did have a hard time stopping doing their festivities. And there we watched constantly that there were not many people together, who might get infected by COVID-19' (female nurse, State 2)

(continued)

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Table 3. (Continued)

Explored topic	RURAL AREAS			
Type of health worker	**How did they prepare for the pandemic?**	**How did they cope with the crisis?**	**Interinstitutional-civil society links and collaborations**	**EXAMPLES OF TESTIMONIES**
Health promoters	• They received instructions from the federal and state levels to spread information about what was coming (leaflets, flyers, posters). They were then instructed not to leave out of [AQ: Please clarify what is meant by 'They were then instructed not to leave out of'] medical healthcare centre. • They elaborated informative material in simple words that was disseminated in places of greater concentration of people. • They produced printed material in local languages. • Health personnel at risk were given work leave. • Administrative staff were trained to support preventive measures activities. • They visited schools to promote prevention activities, such as hand washing and mask wearing. • They implemented screening procedures in the medical units. • They received supplies and PPE. • When necessary, they bought PPE with their own resources.	• They enabled spaces for sample taking. • They followed up positive cases by telephone to avoid contagion at home. • In localities with indigenous population, they convinced them to hold meetings wearing masks. • They recommended use of temazcal baths to indigenous day labourers in the fields. • They recorded cases and reported to the epidemiology area.	• At the beginning, they bought face shields used for welding. • They activated youth brigades and neighbourhood groups as support to disseminate sanitary measures and detect COVID-19 cases. • With municipalities, they closed non-essential services and helped to watch for compliance with lockdown. • They trained town officials. • They used social media to create chat groups and disseminate information.	How did they prepare? 'We bought our face shields; we even used the ones worn by the people who weld iron; those are the face shields that we bought at first' (male health promoter, State 5) How did they adapt? 'The patients were told that at all times, regardless of the hour of the day, they could call us. In my case it was a plus … I had to take care of many of my patients in the early morning, I would tell them, 'Don't wait if you're oxygenating below 95, call me!'. Why? Because we know that timely care is what has been making a difference' (male health promoter, State 4) Links and collaborations 'We had altercations with the people; in the market they were fed up … that we gave them the information. They said that we only scared away the people who were going to buy their merchandise … the health teams didn't want to go out anymore' (male health promoter, State 2)

Source: Authors' elaboration from the collected data.

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

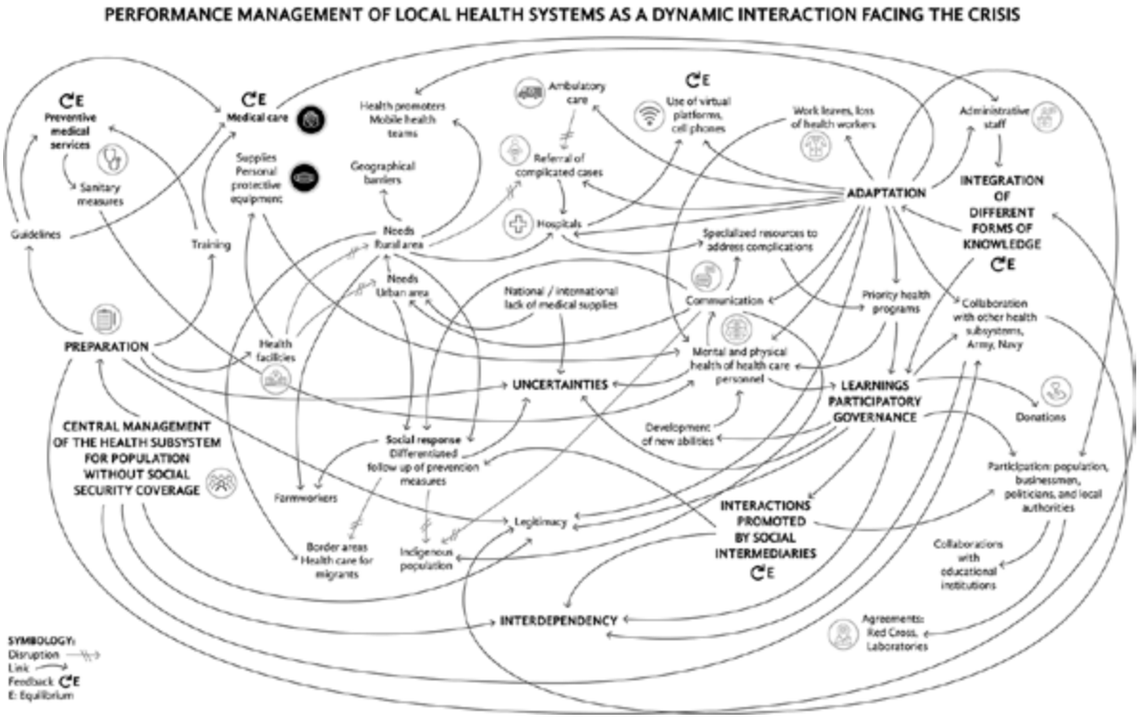


Figure 2. Performance management of local health systems as a dynamic interaction facing the crisis

for cleaning supplies were used by heath workers as dressing rooms and places to sanitize themselves; patios became waiting rooms.

COVID-19 management followed a three-step process depending on the stage of the pandemic: (1) The medical unit informed patients of positive COVID-19 results. The nursing personnel recommended home care measures to both infected persons and their families. Patients were to be isolated at home and symptoms were monitored via telephone; when necessary, patients were referred to hospital. (2) With the increase in cases, mobile teams were integrated to search for COVID-19 cases; the work of nursing personnel and promoters was essential due to their acquaintance with the population. (3) The states with the greatest human resources (State 4) extended the work of the mobile teams (health brigades) to carry out home visits, assess possible cases, take samples with the aid of epidemiological teams and prepare censuses. The positive cases were given information for home care; some of them received an aid kit including an oximeter that later had to be handed back to the health personnel.

Some states allocated ambulatory care facilities of greater capacity as 'COVID centres' to exclusively perform diagnostic tests on suspected cases, provide test results, monitor positive cases at home via telephone and give information for referral to hospital. Other states reassigned health workers from other care departments to cover services lacking staff, who were in leave because of occupational risks. In rural areas, some medical units temporarily closed while staff infected with COVID-19 recovered or substitutes were sent.

Medical care for other diseases

Owing to the lockdown and the limited access of non-urgent cases to medical facilities, continuous care delivery was challenging, mainly for population needing regular care or supplies, such as pregnant women, children under five years of age in need of immunization, patients with pulmonary tuberculosis and people with chronic diseases. These cases were monitored remotely by telephone and social media platforms. An example is the follow-up of patients with chronic diseases. Self-monitoring patients with hypertension or diabetes were followed up with remotely (telephone messages); when necessary, home appointments were made, and medicine supplies for up to three months were sent over to them. Another relevant aspect of the participation of health personnel was the continuation of preventive programmes, such as vector eradication campaigns and health promotion activities. In the voice of an interviewee:

> [The priority health programmes] continued to work, but the health promoters had to work harder. The period of dengue transmission came, and they worked a lot on that, both on the vector programme and on the promotion programme [on COVID-19 prevention], house by house and in the neighbourhoods. And during the influenza period, they promoted vaccination. (HJ level, State 1)

One of the main problems for continuation of care delivery mentioned by health staff in both urban and rural areas was the fear of people returning to health units, because of the risk of infection. This had a negative impact on care for

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Health Policy and Planning, 2022, Vol. 37, No. 10 **1291**

chronic diseases, immunization of children and prenatal control. Likewise, one of the main challenges to getting patients back to health units will be to fight against self-medication and use of home remedies to relieve symptoms of non-COVID-19 diseases.

Difficulties faced by the health personnel

Some interviewees talked about some circumstances that hindered the planned care process. In rural areas, mainly those with an indigenous population, persons infected with COVID-19 and their families did not inform health personnel about their condition for fear of being discriminated against and attacked by other members of their community. In State 4, a border state in Southern Mexico and a region of abundant rivers and jungles, health teams make visits to villages in boats. There, unforeseen technical troubles delayed the COVID-19 screening of the population. On the other hand, northern border states deal with the flows of migrant population that camp in humanitarian shelters. In addition, people who work in the United States and have family in Mexico returned to the country during the closure of the borders and were identified by health personnel as the origin of outbreaks in small towns. Another example is the reluctance of the population to adopt protective measures. Moreover, health workers experienced violent reactions from people due to fake news about the origin of the pandemic; this occurred in both urban and rural areas. These circumstances hindered the early detection of symptoms, care and follow-up of contacts of infected persons, and led to the readjustment of some strategies, such as the escorting of health personnel by local authorities for protection.

Learnings

Collaboration with authorities

Local authorities helped health personnel by installing screening stations and providing information on prevention measures to the population. In rural areas, the authorities collaborated with health personnel by keeping non-essential activities closed, escorted them for protection during COVID-19 informative visits to potentially dangerous areas and collaborated by persuading infected people to stay in their homes. They also asked the population to avoid big parties and crowds and recommended the suspension of religious services. In indigenous communities, traditional authorities supported health workers by persuading people to practise sanitary measures.

Donations

In rural areas, local municipalities donated protective equipment, disinfectant products and cleaning equipment. Some mayors (State 5) distributed PPE to health staff which had been donated by ordinary people and civil society organizations. In other states, the union of health workers collaborated. Oxygen tanks and oximeters were also obtained, which were lent to COVID-19 patients keeping quarantine in their homes. Some health centres received donations to cover the open spaces to which they had moved waiting rooms and vaccination stations.

Cooperation links for the management of the pandemic

The interviewees reported the collaboration of business associations that helped by replicating risk prevention measures inside factories. In states with a migrant population, government agencies supported health workers in preventive activities focused on this mobile population. Health personnel partnered with state government departments responsible for health and educational institutions, as well as with hospital management departments, the Red Cross and some laboratories. According to the context of each state, the Armed Forces and the Navy helped to coordinate activities. Coordination was also established with municipal authorities to use official ambulances for the transfer of COVID-19 patients.

Participation of the population

Nurses and health promoters were assisted by local residents and neighbourhood networks. Especially in rural areas, the voluntarily aid by people from different communities contributed to maintaining communication with the population. The interviewees highlighted their experiences with neighbourhood committees that supported them in various activities, and with youth brigades, which helped to disseminate messages using telephone chats. Additionally, volunteer women were trained as screening assistants. In indigenous populations, local leaders contributed by translating prevention information. Among other examples, the experience of two states stands out, as they suffered natural disasters caused by hurricanes at the same time as the pandemic was unfolding. There, neighbours participated by organizing shelters to house people infected with COVID-19.

Dynamic interactions in health systems

Figure 2 shows, from the perspective of complex adaptive systems, the dynamics and interdependence interactions that were built between the three stages analysed. In the Preparation phase, links were established with preventive medical services to develop care guidelines, train human resources, plan preventive measures and obtain PPE. The Uncertainties stage, which is part of the unpredictability of complex systems, was characterized by the increase of challenges to manage infection risk prevention and provide medical care. This generated disruptions in the feedback of the various teams of human resources that participated in the response to the health crisis. Between the Preparation phase and the Uncertainties phase, there were moments of disruption caused by the different needs, contexts and social responses to compliance with health measures in rural vs. urban areas, which hindered the work of the health teams. In the Adaptation stage, the assimilation of previous experiences and the use of mobile communication technologies for case monitoring and remote care stand out. Finally, the Learning stage incorporated the experiences of local health systems and the interactions promoted by social intermediaries for the management of the health crisis.

Discussion

According to the WHO, understanding how resilience is built in health systems is a key factor in promoting and protecting health (World Health Organization, 2021). Nevertheless, as Saulnier remarks, a lot has been discussed about resilience in conceptual terms, but little is shown in a practical way on

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

how it is built on a day-to-day basis, which is essential for health system recovery in the post-pandemic era. The findings of this study offer a view of how decisions are made daily, both at the managerial planning level and at the health personnel level, in prevention and care activities. It was the social actors interviewed who built the resilience of the local health systems. From this approach, as the authors above-mentioned point out, it is necessary to understand that resilience is simultaneously a *result* and a *skill*, both aspects occurring at the same time and feeding back to each other. This idea broadens the classic definition of resilience that equates it with health system efficiency (Bertalanffy, 2017). Analysed from a complex systems approach, resilience should thus be understood as a process that enhances the experience of the health system through the interconnections generated at different participant levels, which facilitates the planning of more focused responses.

In the stage of Preparedness for the health crisis, local actions were organized as part of the strategies implemented by the Mexican health system for the response to the pandemic before vaccine availability. Actions included containment and mitigation of infections through home confinement, closure of non-essential school and work activities, general hygiene measures and adaptation or conversion of services for the care of cases (Mendoza and Suárez, 2020; Martínez *et al.*, 2022). The centralized governance also defined national policies, which narrowed the response according to regional and local needs (Díaz *et al.*, 2021; Knaul *et al.*, 2021).

The training of health personnel was the main action carried out during this stage. At the same time, other components of the health system influenced the preparedness for service delivery, but it was the conditions of the context that exerted the greatest influence, with rural areas facing additional challenges. This situation has been reported as well in other countries (Peters, 2020; Schiff *et al.*, 2020; Vázquez and Gandolfi, 2020; Bastos and Fonseca, 2021) that paid less attention to rural areas during the COVID-19 pandemic, to territories inhabited by indigenous populations and to homeless people with fewer social resources and greater susceptibility to COVID-19 infection. The inadequate protection for these population sectors has already been evidenced from the public policy analysis (Lal *et al.*, 2021) as one of the serious pending tasks in the response to the pandemic.

The priority for resource allocation in case of a health emergency has also been analysed (Etienne *et al.*, 2020; O'Sullivan *et al.*, 2020; Schiff *et al.*, 2020; Senthilingam, 2021). Urban areas represent a greater risk of virus transmission compared with rural areas due to the higher population density of the former. Rural areas, however, present other challenges, such as the difficulty in accessing health services, a situation of structural inequality aggravated by the COVID-19 pandemic.

During the Adaptation stage, and in relation to *skill*, another aspect to consider was the effort of health professionals to reach small villages in remote areas and provide care in conditions of great disadvantage, such as personnel shortage and high demand for care. This enormous effort had costs to their physical and mental health, which has been reported in other contexts as well (O'Sullivan *et al.*, 2020; Vizheh *et al.*, 2020; Walton *et al.*, 2020; Galbraith *et al.*, 2021). In Mexico, as in other Latin American countries, the reassignment of personnel to address the health emergency caused a lag in other health services, such as care for NCDs (OPS, 2020). To counter that situation, health personnel were temporally hired, and other strategies were developed, such as greater provision of medication to control chronic illnesses at home (Colchero *et al.*, 2021; Tetelboin *et al.*, 2021; Martínez and Gómez, 2022).

As for learning, the pandemic demonstrated the capacity of health personnel to self-manage (which also refers to *skill*) in the performance of preventive activities (an area of special relevance for the containment of the pandemic), in the solution of challenges represented by the remote monitoring of people infected with COVID-19, and in the efforts made to give continuity to care for other diseases. In these activities, the use of technologies, specifically the mobile phone, was paramount. The emergence of electronic media as an alternative for care is also highlighted by other studies. The use of videoconferences to provide medical consultations and inform on preventive measures against the pandemic, the so-called 'telehealth' (Bhaskar *et al.*, 2020; Meyer *et al.*, 2020; Monraz *et al.*, 2021), is identified as an important aid to extend care coverage in rural areas.

Another learning in crisis management was the work of 'social intermediaries', as Blanchet (Blanchet *et al.*, 2017) calls them. These are actors that form links between users and 'build bridges' with health services, provide greater local knowledge and represent an opportunity to expand the provision of services. These organizational experiences arising spontaneously 'from below' as a help offer from the population show the need for the re-conceptualization of the term 'participatory governance' from the experience of the pandemic. They represent a way of integrating the decision-making spaces generated on a day-to-day basis with different social actors who usually were not considered in the traditional concept of governance, as they did not have a formal participation in the decision-making process (Kickbusch and Gleicher, 2012; Pyone *et al.*, 2017). It is important to avoid losing these initiatives by setting up mechanisms to integrate them.

Conclusions

The local health services analysed in this study benefited from the initiatives of health personnel that in some cases positively exceeded their duties. In terms of the resilience analysis, their effort was key in the ability to handle the impact of the crisis and cope with it; their capacity came from their strategies to adapt health services by managing the resources available. From this perspective, our study shows the need to set up response plans for public health emergencies that allow implementing timely and effective care strategies, considering the diversity of contexts as well as the social actors that activate local support networks. The case of Mexico illustrates the way local health services responded effectively to care demand generated by the COVID-19 pandemic, making do with the existing infrastructure, personnel and supplies, in coordination with communities. Yet, the limitation of resources and the heterogeneity of the responses of each region according to its capacity resulted in the delayed care of other pressing health conditions. The results of this study point thus to the need for the implementation of public health policies that consider the health conditions of a population and the capacity of services specifically by region and local contexts as the basis to strengthen the essential functions of a health system

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Health Policy and Planning, 2022, Vol. 37, No. 10 **1293**

to successfully face increasingly complex health challenges of the present and future times.

Limitations

The above analysis derived from the inference of health personnel's narratives obtained by interview, which portrays their own outlook. Our aim was to discover how they coped with the pandemic from their local front line as part of the Mexican health system; therefore, the results are not intended to be generalized. Also, the stages for the assessment of resilience overlapped and did not follow a linear process. They were not homogeneous; even within the states there were variations because of very vast areas to cover and great population diversity. The information about the beginning of the health crisis reached the states at different moments, so there was not specifically a phase of Preparation to deal with the impact/shock, as the crisis and the subsequent stages affected the states unevenly. Lastly, a thorough analysis of the health system resilience would require information on details on the public policy developed to deal with the pandemic, financial resources aimed at the different levels of care and the different health care sectors, details on intersectoral participation and consensus agreements, among others. These aspects exceeded the objectives of the present study.

Supplementary data

Supplementary data is available at *Health Policy and Planning* online.

Reflexivity statement

The group of authors includes three females and five males. It comprises senior and junior researchers with diverse experiences in health research, focused on vulnerable populations in indigenous, rural and urban contexts, or on the analysis of public policies of the Mexican health system, health services, sociocultural analysis and qualitative methods. Six of them have postgraduate degrees in public health in the fields of health systems or epidemiology, and two in Medical Anthropology.

Ethics approval. The CI-1715 protocol was approved by the Ethics and Research committees of the National Institute of Public Health of Mexico on 24 November 2020.

Funding

The study was funded by the Pan American Health Organization, Mexico (Grant: SCON2020-00250).

Acknowledgements

We are very grateful to the health personnel who participated in the study and provided us with time to do the interviews, using even their moments of rest and their own connectivity resources.

Conflict of interest statement. None declared.

Author contributions

CJR and HRM contributed to conception and design of the research. CJR, GGA, DLRP, SFH, JAMH and AEC contributed to data collection and data analysis. All authors contributed to different versions of the article; MM contributed critical revision of the article. All authors provided final approval of the version to be submitted.

References

Bastos B, Fonseca D. 2021. Resilience to dealing with COVID-19: university perspective in a low-income health Brazilian region. *Avaliação E Políticas Públicas Em Educação* **29**: 525–42.

Bertalanffy LV. 2017. The history and status of general systems theory. *Academy of Management Journal* **15**: 407–26.

Bhaskar S, Bradley S, Chattu VK *et al.* 2020.Telemedicine as the new outpatient clinic gone digital: position paper from the pandemic health system resilience PROGRAM (REPROGRAM) international consortium (part 2). *Frontiers in Public Health* **8**: 410.

Blanchet K, Nam S, Ramalingam B *et al.* 2017.Governance and capacity to manage resilience of health systems: towards a new conceptual framework. *International Journal of Health Policy and Management* **6**: 431–5.

Brand FS, Jax K. 2007.Focusing the meaning (s) of resilience: resilience as a descriptive concept and a boundary object. *Ecology and society* **12**: 1.

Charmaz K. 2006. *Constructing Grounded Theory. A Practical Guide through Qualitative Analysis*. *UK*: SAGE Publications.

Colchero M, Gómez R, Pineda C *et al.* 2021.Health care utilization during the Covid-19 pandemic in Mexico: the cascade of care. *Salud Publica de Mexico* **63**: 743–50.

Cyrulnik B. 2001. Manifeste pour la résilience. *Spirale* **18**: 77–82.

Davis CHM. 2021. Readiness and resilience of the health systems of the UK and Russia during Covid-19 epidemics in 2020–2021: impacts of priorities, shortages and rationing. *Post-Communist Economies* **33**: 1–63.

Denzin NK, Lincoln YS (eds), 2011. *The Sage Handbook of Qualitative Research*. Thousand Oaks, CA: Sage.

Díaz L, Ramírez MG, Cabello H *et al.* 2021.Gobernanza en el sistema de salud ante la pandemia por Covid-19 en México. *Salud Publica de Mexico* **63**: 672–81.

Etienne CF, Fitzgerald J, Almeida G *et al.* 2020.COVID-19: transformative actions for more equitable, resilient, sustainable societies and health systems in the Americas. *BMJ Global Health* **5**: e003509.

Galbraith N, Boyda D, McFeeters D *et al.* 2021.The mental health of doctors during the COVID-19 pandemic. *BJPsych Bulletin* **45**: 93–7.

Giarelli G. 2020. The governance of resilience. how the health systems have coped with the covid-19 pandemic. *Culture E Studi Del Sociale* **5**: 245–57.

Glaser B, Strauss A. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New Brunswick, NJ: Aldine Transaction.

Haldane V, De Foo C, Abdalla SM *et al.* 2021.Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries. *Nature Medicine* **27**: 964–80.

Hernández E. 2020. Obesity is the comorbidity more strongly associated for Covid-19 in Mexico. A case-control study. *Obesity Research & Clinical Practice* **14**: 375–9.

Institute for Global Health Sciences. 2021. *Mexico's Response to COVID-19: A Case Study*. San Francisco: University of California. https://globalhealthsciences.ucsf.edu/sites/globalhealthsciences.ucsf.edu/files/mexico-covid-19-case-study-english.pdf, accessed 1 May 2022.

Instituto Nacional de Estadística, Geografía e Informática (INEGI). 2021. *Indicadores por entidad federativa*. https://www.inegi.org.mx/app/estatal/, accesed 15 October 2021.

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Kickbusch I, Gleicher D. 2012. *Governance for Health in the 21st Century*. Regional Office for Europe Copenhagen, Denmark: World Health Organization.

Knaul F, Arreola H, Porteny T *et al.* group from the Observatory for the Containment of COVID-19 in the Americas. 2021. Not far enough: public health policies to combat COVID-19 in Mexico's states. *Plos One* **16**: e0251722.

Kruk ME, Ling EJ, Bitton A *et al.* 2017.Building resilient health systems: a proposal for a resilience index. *BMJ* **357**: 7.

Kruk ME, Myers M, Varpilah ST *et al.* 2015.What is a resilient health system? Lessons from Ebola. *The Lancet* **385**: 1910–2.

Lal A, Erondu N, Heymann D *et al.* 2021.Fragmented health systems in COVID-19: rectifying the misalignment between global health security and universal health coverage. *Lancet* **397**: 61–7.

The Lancet Editorial. 2020. COVID-19 in Latin America: a humanitarian crisis. *The Lancet* **396**: 1463.

Martínez B, Hegewisch J, Arango A *et al.* 2022.Escudos sociales y balas mágicas para el control de la epidemia por Covid-19 en México. *Salud Pública de México* **64**: 218–24.

Martínez R, Gómez R. 2022. Iatrogenia pandémica: la exclusión y el rezago en la atención médica, no COVID, en la Ciudad de México. *Ciencia & Saúde Coletiva*. http://www.cienciaesaudecoletiva.com.br/artigos/iatrogenia-pandemica-la-exclusion-y-el-rezago-en-la-atencion-medica-no-covid-en-la-ciudad-de-mexico/18288, accessed 5 May 2022.

Mendoza C, Suárez M. 2020. Reconversión hospitalaria ante la pandemia de COVID-19. *Revista Mexicana de Anestesiología* **43**: 151–6.

Meyer C, Becot F, Burke R *et al.* 2020.Rural telehealth use during the COVID-19 pandemic: how long-term infrastructure commitment may support rural health care systems resilience. *Journal of Agromedicine* **25**: 362–6.

Monraz S, Pacheco A, Castorena A *et al.* 2021. Telemedicina durante la pandemia por COVID-19. *Neumología Y Cirugía de Tórax* **80**: 132–40.

National Institute of Public Health. 2022. *Tablero analítico de seguimiento de casos documentados de SARS-CoV-2 en México*. https://insp.mx/nuevo-coronavirus-2019.html, accessed 5 May 2022.

O'Sullivan B, Leader J, Couch D *et al.* 2020.Rural pandemic preparedness: the risk, resilience and response required of primary healthcare. *Risk Management and Healthcare Policy* **13**: 1187–94.

OECD. 2021. *Health at a Glance 2021: OECD Indicators*. Paris: *OECD Publishing*.

OPS. 2020. *Informe de la evaluación rápida de la prestación de servicios para enfermedades no transmisibles durante la pandemia de COVID-19 en las Américas*. PAHO/NMH/NV/COVID-19/20-0024. https://iris.paho.org/bitstream/handle/10665.2/52283/OPSNMHNVCOVID-19200024_spa.pdf?sequence=5&isAllowed=y, accessed 5 May 2022.

Peters DJ. 2020. Community susceptibility and resiliency to COVID-19 across the rural-urban continuum in the United States. *The Journal of Rural Health* **36**: 446–56.

Pyone T, Smith H, van den Broek N 2017. Frameworks to assess health systems governance: a systematic review. *Health Policy and Planning* **32**: 710–22.

Saulnier DD, Blanchet K, Canila C *et al.* 2021.A health systems resilience research agenda: moving from concept to practice. *BMJ Global Health* **6**: e006779.

Schiff R, Buccieri K, Waegemakers J *et al.* 2020.COVID-19 and pandemic planning in the context of rural and remote homelessness. *Canadian Journal of Public Health* **111**: 967–70.

Schwalb A, Armyra E, Méndez M *et al.* 2022. COVID-19 in Latin America and the Caribbean: two years of the pandemic. *Journal of Internal Medicine*: 1–19.

Senthilingam M. 2021. Covid-19: why Africa's pandemic is different. *BMJ* **375**: n2512.

Shamah-Levy T, Vielma E, Heredia O *et al.* 2020. *Encuesta Nacional de Salud Y Nutrición 2018–19: Resultados Nacionales*. Cuernavaca, México: Instituto Nacional de Salud Pública.

Strauss A, Corbin JM. 1997. *Grounded Theory in Practice*. Thousand Oaks, CA: Sage.

Tetelboin C, Iturrieta D, Schor C, Coords. 2021. América Latina. Sociedad, política y salud en tiempos de pandemias. Ciudad Autónoma de Buenos Aires: CLACSO; Argentina. Xochimilco: Universidad Autónoma Metropolitana; Xalapa: Universidad Veracruzana; México. Cochabamba: Universidad Mayor de San Simón; Valparaíso: Universidad de Valparaíso, Chile.

Vázquez I, Gandolfi A. 2020. Peruvian efforts to contain COVID-19 fail to protect vulnerable population groups. *Public Health in Practice* **1**: 100020.

Vizheh M, Qorbani M, Arzaghi SM *et al.* 2020.The mental health of healthcare workers in the COVID-19 pandemic: a systematic review. *Journal of Diabetes and Metabolic Disorders* **19**: 1967–78.

Walton M, Murray E, Christian MD. 2020. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *European Heart Journal* **9**: 241–7.

Werner EE. 1989. Children of the Garden Island. *Scientific American* **260**: 106–11.

World Health Organization. 2008. *International Health Regulations*. 2nd ed. https://www.who.int/publications/i/item/9789241580410, accessed 5 May 2022.

World Health Organization. 2021. *Building Resilience: A Key Pillar of Health 2020 and the Sustainable Development Goals: Examples from the WHO Small Countries Initiative*. World Health Organization 2017. https://apps.who.int/iris/handle/10665/338752, accessed 10 October 2021.

World Medical Association. 2013. Declaration of Helsinki: ethical principles for medical research involving human subjects. *Jama* **310**: 2191–4.

Downloaded from https://academic.oup.com/heapol/article/37/10/1278/6633737 by guest on 29 November 2022

Health Care Management Science
https://doi.org/10.1007/s10729-020-09503-7

Tackling maternal mortality by improving technical efficiency in the production of primary health services: longitudinal evidence from the Mexican case

Edson Serván-Mori[1] · Carlos Chivardi[1] · Fato Fene[2] · Ileana Heredia-Pi[1] · Miguel Ángel Mendoza[3] · Gustavo Nigenda[4]

Received: 13 June 2019 / Accepted: 6 February 2020
© Springer Science+Business Media, LLC, part of Springer Nature 2020

Abstract
Ensuring regular and timely access to efficient and quality health services reduces the risk of maternal mortality. Specifically, improving technical efficiency (TE) can result in improved health outcomes. To date, no studies in Mexico have explored the connection of TE with either the production of maternal health services at the primary-care level or the maternal-mortality ratio (MMR) in populations without social security coverage. The present study combined data envelopment analysis (DEA), longitudinal data and selection bias correction methods with the purpose of obtaining original evidence on the impact of TE on the MMR during the period 2008–2015. The results revealed that MMR fell 0.36% ($P < 0.01$) for every percentage point increase in TE at the jurisdictional level or elasticity TE-MMR. This effect proved lower in highly marginalized jurisdictions and disappeared entirely in those with low- or medium-marginalization levels. Our findings also highlighted the relevance of certain social and economic aspects in the attainment of TE by jurisdictions. This clearly demonstrates the need for comprehensive, cross-cutting policies capable of modifying the structural conditions that generate vulnerability in specific population groups. In other words, achieving an effective and sustainable reduction in the MMR requires, inter alia, that the Mexican government review and update two essential elements: the criteria behind resource allocation and distribution, and the control mechanisms currently in place for executing and ensuring accountability in these two functions.

Keywords Maternal mortality · Primary health care · Windows analysis · Data envelopment analysis · Technical efficiency · Mexico

1 Introduction

Maternal mortality brings to light the inability of countries and their health-care systems to provide their populations with appropriate services. Concentrated in the most socially disadvantaged populations [1] and largely preventable with primary-care interventions, maternal deaths constitute an unacceptable yet persistent phenomenon. Regular and timely access to quality and effective health services contributes to reducing the risk of maternal mortality [2, 3] and to improving infant health [4].

The Mexican Health-Care System has made remarkable strides in extending universal health coverage (UHC) to the most socially vulnerable populations. However, its segmented organization has divided health care across population groups under two main institutions: The Social Security institutions —which operate with a tripartite financial base— is responsible for private salaried workers and their families engaged in the formal labor market; and the Ministry of Health (MoH) —relying basically on general taxes— for the population without social security.

Since its creation in 2003, the Social Protection System in Health (SPSS by its Spanish initials) has played a leading role in the expansion of health-care coverage in Mexico. Based on a resource distribution scheme rooted in the rationale of demand-side subsidies [5], the *Seguro Popular de Salud*

✉ Gustavo Nigenda
gnigenda@outlook.com

1 Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Morelos, Mexico

2 School of Public Health, National Institute of Public Health of Mexico, Cuernavaca, Morelos, Mexico

3 School of Economics, National Autonomous University of Mexico, Mexico City, Mexico

4 National School of Nursing and Obstetrics, National Autonomous University of Mexico, Mexico City, Mexico

Published online: 27 July 2020

Serván-Mori E, Chivardi C, Fene F, Heredia-Pi I, Mendoza MÁ, Nigenda G. Tackling maternal mortality by improving technical efficiency in the production of primary health services: longitudinal evidence from the Mexican case. Health Care Manag Sci. 2020;23(4):571-584. https://doi.org/10.1007/s10729-020-09503-7

insurance program (SP by its Spanish initials), the financial and operational arm of the SPSS, transferred resources between 2003 and 2019 to the MoH for the production of services. This has benefited health care delivery by improving quality, use, access, and availability of services, particularly for the poorest sector of the Mexican population [6–8]. Key actions in these developments have included capacity strengthening for human and material resources at health-care facilities, and a voluminous flow – unprecedented in recent Mexican history – of fresh public funds into the Health-Care System [5–9].

However, despite these efforts, the benefits of the SP health policy did not reach the entire Mexican population. Major challenges persist in the provision of effective access for the rural indigenous populations of low socioeconomic level, particularly for those living in geographically isolated areas [6, 8]. These are the populations with the highest maternal mortality rates and largely affected by poverty, low schooling levels, low participation rates in the formal economy, low enrollment to social security institutions, and reduced access to government services in general.

The case of maternal health is particularly illustrative of the prevailing gaps. Pursuant of the Sustainable Development Goals (SDGs), Mexico committed to reduce the number of maternal deaths for every 100,000 live births from roughly 40 in 2015 to 12.6 by 2030. This poses an enormous challenge to the Mexican health authorities, considering that seven of every ten deaths relate to women without social security coverage [10] and occur in a context of huge disparities between states. For instance, the MMR amounts to 14.9 deaths in Queretaro but jumps to 68.5 in Chiapas [11]. Other major concerns for the health authorities include the financial instability of the Mexican Health-care System [12], low-quality health care, inadequate follow-up of patients [13–15], and sub-optimal results from government expenditure [16].

Meeting the UHC and SDG objectives hinges on two priority items on the short- and long-term agendas of effective service delivery: timely and quality maternal care, and efficiency in both the allocation of resources and the production of services. These are feasible tasks given that (i) 70% of maternal deaths can be prevented with timely and adequate interventions by the Health-Care System [17], (ii) the levels of access to health care during pregnancy and of coverage of skilled services during childbirth are virtually universal; and (iii) maternal health has been awarded priority status and is receiving increased financial support [18].

Under these circumstances, tackling inefficient processes in the production of health services is critical [19, 20]. Inefficiency in the production of health services occurs for at least two reasons: first, health system inputs may be directed towards creating some outputs that do not represent social priorities; second, the misuse of inputs in the process of producing valued health system outputs [21]. Technical efficiency (TE) reflects the capacity of service providers to combine available inputs, or production factors (labor and capital) [22]. In other words, TE is the capacity to combine a set of inputs to produce an output. In this sense, measuring TE among health-care providers contributes to identifying the institutions that manage their resources and processes optimally, according to a specific standard, in pursuit of the highest possible levels of production, but also to correct the performance of those operating below capacity. TE focuses mainly on the operational performance of organizations rather than on their strategic choices about which outputs they will produce and which inputs they will consume [21].

To a lesser yet significant extent, the TE concept involves the relationship between inputs and outputs at health-care facilities, as has been illustrated by TE studies at hospitals and other health-care facilities [23]. Moreover, previous research has compared TE levels between and within countries [24]. Serván-Mori et al. (2019) compared the performance of institutions in the public health sub-sector, demonstrating that TE in health is conditioned by contextual characteristics such as social marginalization, the presence of indigenous populations and the demand for maternal health services [25]. Similarly, Ravangard et al. (2014) highlighted the existence of a significant relationship between TE in health systems and economic factors such as the Gross Domestic Product per capita and health expenditures [26]. However, few public health studies have attempted to analyze the association between TE and specific health conditions, even though TE capacity is linked to the structure and functioning of health-care systems, more specifically, to their competence in obtaining improved outcomes: in our case, a reduction in maternal mortality [27, 28].

Social policies affect maternal mortality mainly via health systems, but also through programs in other sectors that influence its occurrence and buffer the negative impact of its social determinants [27, 29, 30]. These policies are developed in response to expressed health needs and consequently incorporated into the agenda for priority investments. In theory, health systems ensure TE by building a health-care model that is capable of translating resource investments into adequate and available health services. In maternal health care specifically, TE relates to two groups of components: (i) inputs (labor and capital) and (ii) outputs (health products and services for women during pregnancy, childbirth, and the post-partum period) [30]. Thus, health systems offer different levels of TE and enhance population health to the extent that the necessary conditions exist. On one hand, TE depends on input availability, allocation and planning, and on the other hand on the organizational structure of production units [31]. As such, TE is closely related to the quality of care (QoC), and consequently, to health outcomes. According to the WHO definition, quality of care is '*the extent to which health care services are provided to individuals and patient populations to improve desired health outcomes. In order to achieve this, health care must be safe, effective, timely, efficient, equitable and people-centered*'

[32]. QoC reflects the available physical infrastructure, supplies, management, and human resources with the knowledge, skills and capacity to provide antenatal care services.

It is important to mention that our study is the continuation of a series of studies published on the subject [25, 33]. While this and previous research bear methodological similarities (particularly in the construction of the TE score), they differ regarding the foundation of the research questions. This article addresses the relationship between TE in the production of maternal-health services at the primary-care level and the MMR in Mexican populations without social security coverage. To the best of our knowledge, no studies have addressed this relationship in Mexico, in the rest of Latin America or in other middle- and low-income countries. Our study aims to contribute novel and robust information towards a better understanding of the performance of health systems and hence, to improve the care for populations that would benefit the most from a technically efficient system.

2 Methods

2.1 Design, data and analysis unit

We conducted an ecological and longitudinal study of 243 health jurisdictions pertaining to the Mexican MoH, for the 2008–2015 period. In Mexico, health jurisdictions are the administrative structures theoretically responsible for managing and providing health services for the population. They execute, coordinate and monitor health programs and services at the sub-state level. Our study focused on women without social security coverage given their relative weight in maternal mortality. Fourteen jurisdictions were excluded from the analysis due to insufficient information for the analysis period. Our final sample was comprised of 229 health jurisdictions, representing 94% of the total number of jurisdictions in Mexico. The project was reviewed and approved by the Committees of Research, Biosafety and Ethics of the INSP, Mexico (Research committee: CI- 099 -2017, Ethics committee: 1366, Biosafety committee: exempt).

2.2 Analytical variables

2.2.1 Dependent variable: The maternal-mortality ratio (MMR)

The MMR has been widely acknowledged as a general indicator of overall health in populations, the status of women in society, and the functioning of health-care systems [34]. The MMR denotes the number of maternal deaths per 100,000 live births [35]. Maternal death is defined as the death of a woman while pregnant or within 42 days of pregnancy termination–irrespective of the duration and the site of the pregnancy–from any cause related to or aggravated by the pregnancy or its management, but not from an accidental or incidental cause [35, 36]. Our study analyzed maternal deaths and live births that occurred among women without social security coverage and were registered in their place of residence. Estimates were performed by jurisdiction and year analyzed.

Consistent with previous studies and in order to achieve an inclusive analysis, our estimate focused on women between the ages of 10-54y and included post-discharge maternal deaths as well as deaths from sequelae of obstetric or other indirect causes previously documented as relevant [35, 36]. Maternal death information was drawn from the mortality databases of the National Health Information System (SINAIS by its Spanish initials) [10]; birth information was drawn from the population projections 2005–2030 of the National Population Council (CONAPO by its Spanish initials) [10].

2.2.2 Independent variable: Technical efficiency in the production of adequate maternal health services at the primary-care level

Theoretically, we defined TE in the production of adequate maternal health services as the ability of health jurisdictions to utilize available human (personnel) and material (infrastructure and equipment) resources optimally for generating maternal health services [37]. It followed, then, that the optimal use of resources correlated closely with organizational capacities and ability for innovation as a means of achieving the best possible outcomes [38]. Details on the methodology used for estimating this variable have been published elsewhere [33]. We constructed the explanatory variable in two steps: first, we used Data Envelopment Analysis (DEA) [39] to calculate the relative TE score θ_p for every pth health jurisdiction or decision-making unit (DMU) employing m inputs in the production of s outputs. In general, this method enabled us, on one hand, to identify which units (those classified as technically efficient) could be used to construct others (virtual units) susceptible of being compared, and on the other, to calculate efficiency indicators (the distance between the efficient and virtual units) [40]. Calculations were performed after resolving the optimization problem below:

$$\theta_p = \max \sum_{j=1}^{s} u_{jp} y_{jp} - w_p, p \in \{1, 2, \ldots, n\}$$

s.t.

$$\sum_{i=1}^{m} v_{ip} x_{ip} = 1$$

$$\sum_{j=1}^{s} u_{jp} y_{jr} - w_p - \sum_{i=1}^{m} v_i x_{ip} \geq 0, \forall r = 1, 2, \ldots, n$$

$$u_{jp} \geq \mathcal{E}, v_{ip} \geq \mathcal{E} \forall i, j.$$

$$w_p \in \mathbb{R}$$

where u_{jp}, v_{ip}were the weights (positive) of the *ith* input and the *jth* output of DMU number *p*. The term w_p indicated the variable returns to scale whose sign determined the returns to scale [41]. Given heterogeneity in the DMUs and the longitudinal scope of our analysis, we estimated θ_p assuming an output-oriented production model with variable returns of scale (Banker-Charnes-Cooper model or BCC model) [42], and applied the Window-DEA method [39, 41], which allowed for characterizing each DMU as if it were different in each time period, and thus, for establishing comparisons among units across different time periods [43–47]. In our case, the Window-DEA method was based on the following assumptions: *n* DMUs, *k* time periods, *t* longitudinal windows *p* ($p \leq k$) and the total number of windows $t = k\text{-}p + 1$. The number of DMUs in each window equaled $np/2$, and the increase in DMUs over time equaled $n(p-1)(k-p)$. Hence, the total number of 'different' DMUs came to $n(k-p+1)p$.

The selection of inputs and outputs used to construct the TE score was based on the recommendations of previous studies. For example, in [44, 47] we found general physicians, and specialists with patient contact, and other types of personnel and we decided to include in our analysis like inputs [44, 45, 48]. The output analyzed was the unweighted coverage of adequate maternal health services by each DMU at the primary-care level. As mentioned before, it has been documented that regular and timely access to quality and effective health services would contribute to reducing the risk of maternal mortality [2, 3]. Based on a continuum of healthcare and in line with our previous work [15, 49], this indicator was defined as the percentage of women (10–54 years old) who reported having had at least one live birth and having fully received all of the following interventions: (i) skilled health care during pregnancy or antenatal care; (ii) the initial antenatal consultation during the first trimester of pregnancy or timeliness of antenatal care; (iii) at least four medical consultations during pregnancy or sufficient antenatal care; and (iv) institutionalized delivery care. This output almost fully encompassed the maternal health care process, and explicitly incorporated previously documented aspects of health-care quality [15]. In this sense, our proposed outcome is more comprehensive, patient-centered, focused on continuity of antenatal care and combines all the aforementioned indicators. Data used for the construction of the adequate maternal health care services coverage were obtained from the Mexico Births Information Subsystem (SINAC by its Spanish initials), a component of the SINAIS [10]. This dataset contains information of all birth certificates received by the MoH (around two million births annually). Among other variables, this subsystem collects information about the place of residence, date of birth, place of birth, birth procedure and health insurance of the mother of the newborns registered.

The vector *m* for inputs included (i) human resources: the number of medical or nursing students or interns with patient contact, general physicians, and specialists such as pediatricians and obstetrician/gynecologists with patient contact, administrative staff, and other types of personnel (e.g., technical and maintenance); and (ii) capital resources such as the number of consultation offices for general medicine, obstetrics/gynecology, pediatrics, and sexual and reproductive health, the number of hospital beds for emergencies, recovery and labor, and the number of delivery rooms. These data were also obtained from the SINAIS [10]. Following Diez de Castro, 2005 [50], our assumptions on positivity and isotonicity were verified for all inputs. Regarding the first, we verified that none of the variables took negative values over the period analyzed. Regarding isotonicity, we confirmed that increases in the inputs represented no decreases in the product analyzed (see Table 1). θ_p was estimated using DEA SOLVER PRO software [51]. To prove the robustness of our results, we estimated $\theta_p$for the entire sample (233 DMUs) and excluded four DMUs with outlier values. Both tests produced similar results in the TE scores.

The second step and in order to ensure the comparability of the TE estimate with regard to DMU structural characteristics, we calculated the TE score adjusted $\Phi_{p,t}^{adj}$ for each DMU *p* in each year *t* analyzed, we also estimated the follow pooled regression model with a balanced-panel data structure and robust standard errors [52]:

$$\theta_{p,t} = \alpha + Z_{pt}^{'}\beta + u_{pt}$$

where $Z_{pt}^{'}$ was a vector containing the *k* structural characteristics of each DMU *p* in each time period *t* (*t* = 2008, …, 2015), β was a vector of *k* parameters to be estimated, α is a constant term, and u_{pt} is an error term distributed by $N\left(0, \sigma_u^2\right)$.

Consistent with our previous work [33], $Z_{it}^{'}$ included structural and social determinants, namely (i) the municipal average of the social marginalization index for each DMU [53], (ii) the municipal average of the Gini coefficient for each DMU [54], (iii) the percentage of the population aged ≥5y who spoke an indigenous language, (iv) the cumulative percentage of women between the ages of 10 and 54 benefiting from the SP vs. the total population of women without social security coverage, as a measure of SP expansion, (v) the percentage of women between the ages of 10 and 54 without social security coverage vs. the total population of women without social security coverage, as a measure of the size of demand by maternal health service, and (vi) the type of political party (i.e., National Action Party-PAN-or right or allied parties-wing; Party of the Democratic Revolution or allied parties -PRD or left-wing, Institutional Revolutionary Party or allied parties -PRI or center-right, and others such as independent political parties) governing during the analysis period at regional level, as well as the state where each DMU was located. This model was also adjusted by a dummy variable of each year. We estimated $\Phi_{p,t}^{adj}$ using the Stata MP v15.1 statistical package [55].

Table 1 Outputs, inputs for the production of maternal health services, and structural and social determinants in the health jurisdictions analyzed

Number of health jurisdictions = 229	2008 Mean [standard error]	2015
Structural and social determinants		
At the health jurisdiction level		
Marginalization index, %	30.8 [0.91]	31.0 [0.87]
Cumulative *SP* beneficiaries**, %	58.7 [1.49]	87.1 [0.80]
Demand for maternal health services, %	67.2 [0.19]	67.4 [0.16]
Gini coefficient**	47.1 [0.26]	39.2 [0.17]
Indigenous population, %	9.0 [1.17]	9.0 [1.14]
At state level		
Type of governing political party		
Right**	18.8 [2.59]	5.6 [1.53]
Center*	61.6 [3.22]	67.7 [3.10]
Left	19.7 [2.63]	17.5 [2.51]
Other (Alliances and other parties)	ncr	9.2 [1.91]
Of The Health System		
Inputs		
Work		
No. of medical and nursing students**	47.4 [2.24]	53.8 [2.74]
No. of doctors and nurses**	146.2 [6.36]	178.7 [7.87]
No. of administrative workers	6.2 [0.52]	5.9 [0.51]
No. of workers doing other types of work**	26.3 [1.79]	32.3 [1.97]
Capital		
Hospital beds**	29.4 [3.08]	11.3 [2.68]
Consultation offices*	62.5 [2.67]	68.4 [3.01]
Delivery rooms**	14.9 [1.74]	7.3 [1.45]
Outputs		
Antenatal care during pregnancy (A)**, %	95.6 [0.23]	97.4 [0.14]
Opportune antenatal care (B)**, %	67.4 [0.63]	73.7 [0.53]
Frequent antenatal care (C)**, %	85.8 [0.41]	89.2 [0.32]
Institutionalized delivery (D)**, %	75.7 [1.01]	79.5 [0.88]
Skilled services during childbirth (E)**, %	95.7 [0.43]	97.3 [0.32]
Adequate maternal care (A-E) **, %	41.6 [0.90]	49.9 [0.80]
Result		
Maternal mortality ratio for women without social security coverage^{+}	61.5 [3.13]	54.5 [3.02]

ncr, no cases reported, ** $P < 0.01$, * $P < 0.05$, + $P < 0.10$. Standard error in brackets

2.3 Analysis

We first present dispersion and central tendency statistics for each of the variables of interest (previously mentioned) for the years analyzed. We then mapped quintiles of MMR at jurisdictional level and show the Epanechnikov-kernel [56] univariate distribution of the adjusted technical efficiency score for the period 2008–2015.

The assessment of the impact of TE on the MMR introduced a methodological challenge evidenced previously [57]: the existence of two processes underlying the behavior of maternal mortality in Mexico. The first was defined as the occurrence or presence of maternal mortality, and the second as the severity of maternal mortality in Mexico, that is, the MMR among the jurisdictions with records of maternal deaths. This resulted in the presence of selection biases derived from the existence of structural characteristics that conditioned the non/occurrence of maternal deaths. Failure to consider this problem would have led to skewed parameter estimations. An analysis of contextual characteristics at the jurisdictional level according to the occurrence (80.3%) and non-occurrence (19.7%) of maternal deaths from 2008 to 2015 (Fig. 1) showed that they occurred in more socially disadvantaged health jurisdictions characterized by greater marginalization, a lower percentage of women benefiting from SP, a larger indigenous population, as well as greater demand for maternal health services.

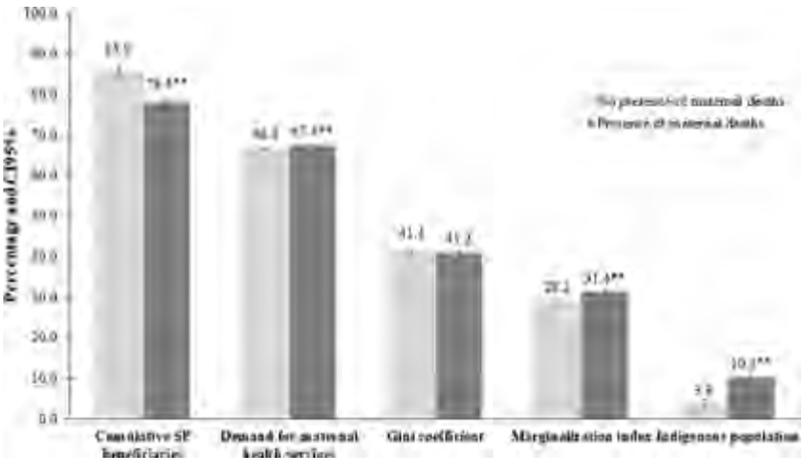


Fig. 1 Differences in structural and social determinants by health jurisdiction according to the occurrence of maternal mortality during the period 2008–2015
Note: CI95% in brackets,
$^{**}P < 0.01$, $^{*}P < 0.05$, $^{+}P < 0.10$

The selection bias in the occurrence of maternal mortality was incorporated following the work of Heckman (1979) [58]. Using the *xtprobit* Stata's command [55], we estimated a longitudinal probit model to calculate the conditional probability (in a vector of correlates) that a given health jurisdiction would record at least one maternal death (as a function of the social marginalization index·the Gini coefficient·the percentage of the population aged ≥5y who spoke an indigenous language, the cumulative percentage of women between the ages of 10–54 benefiting from the *SP*, the percentage of women between the ages of 10–54 without social security coverage, and the type of political party mentioned above). We then calculated the $\boldsymbol{\lambda_{p,t}} = \frac{F(x)}{f(x)}$ parameter (Mills ratio) to capture the magnitude of the selection bias for each DMU or year analyzed, where $F(x$ is the normal probability density function and $f(x)$ normal function [59]. Subsequently, the $\lambda_{p,\,t}$ parameter was incorporated as a regressor to the linear longitudinal model for the MMR. The Breusch-Pagan and Hausman [60] tests ($\chi^2 = 10.4$, $p < 0.01$) suggested to estimate the following fixed effects model:

$$Ln\left[MMR_{p.t}\right] = Ln\left[\Phi_{p,t}^{adj}\right]\beta + \lambda_{p,t}\delta + \epsilon_p + u_{pt},$$

with $\epsilon_p \sim N\left(0, \sigma_\epsilon^2\right)$, $u_{pt} \sim N\left(0, \sigma_u^2\right)$, $\epsilon_p (p = 1, \ldots, n)$ is the unknown intercept for each DMU (n entity-specific intercepts), and $\boldsymbol{\beta,\delta}$ were coefficients to be estimated. This model was fitted using the *xtreg* command for panel data in the MP v15.1 statistical package [55].

3 Results

Table 1 presents the principal characteristics of the health jurisdictions, or DMUs, analyzed between 2008 and 2015. As can be observed with respect to social determinants, social marginalization remained constant (30%), as did the percentage of women (10 to 54 years old) without social security coverage (67%) and the percentage of indigenous population (9%). Additionally, the percentage of women in this age group benefiting from SP markedly increased ($P < 0.01$): from 58.7% in 2008 to 87.1% in 2015, with the Gini coefficient falling from 47.1 to 39.2 ($P < 0.01$).

Table 1 also shows an increase in human and capital inputs for maternal health services in primary-care facilities. According to the SINAIS, the number of medical and nursing students grew by 13% ($P < 0.01$), as did the number of physicians (general medicine and specialists) and nurses with patient contact (22%). Financial resources increased (9%) in terms of the number of consultation offices for general medicine, obstetrics/gynecology, pediatrics, and sexual and reproductive health.

During this time period, the production of adequate maternal health services rose by 20% (from 41% to 49%, $P < 0.01$). The largest increase was recorded in coverage for women who received their initial antenatal consultation during the first trimester of pregnancy (9%), going from 67.4% to 73.7%, while coverage for childbirth in MoH hospitals went from 75.7% to 79.5%. More than 95% of women (10 to 54 years old) who reported having at least one live birth indicated that they had received antenatal and institutionalized delivery care. Finally, Table 1 shows that, on average, the MMR declined by 12% ($P < 0.10$), going from 61deaths for every thousand live births in 2008 to 54.5 in 2015.

Figure 2 shows MMR maps (in quintiles) by health jurisdiction for the period 2008–2015. In general, the highest levels of MMR were observed in the Central and Southern regions of the country, specifically in the states of Mexico, Puebla, Oaxaca, Tabasco and Chiapas. In contrast, health jurisdictions in the North of Mexico registered the lowest MMR levels. The enormous variation in MMRs within states is particularly striking, above all in the North of the country.

Figure 3 shows the Epanechnikov-kernel univariate distribution of the adjusted TE score ($\Phi_{p,t}^{adj}$) for the period 2008–2015. A shift in efficiency curves towards the right can be

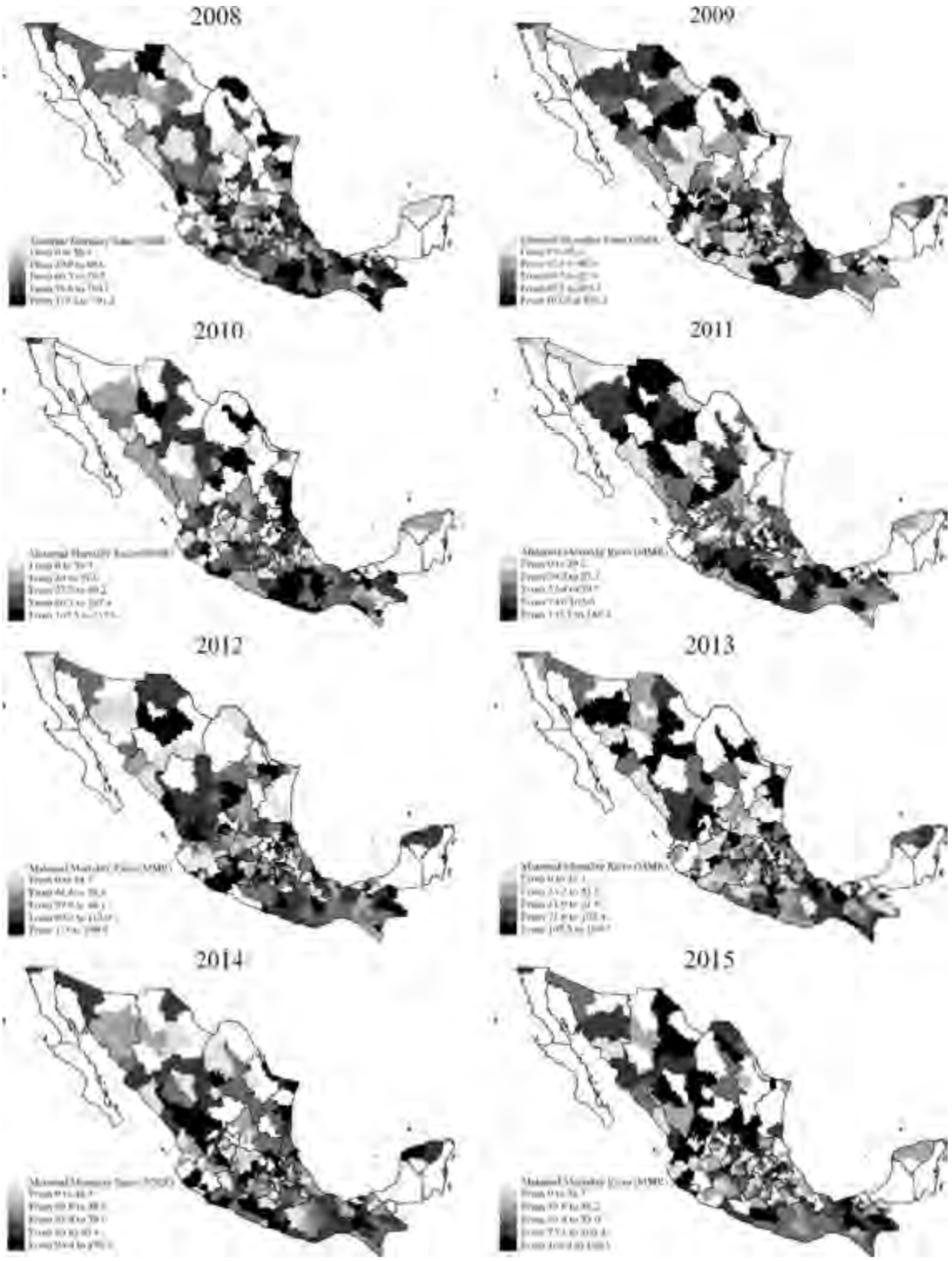


Fig. 2 Maternal mortality ratio by health jurisdiction in the period 2008–2015

observed. The increase in the TE score and a reduction in its variation are also worth noting. Additionally, in Fig. 4 we show the geographical distribution (in quintiles) of the TE at the level of health jurisdictions. Overall, 2008 and 2015 clearly registered non-randomized territorial patterns of TE, with the Northern state's jurisdictions exhibiting higher levels than those of the Southern and Southeastern states, and opposite to the ones observed for MMR.

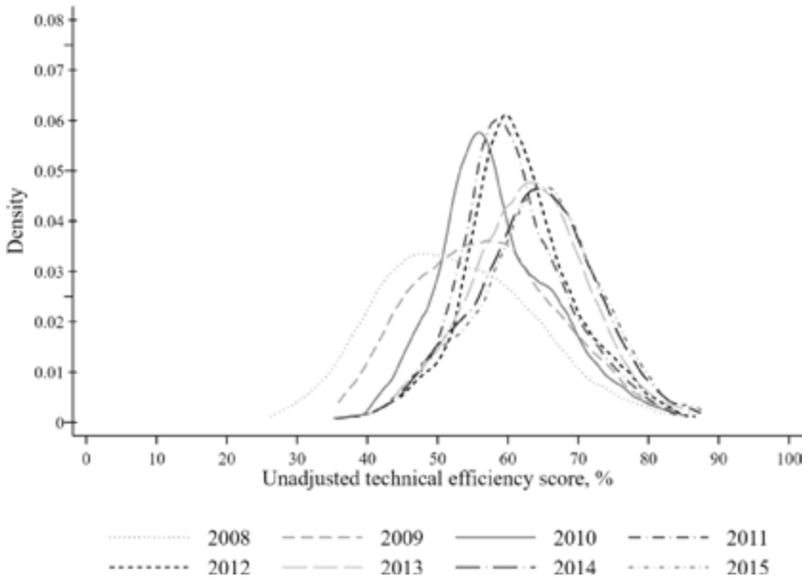


Fig. 3 Epanechnikov-kernel density of adjusted efficiency score in the period 2008–2015

Finally, Table 2 shows the results of the regression model for panel data analysis with fixed effects in the relationship between the MMR and the adjusted TE score ($\Phi_{p,t}^{adj}$). Each percentage point increase in TE is reflected in a 0.36 percentage ($P < 0.01$) point decrease in the global MMR. A heterogeneous effect can be observed according to the level of social marginalization, with a value of −079% ($P < 0.01$) in jurisdictions of high levels of social marginalization. Table 2 highlights the importance of the selection bias mentioned above, particularly among jurisdictions of high levels of social marginalization (coefficient = 1.33, $P < 0.01$).

4 Discussion and conclusions

This article presents the results of Data Envelopment Analysis and econometric analyses applied to the study of longitudinal administrative information obtained from the Mexican Ministry of Health (MoH). It provides original and robust evidence indicating that improved technical efficiency (TE) in the production of primary-care services can contribute to a significant reduction in the maternal mortality ratio (MMR) in Mexico, particularly in the most socially vulnerable communities.

Specifically, our results demonstrated the following during the period analyzed: (i) the observed reduction in the MMR was distributed non-randomly both spatially and temporally throughout the country, with health jurisdictions in the Center and South of Mexico registering the largest reductions vis-à-vis those in the North; (ii) MMRs varied sharply within states, particularly in the North; (iii) an increase occurred both in the percentage of women between the ages of 10 and 54 being covered by the SP and in available resources (human and financial) for maternal health care at the primary-care level; (iv) the estimated TE score showed a generalized increase and reduced variation; and (v) after controlling for selection bias in the occurrence of maternal mortality from 2008 to 2015, each percentage point increase in TE reduced the MMR by 0.36% ($P < 0.01$) for every percentage point increase in TE at the jurisdictional level (TE-MMR elasticity). This negative effect rose to 0.79% in socially marginalized communities.

Our findings have important implications for the Mexican Health-Care System. Despite an unprecedented increase in coverage, investment, and availability of human and material resources for health care at the MoH services units between 2004 and 2015 [9], the results observed in the reduction of maternal mortality and in the coverage for essential maternal health interventions are clearly unsatisfactory. Our findings make it possible to introduce at least three new dimensions into the current debate on the performance of the Mexican Health-Care System, which may be applicable to other middle- and low-income countries. First, it is important to analyze maternal mortality from a twofold perspective that includes the socioeconomic structure of the country as well as the Health-Care System itself. Our findings demonstrate the existence of a link between specific components of the socioeconomic structure and the distribution of maternal mortality. While modifying this structure entails an extremely complex matter extending beyond health boundaries, the efficient allocation of health resources to vulnerable populations seems like a feasible strategy. In implementing targeted policies, it is reasonable to consider approaches such as that proposed by the World Health Organization in its Helsinki declaration, Health in All Policies [61]. This approach implies elaborating intersectional public policies capable of acting not only on the organization of the health-care system through its principal functions, but also on social and economic

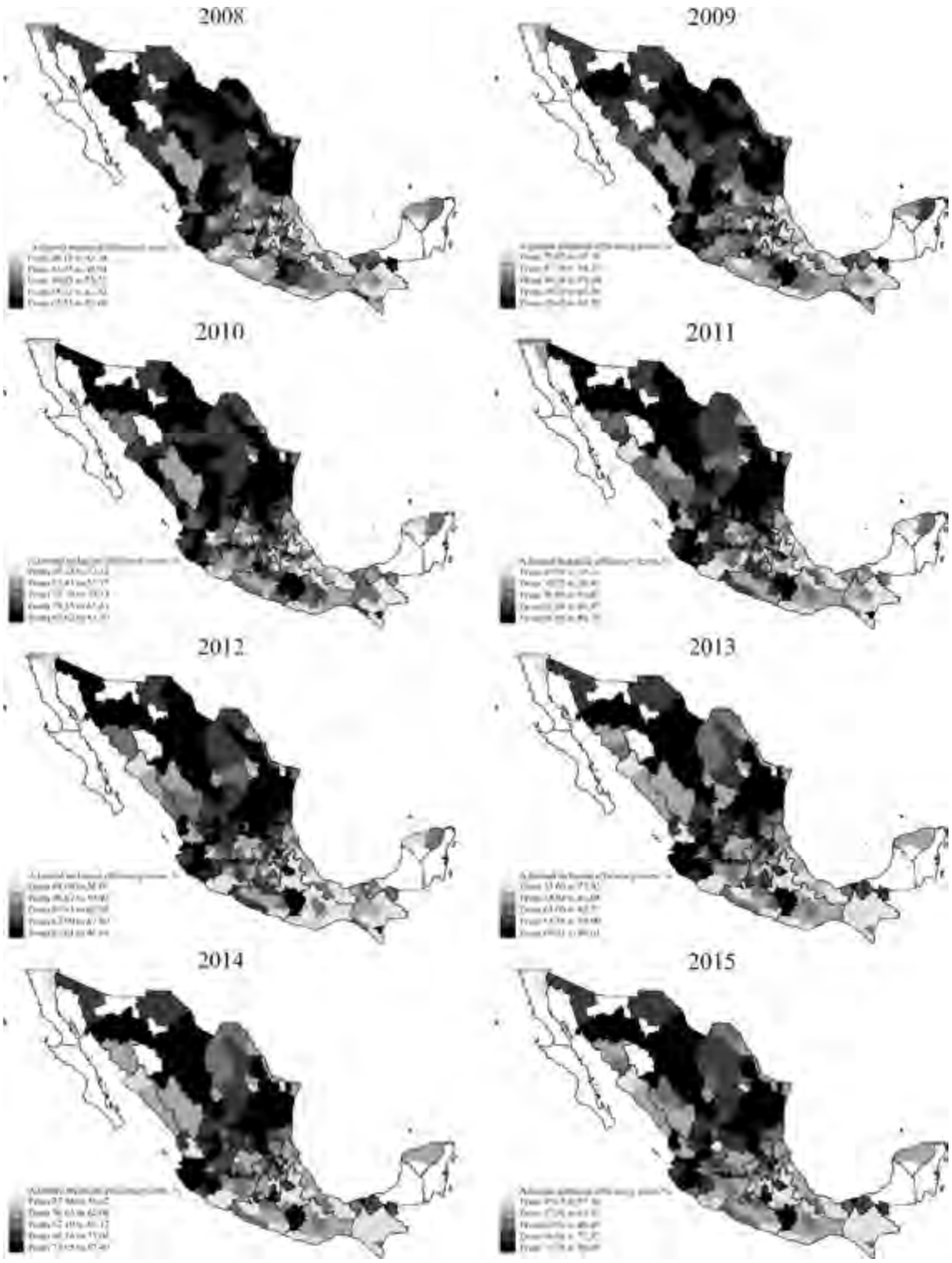


Fig. 4 Adjusted technical efficiency score by health jurisdiction in the period 2008–2015

structures, focusing efforts on the populations suffering the deepest levels of social marginalization. Such a strategy could help close the gap between the Northern and Center-Southern regions in terms of health inequities and maternal mortality. Even though some of these inter-institutional relationships already exist in Mexico, the challenge lies in designing effective coordination and implementation mechanisms.

Table 2 Results of the regression effects model for the relationship between technical efficiency and maternal mortality, 2008–2015

	National	Level of social marginalization (terciles)		
		Low	Medium	High
Efficiency score logarithm ($\Phi_{p,t}^{adj}$)	**−0.36****	−0.03	−0.14	**−0.79****
	[0.20]	[0.30]	[0.49]	**[0.34]**
Mills ratio($\lambda_{p,\ t}$)	0.13	−0.32	−0.22	**1.33****
	[0.37]	[0.58]	[0.72]	**[0.79]**
Observations	1454	490	442	522
Jurisdictions	223	80	84	79
σ_u	0.38	0.44	0.44	0.34
σ_e	0.49	0.48	0.51	0.48
ρ	0.37	0.46	0.42	0.33

Standard errors in brackets, ** $P < 0.01$, * $P < 0.05$, + $P < 0.10$. The reduction in the number of jurisdictions (6) is explained by the presence of zero maternal deaths. Where σ_u is the variance, σ_e is the standard deviation and ρ which is the proportion of the total variance contributed by the panel-level variance component

Second, the distribution of government resources for effective health care constitutes, in essence, a mechanism for the redistribution of social advantages and disadvantages. No agreement exists among specialists regarding the potential conflict that would ensue from centering the actions of health-care systems on economic efficiency principles and achieving an equitable distribution of resources. Some authors have seen this conflict as a real possibility [62], while others have dismissed it entirely, describing it as a 'fallacy' [63]. It has been suggested that allocating resources based on economic efficiency criteria could interfere with an equitable distribution given the similarity of the following elements: social conditions, the free flow of information and resources among regions, processes leading to the concentration of service supply, and the existence of hidden costs [64–66]. In this sense, it is important to place our findings in perspective, considering that efficiency must be viewed as one more factor that could guide the development of effective public policies. In spite of this, the results of our study appear to indicate that the potential 'trade-off' between efficiency and equity is not always at play, and in situations of great vulnerability marked by structural and social disadvantage, ample room for improving both indicators may exist [67]. According to results from highly marginalized areas, beyond increasing resources in accordance with the needs, improving TE through an efficient use of existing resources could have a greater effect on reducing the MMR. Future studies must delve more deeply into this point.

Third, the observed heterogeneity of adjusted TE scores to produce maternal health, particularly within states, raised the possibility of coordination problems among the federal, state and jurisdictional ambits. It will be necessary to implement resource management models that incorporate equity and efficiency criteria in the interest of improving the health of the population. These decisions now are responsibility of the new government (2018–2024) and the following processes should be considered: reflecting critically about the failures and successes of the implementation and expansion processes of the SP; learning from successful and innovative cases within the country; leaving behind customary views of health resource allocation and management stuck in the past; and analyzing, inter alia, the relevance of introducing regulated market mechanisms that promote competition among public and private providers. The latter must be permanently driven by the objective of benefitting the public and consolidating an effective system of resource allocation, with rules ensuring explicit accountability and transparency, but most importantly, preserving the right to health care for the most vulnerable populations in the country.

Our study had some limitations. First, we undertook an ecological analysis with a reduced number of explored variables. Second, we used data from administrative records compiled by the MoH, and notwithstanding notable improvements in this system, we cannot discount the possibility of data logging problems. For example, in those regions suffering the worst living conditions, underreporting may exist. Underreporting is possible given the differences in the capabilities of the personnel involved with this work and the existence of non-standardized recording procedures [68]. Additionally, we confronted limitations related to DEA methodology based on a deterministic approach, with results dependent on the variables included in the analysis. Moreover, because this methodology provides relative measures of efficiency, any change in the number of DMUs or the inclusion of different variables in the analysis could generate different efficiency scores. As mentioned elsewhere [33], it is also possible that our estimations of TE scores could be overestimated, particularly because the source of information would not allow us to weight the time dedicated by each input to the elaboration of the products analyzed or the inclusion of

specific inputs such as drug and supply availability. In this sense, ideally, the unit of analysis should be each outpatient care facility or include specific or more detailed inputs. However, we consider that this limitation does not invalidate our results; first, because we considered enough capital and labour inputs; and second, because we are grouping the health units that belong to the same and/or homogeneous jurisdictions or production unit. Nonetheless, in order to capture the heterogeneity between these clusters we are assuming variable returns to scale. In other words, we assume that the observation units have different levels of performance among themselves. Third, in the absence of appropriate indicators, it was not possible to control for the quality of services in the relationship under study, amply recognized in the literature as a factor which can conflict with estimated TE levels [69–71]. Finally, our analysis was limited to the Mexican population without social security coverage (currently representing 57% of the total population) [72]. Therefore, the results presented in this paper are representative only of maternal health service production in the public health sub-system.

In sum, we expanded our previous research on TE in the production of maternal health services in two directions: (1) we utilized innovative methodology to model and measure efficiency in the provision of health care during pregnancy, childbirth and the postpartum period, adjusting TE scores by contextual variables (structural and social) and utilizing econometric correction methods for selection bias, and (2) we performed analysis at the health jurisdiction level. This allowed us to obtain evidence at the sub-national level by employing an analysis unit not utilized in previous estimates. At least three policy implications can be drawn from this research. First, we demonstrate that it is possible to improve performance and TE in the production of maternal health services. Second, we show the presence of a clear relationship between TE in the production of these services by health jurisdictions and maternal health results, in such a way that increases in TE levels could be associated with a reduction in the MMR. Finally, our results indicate the importance of contextual elements (eg, socio-economic gaps across regions, sufficient availability of material and human resources) in the TE results of jurisdictions, suggesting the need to design and execute comprehensive and cross-cutting public policies aimed at modifying the conditions that generate vulnerability in specific populations. These results suggest that increased efficiency in the production of services could contribute to effectively and permanently reduce the level of maternal mortality in Mexico. This option would require, inter alia, that the analysis of maternal mortality incorporate the following elements: the resources and capacities of health systems, specific components of the social context, and the criteria governing resource allocation and distribution, as well as the control mechanisms for applying them and achieving accountability.

Acknowledgements The authors gratefully acknowledge the support of the National Council of Science and Technology (CONACyT by its Spanish initials). Project ID: FOSISS-S0008-2015-1,261535. We also thanks Patricia E. Solis and Michael H. Sumner for their valuable editing support.

Author contributions Edson Serván-Mori: conceptualization, data curation, funding acquisition, investigation, methodology, project administration, supervision, writing – original draft, writing – review & editing Carlos Chivardi: data curation, formal analysis, methodology, writing – review & editing Fato Fene: formal analysis, writing – original draft, writing – review & editing Ileana Heredia-Pi: formal analysis, writing – original draft, writing – review & editing Miguel Ángel Mendoza: formal analysis, methodology, writing – original draft, writing – review & editing Gustavo Nigenda: conceptualization, formal analysis, investigation, writing – original draft, writing – review & editing.

Data availability All data underlying this study have been uploaded to figshare and are freely accessible using the following link: https://doi.org/10.6084/m9.figshare.7898054.v1.

Compliance with ethical standards

Competing interests The authors declare that they have no competing interests.

Financial disclosure This research was possible with the support of the National Council of Science and Technology (CONACyT by its Spanish initials). Project ID: FOSISS-S0008–2015-1,261,535.

References

1. World Health Organization, United Nations Children's Fund, United Nations Development Programme, World Bank. Trends in maternal mortality: 1990 to 2015: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva 27, Switzerland: World Health Organization; 2015
2. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller A-B, Daniels J et al (2014 Jan) Global causes of maternal death: a WHO systematic analysis. Lancet Glob Heal 2(6):e323–e333
3. Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, Shackelford KA, Steiner C, Heuton KR, Gonzalez-Medina D, Barber R, Huynh C, Dicker D, Templin T, Wolock TM, Ozgoren AA, Abd-Allah F, Abera SF, Abubakar I, Achoki T, Adelekan A, Ademi Z, Adou AK, Adsuar JC, Agardh EE, Akena D, Alasfoor D, Alemu ZA, Alfonso-Cristancho R, Alhabib S, Ali R, al Kahbouri MJ, Alla F, Allen PJ, AlMazroa M, Alsharif U, Alvarez E, Alvis-Guzmán N, Amankwaa AA, Amare AT, Amini H, Ammar W, Antonio CA, Anwari P, Arnlöv J, Arsenijevic VS, Artaman A, Asad MM, Asghar RJ, Assadi R, Atkins LS, Badawi A, Balakrishnan K, Basu A, Basu S, Beardsley J, Bedi N, Bekele T, Bell ML, Bernabe E, Beyene TJ, Bhutta Z, Bin Abdulhak A, Blore JD, Basara BB, Bose D, Breitborde N, Cárdenas R, Castañeda-Orjuela CA, Castro RE, Catalá-López F, Cavlin A, Chang JC, Che X, Christophi CA, Chugh SS, Cirillo M, Colquhoun SM, Cooper LT, Cooper C, da Costa Leite I, Dandona L, Dandona R, Davis A, Dayama A, Degenhardt L, de Leo D, del Pozo-Cruz B, Deribe K, Dessalegn M, deVeber G, Dharmaratne SD, Dilmen U, Ding EL, Dorrington RE, Driscoll TR, Ermakov SP, Esteghamati A, Faraon EJ, Farzadfar F, Felicio MM, Fereshtehnejad SM, de Lima GM, Forouzanfar MH, França EB, Gaffikin L,

Gambashidze K, Gankpé FG, Garcia AC, Geleijnse JM, Gibney KB, Giroud M, Glaser EL, Goginashvili K, Gona P, González-Castell D, Goto A, Gouda HN, Gugnani HC, Gupta R, Gupta R, Hafezi-Nejad N, Hamadeh RR, Hammami M, Hankey GJ, Harb HL, Havmoeller R, Hay SI, Pi IB, Hoek HW, Hosgood HD, Hoy DG, Husseini A, Idrisov BT, Innos K, Inoue M, Jacobsen KH, Jahangir E, Jee SH, Jensen PN, Jha V, Jiang G, Jonas JB, Juel K, Kabagambe EK, Kan H, Karam NE, Karch A, Karema CK, Kaul A, Kawakami N, Kazanjan K, Kazi DS, Kemp AH, Kengne AP, Kereselidze M, Khader YS, Khalifa SE, Khan EA, Khang YH, Knibbs L, Kokubo Y, Kosen S, Defo BK, Kulkarni C, Kulkarni VS, Kumar GA, Kumar K, Kumar RB, Kwan G, Lai T, Lalloo R, Lam H, Lansingh VC, Larsson A, Lee JT, Leigh J, Leinsalu M, Leung R, Li X, Li Y, Li Y, Liang J, Liang X, Lim SS, Lin HH, Lipshultz SE, Liu S, Liu Y, Lloyd BK, London SJ, Lotufo PA, Ma J, Ma S, Machado VM, Mainoo NK, Majdan M, Mapoma CC, Marcenes W, Marzan MB, Mason-Jones AJ, Mehndiratta MM, Mejia-Rodriguez F, Memish ZA, Mendoza W, Miller TR, Mills EJ, Mokdad AH, Mola GL, Monasta L, de la Cruz Monis J, Hernandez JC, Moore AR, Moradi-Lakeh M, Mori R, Mueller UO, Mukaigawara M, Naheed A, Naidoo KS, Nand D, Nangia V, Nash D, Nejjari C, Nelson RG, Neupane SP, Newton CR, Ng M, Nieuwenhuijsen MJ, Nisar MI, Nolte S, Norheim OF, Nyakarahuka L, Oh IH, Ohkubo T, Olusanya BO, Omer SB, Opio JN, Orisakwe OE, Pandian JD, Papachristou C, Park JH, Caicedo AJ, Patten SB, Paul VK, Pavlin BI, Pearce N, Pereira DM, Pesudovs K, Petzold M, Poenaru D, Polanczyk GV, Polinder S, Pope D, Pourmalek F, Qato D, Quistberg DA, Rafay A, Rahimi K, Rahimi-Movaghar V, ur Rahman S, Raju M, Rana SM, Refaat A, Ronfani L, Roy N, Pimienta TG, Sahraian MA, Salomon JA, Sampson U, Santos IS, Sawhney M, Sayinzoga F, Schneider IJ, Schumacher A, Schwebel DC, Seedat S, Sepanlou SG, Servan-Mori EE, Shakh-Nazarova M, Sheikhbahaei S, Shibuya K, Shin HH, Shiue I, Sigfusdottir ID, Silberberg DH, Silva AP, Singh JA, Skirbekk V, Sliwa K, Soshnikov SS, Sposato LA, Sreeramareddy CT, Stroumpoulis K, Sturua L, Sykes BL, Tabb KM, Talongwa RT, Tan F, Teixeira CM, Tenkorang EY, Terkawi AS, Thorne-Lyman AL, Tirschwell DL, Towbin JA, Tran BX, Tsilimbaris M, Uchendu US, Ukwaja KN, Undurraga EA, Uzun SB, Vallely AJ, van Gool C, Vasankari TJ, Vavilala MS, Venketasubramanian N, Villalpando S, Violante FS, Vlassov VV, Vos T, Waller S, Wang H, Wang L, Wang X, Wang Y, Weichenthal S, Weiderpass E, Weintraub RG, Westerman R, Wilkinson JD, Woldeyohannes SM, Wong JQ, Wordofa MA, Xu G, Yang YC, Yano Y, Yentur GK, Yip P, Yonemoto N, Yoon SJ, Younis MZ, Yu C, Jin KY, el Sayed Zaki M, Zhao Y, Zheng Y, Zhou M, Zhu J, Zou XN, Lopez AD, Naghavi M, Murray CJ, Lozano R (2014 Nov 9) Global, regional, and national levels and causes of maternal mortality during 1990-2013: a systematic analysis for the global burden of disease study 2013. Lancet. 384(9947): 980–1004

4. Serván-Mori E, Sosa-Rubí SG, Najera-Leon E, Darney BG (2016) Timeliness, frequency and content of antenatal care: which is most important to reducing indigenous disparities in birth weight in Mexico? Health Policy Plan 31(4):444–453
5. Knaul FM, Frenk J (2005 Nov) Health insurance in Mexico: achieving universal coverage through structural reform. Health Aff 24(6):1467–1476
6. Gakidou E, Lozano R, González-Pier E, Abbott-Klafter J, Barofsky JT, Bryson-Cahn C, Feehan DM, Lee DK, Hernández-Llamas H, Murray CJ (2006 Nov 25) Assessing the effect of the 2001-06 Mexican health reform: an interim report card. Lancet. 368(9550): 1920–1935
7. King G, Gakidou E, Imai K, Lakin J, Moore RT, Nall C, Ravishankar N, Vargas M, Téllez-Rojo MM, Avila JE, Avila MH, Llamas HH (2009 Apr 25) Public policy for the poor? A randomised assessment of the Mexican universal health insurance programme. Lancet. 373(9673):1447–1454
8. Sosa-Rubí SG, Galárraga O, Harris JE (2009) Heterogeneous impact of the "Seguro popular" program on the utilization of obstetrical services in Mexico, 2001-2006: a multinomial probit model with a discrete endogenous variable. J Health Econ 28(1):20–34
9. Comisión Nacional de Protección Social en Salud. Sistema de Protección Social en Salud: Informe de resultados enero-diciembre 2016 [Internet]. 1st ed. Vol. 1. Mexico city; 2017. Available from: http://www.transparencia.seguro-popular.gob.mx/contenidos/archivos/transparencia/planesprogramaseinformes/informes/InfResSPSSEne-Dic2016Final.pdf
10. Secretaría de Salud de México. Dirección General de Información en Salud [Internet]. Sistema Nacional de Información en Salud (SINAIS). 2018 [cited 2018 Feb 5]. Available from: https://www.gob.mx/salud/acciones-y-programas/direccion-general-de-informacion-en-salud-dgis
11. Government of Mexico. MDG's Information System (SIODM) [Internet]. 2015 [cited 2016 Feb 3]. Available from: http://www.objetivosdedesarrollodelmilenio.org.mx/cgi-win/odmsql.exe/LOI,E
12. Organization for Economic Co-operation and Development. OECD reviews of health systems: Mexico 2016 [Internet]. Paris, France: OECD Publishing; 2016. Available from: http://www.oecd-ilibrary.org/social-issues-migration-health/oecd-reviews-of-health-systems-mexico-2016_9789264230491-en
13. Serván-Mori E, Wirtz V, Avila-Burgos L, Heredia-Pi I (2015) Antenatal care among poor women in Mexico in the context of universal health coverage. Matern Child Health J 19(10):2314–2322
14. Serván-Mori E, Contreras-Loya D, Gomez-Dantés O, Nigenda G, Sosa-Rubí SG, Lozano R (2017) Use of performance metrics for the measurement of universal coverage for maternal care in Mexico. Health Policy Plan 32(5):625–633
15. Heredia-Pi I, Servan-Mori E, Darney BG, Reyes-Morales H, Lozano R (2016) Measuring the adequacy of antenatal health care: a national cross-sectional study in Mexico. Bull World Health Organ 94(6):452–461
16. Serván-Mori E, Avila-Burgos L, Nigenda G, Lozano R (2016) A performance analysis of public expenditure on maternal health in Mexico. Ciccozzi M, editor. PLoS One 11(4):e0152635
17. Freyermuth Enciso MG, Luna CM (2014) Muerte maternay muertes evitables en exceso. Propuesta metodológica para evaluar la política pública en salud. Rev Int Estadística y Geogr 5(3):44–61
18. Ávila-Burgos L, Cahuana-Hurtado L, Montañez-Hernandez J, Serván-Mori E, Aracena-Genao B, Del Río-Zolezzi A. Financing maternal health and family planning: are we on the right track? Evidence from the reproductive health subaccounts in Mexico, 2003–2012. PLoS One. 2016;11(1)
19. Cid C, Báscolo E, Morales C (2016) La eficiencia en la agenda de la estrategia de acceso universal a la salud y cobertura universal en salud en las Américas. Salud Publica Mex 58(5):496–503
20. González-Villalpando C (2007 Feb 2) Mejorar la calidad y eficiencia de los servicios de salud en mexico la prioridad. Salud Publica Mex 49(Suppl. 1):S288–S289
21. Cylus J, Papanicolas I, Smith PC (2016) A framework for thinking about health system efficiency. In: Cylus J, Papanicolas I, Smith PC (eds) Health system efficiency: how to make measurement matter for policy and management [internet], 1st edn. European Observatory on Health Systems and Policies, London, UK, pp 1–20 Available from: http://www.euro.who.int/__data/assets/pdf_file/0004/324283/Health-System-Efficiency-How-make-measurement-matter-policy-management.pdf
22. Martínez S, Quindós M, Rubiera F (2003) Análisis de la eficiencia en el sector de los servicios avanzados a las empresas : una aplicación para el caso del Principado de Asturias. Asoc española profesores Univ matemáticas para la Econ y la Empres XI Jornadas Oviedo 11:28

23. Kirigia JM, Emrouznejad A, Sambo LG, Munguti N, Liambila W (2004) Using data envelopment analysis to measure the technical efficiency of public health centers in Kenya. J Med Syst 28(2):155–166
24. Anton SG (2013) Technical efficiency in the use of health care resources: a cross-country analysis. Ann Alexandru Ioan Cuza Univ - Econ 60(1):31–42
25. Serván-Mori E, Mendoza MÁ, Chivardi C, Pineda-Antúnez C, Rodríguez-Franco R, Nigenda G (2019 Jun 12) A spatio-temporal cluster analysis of technical efficiency in the production of outpatient maternal health services and its structural correlates in México. Int J Health Plann Manag 34(4):e1417–e1436
26. Ravangard R, Hatam N, Teimourizad A, Jafari A (2014) Factors affecting the technical efficiency of health systems: a case study of economic cooperation organization (ECO) countries (2004–10). Int J Heal policy Manag 3(2):63
27. Nelson-Piercy C, Mackillop L, Williams DJ, Williamson C, De Swiet M, Redman C (2011 Aug) Maternal mortality in the UK and the need for obstetric physicians: most deaths are now caused by preventable or treatable medical conditions. BMJ. 9:343(7821)
28. Seth P (2009) Infant mortality and maternal mortality: socio-economic causes and determinants, 1st edn. Gyan Publishing House, New Delhi, 302 p
29. Oxaal Z, Baden S. Challenges to women's reproductive health: maternal mortality [Internet]. Brigthon: BRIDGE (development - gender); 1996. Available from: http://www.bridge.ids.ac.uk/
30. García Jordá D, Díaz BZ (2010) Perspectiva antropológica y de género en el análisis de la atención al embarazo, parto y puerperio. Rev Cuba Salud Pública 36(4):330–336
31. United Nations Development Programme. A social determinants approach to maternal health [Internet]. Discussion paper on roles for development actors. Ginebra 27, Suiza; 2011. (Discussion Paper). Available from: http://www.undp.org/content/dam/undp/library/Democratic Governance/Discussion Paper MaternalHealth.pdf
32. Tunçalp Ö, Were WM, MacLennan C, Oladapo OT, Gülmezoglu AM, Bahl R et al (2015 Jul 1) Quality of care for pregnant women and newborns—the WHO vision. BJOG An Int J Obstet Gynaecol 122(8):1045–1049
33. Serván-Mori E, Chivardi C, Mendoza MÁ, Nigenda G (2018) A longitudinal assessment of the technical efficiency in the outpatient production of maternal health services in México. Health Policy Plan:888–897
34. Measure Evaluation. Family Planning and Reproductive Health Indicators Database [Internet]. Maternal mortality ratio (MMR). 2019 [cited 2018 Feb 5]. Available from: https://www.measureevaluation.org/prh/rh_indicators
35. Hogan MC, Saavedra-Avendano B, Darney BG, Torres-Palacios LM, Rhenals-Osorio AL, Sierra BLV, Soliz-Sánchez PN, Gakidou E, Lozano R (2016) Reclassifying causes of obstetric death in Mexico: a repeated cross-sectional study. Bull World Health Organ 94(5):362–369B
36. Lamadrid-Figueroa H, Montoya A, Fritz J, Olvera M, Torres LM, Lozano R. Towards an inclusive and evidence-based definition of the maternal mortality ratio: an analysis of the distribution of time after delivery of maternal deaths in Mexico, 2010–2013. PLoS One. 2016;11(6)
37. Farrell MJ (1957) The measurement of productive efficiency. J R Stat Soc Ser A 120(3):253–290
38. Ruggiero J (2000) Measuring technical efficiency. Eur J Oper Res 121(1):138–150
39. Charnes A, Clark CT, Cooper WW, Golany B (1984 Dec) A developmental study of data envelopment analysis in measuring the efficiency of maintenance units in the U.S. air forces. Ann Oper Res 2(1):95–112
40. Kirigia JM, Asbu EZ (2013) Technical and scale efficiency of public community hospitals in Eritrea: an exploratory study. Health Econ Rev 3(1):1–16
41. Simar L, Wilson PW (2007 Jan) Estimation and inference in two-stage, semi-parametric models of production processes. J Econom 136(1):31–64
42. Banker RD, Charnes A, Cooper WW (1984 Sep 1) Some models for estimating technical and scale inefficiencies in data envelopment analysis. Manag Sci 30(9):1078–1092
43. Fernández-Santos Y, Martínez-Campillo A, Fernández-Fernández JM (2015) Determinantes de la eficiencia en las universidades públicas españolas: un análisis DEA en dos etapas. Investig Econ la Educ 10:491–508
44. Flokou A, Aletras V, Niakas D (2017) Awindow-DEA based efficiency evaluation of the public hospital sector in Greece during the 5-year economic crisis. PLoS One 12(5):1–26
45. Montoya Suarez O, Soto Mejía J. Estimacion de la eficiencia tecnica de las economías de los departamentos cafeteros de Colombia, por el método de programación lineal análisis envolvente de datos (DEA). Scientia. 2010 Apr 30;XVI(44):348–53
46. Chung SH, Lee AHI, Kang HY, Lai CW (2008) A DEA window analysis on the product family mix selection for a semiconductor fabricator. Expert Syst Appl 35(1–2):379–388
47. Jia T, Yuan H (2017) The application of DEA (data envelopment analysis) window analysis in the assessment of influence on operational efficiencies after the establishment of branched hospitals. BMC Health Serv Res 17(1):265
48. Cordero JM, Nuño-Solinís R, Orueta JF, Polo C, del Río-Cámara M, Alonso-Morán E (2016) Evaluación de la eficiencia técnica de la atención primaria pública en el País Vasco, 2010-2013. Gac Sanit 30(2):104–109
49. Heredia-Pi I, Serván-Mori E, Reyes-Morales H, Lozano R. Brechas en la cobertura de atención continua del embarazo y el parto en México. Salud Publica Mex. 2013;55(Supl. 2):S282–8
50. Díez de Castro EP, Díez Martín F de A. Un modelo para la medición de la eficiencia en los departamentos universitarios. Rev Enseñanza Univ. 2005;25:7–33
51. SAITECH. DEA Solver, Professional version [Internet]. New Jersey 07733: SAITECH; 2006. Available from: http://www.saitech-inc.com/products/prod-dsp.asp
52. Greene WH (2018) Econometric analysis [internet], 8th edn. Pearson, New York, 1168 p. Available from: http://pubs.amstat.org/doi/abs/10.1198/jasa.2002.s458
53. Consejo Nacional de Población. Índices de marginación municipal 2000 Y 2010 [Internet]. Índices de marginación 2017. Available from: http://www.conapo.gob.mx/es/CONAPO/Indices_de_Marginacion_Publicaciones
54. Consejo Nacional de Evaluación de la Política de Desarrollo Social. Medición de la pobreza [Internet]. Evolución de las dimensiones de la pobreza 1990–2016. 2018 [cited 2017 Dec 5]. p. http://www.coneval.org.mx/Medicion/Paginas/AE_pobr. Available from: https://www.coneval.org.mx/Medicion/Paginas/Evolucion-de-las-dimensiones-de-pobreza.aspx
55. StataCorp. Stata Statistical Software: Release 15 MP. Texas, USA: College Station, TX: StataCorp LP; 2017
56. Silalahi DD, Wahyuningsih PA, Siregar FA (2013) Representing data distributions with a nonparametric kernel density: the way to estimate the optimal oil contents of palm mesocarp at various periods. Math Stat 1(2):64–73
57. Pérez-Pérez E, Serván-Mori E, Nigenda G, Ávila-Burgos L, Mayer-Foulkes D. Government expenditure on health and maternal mortality in México: a spatial-econometric analysis. Int J Health Plann Manag 2019 Jan 7;0(0):1–17
58. Heckman JJ (1979) Sample selection bias as a specification error. Econometrica. 47(1):153
59. Savage IR (1962) Mills' ratio for multivariate normal distributions. J Res Natl Bur Stand Sect B Math Sci 66:93–96

60. Cameron AC, Trivedi PK (2005) Microeconometrics: methods and applications. 1st ed. Cambridge university press, editor. Cambridge university press, New York
61. World Health Organization. Health in all policies: framework for country action. World Health Organization, Geneva, Switzerland. Geneva 27, Switzerland; 2015
62. Sassi F, Le Grand J, Archard L. Equity versus efficiency: a dilemma for the NHS. BMJ. 2001 Oct 6;323(7316):762 LP – 763
63. Reidpath DD, Olafsdottir AE, Pokhrel S, Allotey P (2012 Jun 22) The fallacy of the equity-efficiency trade off: rethinking the efficient health system. BMC Public Health 12(Suppl 1):S3–S3
64. Symons JG (1971) Some comments on equity and efficiency in public facility location models. Antipode. 3(1):54–67
65. Garrocho C (1990) Localización geográfica de los servicios de salud en un subsistema de asentamientos rurales del Estado de México un intento de evaluación. Estud Demogr Urbanos Col Mex 5(1):127–148
66. Bigman D, ReVelle C (1978) The theory of welfare considerations in public facility location problems. Geogr Anal 10(3):229–240
67. James C, Carrin G, Savedoff W, Hanvoravongchai P (2005) Clarifying efficiency-equity tradeoffs through explicit criteria, with a focus on developing countries. Heal Care Anal 13(1):33–51
68. Consejo Nacional de Evaluación de la Política de Desarrollo Social. Evaluación estratégica sobre mortalidad materna en México [Internet]. Mexico City; 2010. Available from: http://www.coneval.gob.mx/Informes/Evaluacion/Mortalidad materna 2010/INFORME_MORTALIDAD_MATERNA.pdf
69. Cordero Ferrera JM, Cebada EC, Murillo Zamorano LR (2014) The effect of quality and socio-demographic variables on efficiency measures in primary health care. Eur J Health Econ 15(3):289–302
70. Ruiz-Rodriguez M, Rodriguez-Villamizar LA, Heredia-Pi I (2016) Technical efficiency of women's health prevention programs in Bucaramanga, Colombia: a four-stage analysis. BMC Health Serv Res 16(1):576
71. Murillo-Zamorano LR, Petraglia C (2011) Technical efficiency in primary health care: does quality matter? Eur J Health Econ 12(2):115–125
72. Consejo Nacional de Evaluación de la Política de Desarrollo Social. Medición de la pobreza 2008–2018, Estados Unidos Mexicanos [Internet]. 2020 [cited 2020 Jan 23]. Available from: https://www.coneval.org.mx/Medicion/MP/Paginas/Pobreza-2018.aspx

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

View publication stats

Alcalde-Rabanal *et al. Human Resources for Health* (2017) 15:49
DOI 10.1186/s12960-017-0220-5

Human Resources for Health

RESEARCH Open Access

The gap in human resources to deliver the guaranteed package of prevention and health promotion services at urban and rural primary care facilities in Mexico

Jacqueline Elizabeth Alcalde-Rabanal[1], Gustavo Nigenda[2*], Till Bärnighausen[3,6], Héctor Eduardo Velasco-Mondragón[4] and Blair Grant Darney[1,5]

Abstract

Background: The purpose of this study was to estimate the gap between the available and the ideal supply of human resources (physicians, nurses, and health promoters) to deliver the guaranteed package of prevention and health promotion services at urban and rural primary care facilities in Mexico.

Methods: We conducted a cross-sectional observational study using a convenience sample. We selected 20 primary health facilities in urban and rural areas in 10 states of Mexico. We calculated the available and the ideal supply of human resources in these facilities using estimates of time available, used, and required to deliver health prevention and promotion services. We performed descriptive statistics and bivariate hypothesis testing using Wilcoxon and Friedman tests. Finally, we conducted a sensitivity analysis to test whether the non-normal distribution of our time variables biased estimation of available and ideal supply of human resources.

Results: The comparison between available and ideal supply for urban and rural primary health care facilities reveals a low supply of physicians. On average, primary health care facilities are lacking five physicians when they were estimated with time used and nine if they were estimated with time required ($P < 0.05$). No difference was observed between available and ideal supply of nurses in either urban or rural primary health care facilities. There is a shortage of health promoters in urban primary health facilities ($P < 0.05$).

Conclusion: The available supply of physicians and health promoters is lower than the ideal supply to deliver the guaranteed package of prevention and health promotion services. Policies must address the level and distribution of human resources in primary health facilities.

Keywords: Health promotion, Preventive health services, Human resources planning, Health manpower, Health workforce, Health personnel, Primary health care, Mexico

Background

The availability of sufficient human resources (HR) for delivery of health services is a major global policy concern [1]. The health workforce is the social and technical foundation of any health system [2], and the absence or poor distribution [3] of HR can negatively impact both the delivery of health services and the accomplishment of local or national population health goals [4]. The strengthening of primary health care and health promotion services through sufficient human resources has been identified as a high priority area for health systems in many countries [5]. According to the World Health Organization's (WHO) recent reports, most developing countries, despite important advancements, are still struggling to find clear guidelines for integration of HR into health systems; however, these countries have been experiencing important transformations in recent decades [6, 7].

* Correspondence: gnigenda@uaem.mx; gnigenda@outlook.com
[2]Partners in Health, Calle Primera Poniente Sur # 25, Angel Albino Corzo, CP 30370 Chiapas, Mexico
Full list of author information is available at the end of the article

© The Author(s). 2017 **Open Access** This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

Alcalde-Rabanal JE, Nigenda G, Bärnighausen T, Velasco-Mondragón HE, Darney B. The gap in human resources to deliver the guaranteed package of prevention and health promotion services at urban and rural primary care facilities in Mexico. Hum Resour Health. 2017;15(1):49. https://doi.org/10.1186/s12960-017-0220-5

The Mexican health system is segmented into social security (employment-based), public (Ministry of Health), and private sectors. The health system has evolved through three generations of reforms, which have motivated various actions and strategies for the strengthening of HR. The first reform, in 1943 [2, 8], highlighted the creation of the social security sub-system and focused primarily on making HR available in hospitals.

The second reform, in the 1980s and 1990s, focused on hiring HR for extending coverage through the decentralization of the public sub-system (Ministry of Health) and strengthening of primary health care (PHC) [4, 8, 9]. At that time, "Oportunidades" (formerly PROGRESA, now PROSPERA), a conditional cash transfer program that began in 1997 [10], was specifically designed to encourage demand for health services at the primary care level. Physicians, nurses, and health promoters were hired by the program to provide services to beneficiaries.

The third reform, in the early 2000s, created *Seguro Popular de Salud* (SPS) (2003) to allocate new resources to strengthen primary care and health promotion services in the public sub-system. SPS also aimed to transform the existing curative, hospital-centered health care model to a new one more focused on primary care, prevention, and health promotion. This reform meant to hire and allocate personnel for general hospitals and primary health care facilities in rural and urban areas. SPS slowly rolled out across the country covering by 2012 around 57 million Mexicans [11]. It provides a package of 284 primary and secondary care interventions (CAUSES in Spanish) aimed at improving population health, reducing out-of-pocket expenditures, and satisfying client expectations. SPS serves the population outside the formal sector of the economy who are not eligible for social security (employment-based coverage). In each state, the Health Social Protection Regime (REPSS in Spanish) was created to take responsibility for pooling together the different sources of financing and allocate them according to SPS managerial guidelines to guarantee the provision of services to beneficiary populations.

Seguro Popular greatly expanded access to health services to the uninsured population [12–15], with the gradual introduction of the CAUSES package, which includes both health promotion and preventive services (PPPS) [14, 16]. CAUSES should operate in all Ministry of Health (public) primary health care facilities. The PPPS has 99 guaranteed activities and was structured to cover the needs of different age groups (Table 1). The massive expansion in demand and access to services following implementation of SPS required additional HR for health in all states in the country. However, the newly contracted health personnel were concentrated in urban areas, due to the lack of an explicit and specific HR distribution policy [14, 17], leaving rural facilities with little HR capacity. Thus, the number of health professionals in primary care facilities has not grown significantly, while at the same time an increasingly larger population is demanding health care.

In order to transform administrative and financial reforms into concrete actions to improve population health status [15, 18] and health service delivery goals, it is critical to have sufficient human resources and to distribute them appropriately [19]. Evidence on the sufficiency of human resources to meet health goals and objectives is scarce. Information on the link between human resources supply and prevention and promotion services is even more sparse. The purpose of this study was to estimate the gap between the available and the ideal supply of human resources to deliver health prevention and promotion services to the Mexican population served by the public sub-system. We hypothesized that the available supply of human resources is insufficient to ensure the delivery of PPPS in rural and urban primary health care facilities in Mexico.

Methods

We conducted a cross-sectional observational study and used a convenience sample considering the following criteria: (a) geographic diversity (North, Center, and South), (b) REPSS juridical status (decentralized, deconcentrated, or integrated), and (c) level of REPSS performance (percentage of the population affiliated to SPS and percentage of population with SPS that use health services). Ten states were included (Morelos, Ciüdad de México, Hidalgo, Querétaro, Guerrero, Baja California, Jalisco, Campeche, Zacatecas, and Estado de México). In each state, we selected two primary care facilities (PHFs) that provided a prevention and health promotion package since initiation of SPS in 2003 (Lifeline Program). One rural and one urban PHF was included (we used the classification of urban/rural PHF established by the General Directorate of Health Information). However, Mexico City is completely urban and Jalisco did not have rural primary health facilities that had implemented the package by 2003, so in these states, we included only urban facilities.

Our analysis is guided by the service delivery target model, which is based on demand of health services [20–23] and the availability of human resources to deliver health services. To estimate the demand of preventive and health promotion services, we employed the normative-need approach [24], which relies on an expert opinion about which health services an individual should receive over 1 year (Fig. 1). We focused on all 99 prevention and promotion activities that are included in the guaranteed package for all age groups [16] included in CAUSES and implemented in all primary care facilities (Table 1).

Table 1 Guaranteed prevention and health promotion package by age group

Newborns	Children under 9 years	Teens 10–19 years	Women and men 20–59 years	Women and men over 60 years	Pre- and postpartum
1. Risk signs 2. Birth conditions 3. Complete physical examination 4. Birth defects 5. Umbilical cord examination 6. Neonatal screening 7. Eye prophylaxis and vitamin K 8. Vaccination 9. Promotion of breastfeeding and early stimulation 10. Card to follow child	1. Weight and height 2. Complete physical examination 3. Visual acuity 4. Growth and learning disorders 5. Postural problems 6. Family factors of poor prognosis (<5 years) 7. Complete vaccination schedule 8. Micronutrients administration (<5 years) 9. Oral health 10. Healthy nutrition 11. Early stimulation (<5 years) 12. Physical activity and accident prevention 13. Individual and family hygiene education	1. Tuberculosis risk 2. Nutritional status 3. Attention disorders and addictions 4. Complete physical examination 5. Identification of pregnancy 6. Detection of sexually transmitted infections and HIV/AIDS 7. Complete vaccination 8. Reproductive health and contraception 9. Promoting physical activity, oral health, and accident prevention	1. Tuberculosis and BK 2. Sexually transmitted diseases and HIV/AIDS 3. Diabetes, hypertension, overweight, obesity, and osteoporosis 4. Climacteric and menopause (women >40 years) 5. Prostatic disease (men) 6. Complete vaccination 7. Papanicolaou and breast exam (women) 8. Sexual and reproductive health 9. Education for preventing cervical and breast cancer 10. Physical activity, accident prevention, alcohol, and tobacco smoke risk 11. Oral health	1. Visual and hearing problems 2. Prostatic disease 3. Diabetes, hypertension, overweight, obesity, and osteoporosis 4. Tuberculosis risk and BK 5. Signs of cognitive impairment and depression 6. Complete vaccination 7. Breast examination 8. Oral health 9. Physical activity and accident prevention (falls) 10. Information about cervical and breast cancer. 11. Education on acute respiratory infections and vaccines	1. Weight and blood pressure 2. Pregnancy confirmation 3. Pregnancy risks factors 4. Perinatal card 5. Laboratory studies (blood test, syphilis, complete urinalysis, and others) 6. Complete vaccination to pregnant women 7. Micronutrient administration 8. Oral health 9. Parental education 10. Care of the newborn 11. Family planning 12. Health education and treatment to HIV/AIDS

Source: Adapted from Lifeline strategy for Prevention and Health Promotion

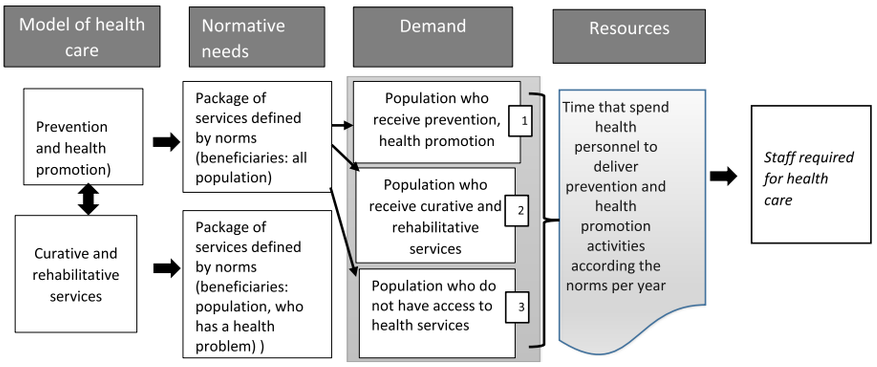


Fig. 1 Sub-model for calculating health-staffing requirements from normative needs. This study only considers population who received service in PHF (1y2). Source: adapted from sub-personal requirement model proposed by division of family

Our operational variables to estimate HR were available and ideal supply, both estimated from time variables. Available supply (As) was estimated as the average of payable number of hours stipulated in staff labor contracts (physicians, nurses, and health promoters) in primary health facilities in 2009. Ideal supply (Is) was estimated from time used and required to perform health promotion and prevention activities (Table 1). Time used is the time that staff use to deliver health prevention and promotion activities while time required is the time that staff considered suitable to deliver prevention and health promotion activities. To estimate our operational variables, we followed several steps (Table 2):

First, we organized a group of experts all of whom were knowledgeable about prevention and health promotion, having at least 10 years of experience working in primary care facilities and implementing prevention and promotion activities included in the Lifeline Program [16]. The group included two physicians, two nurses, three health promoters, two primary health technicians, two local health coordinators, and one health promotion coordinator at the state level. Experts checked all 99 activities and assigned each one to a single occupational category (physician, nurse, or primary care technician).

Second, available supply was estimated from the number of personnel available (physicians, nurses, and health promoters) at each primary care facility in 2009 (using Ministry of Health official information) [25] multiplied by 200 working days per year and six working hours per day. These figures were added up to obtain the total of annual hours available as a variable of available supply.

Third, we developed an instrument to estimate the time used and the time required. Health workers reported the time used and the time required to perform a single activity from the package of prevention and health promotion. The instrument was piloted in two PHFs in the State of México not included in the study. During the pilot phase, the researchers measured the time used to perform a group of activities (16 of the 99), and then we compared this time with the time reported by health staff. Eighty percent of the time measured to perform activities were very similar to the time reported, and the remaining 20% were not statistically significantly different.

Next, we estimated the ideal supply. Teams working in each of the participating primary care facilities estimated by consensus the amount of time used and time required for performing each of the 99 activities. The age and sex of the individuals were very important, because the package of prevention and health promotion has different annual frequencies and different number of activities whether the subject is a child, adolescent, adult, elderly, man, or woman. Estimation of time used and required by activity according to age and sex was multiplied by the total number of individuals who received care in PHFs in 2009. Then, we added up these figures to obtain the total of annual hours from time used and time required to obtain two variables of ideal supply, one estimated from time used and another from time required. The available and ideal supply estimations were made under the assumption that all personnel at each facility spent all their working time to perform health promotion and prevention activities, as we had no reliable estimates of the distribution of working time to perform health promotion and prevention services.

Fourth, we calculated available and ideal supply by age groups, personnel type, and rural/urban areas and information is presented using descriptive statistics. To compare similarities and differences, we used median differences (Table 2) as the distribution of data was not normal. The null hypothesis was that the median of available supply is equal to the median of ideal supply (time used and required). We used the Wilcoxon matched-pairs signed-ranks test to compare available supply with ideal supply (available supply with ideal supply estimated from time used or available supply with ideal supply estimated

Table 2 Median of time used and required by individual per year according to age group to deliver the guaranteed package of prevention and health promotion. Mexico, 2009

Age group	Number of prevention and health promotion activities	Total of population attended in PHFs	Median of time used by individual per year (min)				Median of time required by individual per year (min)				Differences			
			Total (a1)	Physician (a2)	Nurse (a3)	HP (a4)	Total (b1)	Physician (b2)	Nurse (b3)	HP (b4)	a1 – b1	a2 – b2	a3 – b3	a4 – b4
Newborns	10	5 601	55.50	24.00	27.00	5.00	90.00	41.00	43.50	10.00	−34.50	−17.00	−16.50	−5.00
Children under 5 years	10	41 094	61.50	13.50	33.50	15.50	94.00	20.00	46.00	22.50	−32.50	−6.50	−12.50	−7.00
Children from 5 to 9 years	10	24 266	71.00	30.00	20.00	14.00	94.50	40.00	30.00	22.50	−23.50	−10.00	−10.00	−8.50
Teen from 10 to 19 years	10	50 508	97.50	60.00	17.50	27.50	131.00	77.50	25.00	35.00	−33.50	−17.50	−7.50	−7.50
Women from 20 to 59 years	11	76 839	97.50	40.00	25.00	35.50	165.40	57.50	37.50	76.50	−67.90	−17.50	−12.50	−41.00
Men from 20 to 59 years	11	39 459	83.50	37.50	32.50	25.00	152.50	51.50	30.00	62.50	−69.00	−14.00	2.50	−37.50
Women and men over 60 years	10	16 591	100.00	52.50	39.50	15.00	162.50	70.00	72.50	20.00	−62.50	−17.50	−33.00	−5.00
Pregnant women														
First visit	10	7 610	61.50	46.00	10.00	5.00	85.50	67.00	10.00	9.00	−24.00	−21.00	0.00	−4.00
Subsequent visit	7	5 076	46.50	36.50	10.00	0.00	58.50	47.00	10.00	0.00	−12.00	−10.50	0.00	0.00
Postnatal care	10	1 483	58.50	27.50	35.00	0.00	91.50	37.00	50.00	0.00	−33.00	−9.50	−15.00	0.00
All groups	99	268 527	73.00	40.00	25.00	22.00	105.00	51.00	35.00	30.00	−32.00	−11.00	−10.00	−8.00

from time required). Friedman test was used to compare available and ideal supply estimated from used time and ideal supply estimated from time required. Our samples are non-independent (time estimates come from the same teams); these tests account for dependence of the estimates [26]. After, we estimated available and ideal supply into number of human resources (annual hours estimated were divided by 1200 working hours per health worker per year).

Finally, we conducted a sensitivity analysis to test whether the non-normal distribution of our time data biased our estimates of available and ideal supply of human resources. We used the gamma density function (Table 3) because of the non-normal distribution of the variables and tested the following assumptions: (a) asymmetrical distribution, (b) positive asymmetry, (c) no values lower than zero, and (d) the existence of a high degree of variability. We estimated alpha, the peak of the frequency distribution. A smaller alpha value indicates more highly skewed data, with variation so great as to render the median not useful as a method to summarize the distribution. No data were found to have an alpha <1.33, which indicates that our use of the gamma distribution fit our data and the median is a valid way to summarize our data.

Results

Of the 20 PHFs, 60% (12) were located in an urban area and 40% (8) in a rural one. A total of 866 health workers were working on PHFs, 57% (CI 53–60; $n = 489$) delivered health services and 43% (CI 40–47; $n = 377$) worked as administrative staff. Of the workers who delivered health services, 45% (CI 41–50; $n = 220$) were nurses; 36% (32–40; $n = 176$) physicians; 8% (CI 06–11; $n = 39$) health promoters; 3% (CI 2–5; $n = 15$) nutritionists, psychologists, or social workers; and 8% (CI 6–11; $n = 39$) dentists or medical students in social service. The total population that received care in PHFs in 2009 accounted for 268 527 individuals, 87% ($n = 233\,618$) received care in urban and 13% ($n = 34\,909$) in rural PHFs.

The median of time used to deliver all activities from the guaranteed package of prevention and health promotion per year by individuals across age and gender groups was lower than the median of time required; a difference of −32 min was observed between them (Table 2). In the case of physicians, the median difference between time used and required was −11 min; for nurses, −10 min; and for primary health technicians (PHTs), −8 min. These results show that the time used is lower than the time required to perform prevention and health promotion activities across all age groups and occupational categories.

By age, the largest gaps between time used and time required were observed for women and men from 20 to 59 and women and men over 60 years; the difference was more than 1 h. For newborns, children from 1 to 4 years, teens from 10 to 19 years, and postpartum women, the difference was almost 30 min. Differences lower than 24 min were observed for children of 5–9 years and subsequent queries of pregnant women (Table 2).

The analysis of available and ideal supply by occupational categories using the Friedman chi-square test suggests the distributions (Table 4) of these variables for physicians are statistically different ($P = 0.001$). The Wilcoxon test that compared available supply with ideal supply estimated by time used ($P = 0.003$) and time required ($P = 0.002$) is statistically significant. Therefore, the negative outcome difference confirms that available supply is lower than ideal supply.

The supply analysis for nurses (Table 4) suggests that available and ideal supply are different (Friedman $P = 0.0001$), but the Wilcoxon test shows that available and ideal supply estimated by time used ($P = 0.252$) are not different. Available supply is lower than ideal supply estimated by time required ($P = 0.019$). No differences were found in nurse supply when analyzed by urban and rural PHFs ($P > 0.05$).

The supply analysis for health promoters (Table 4) suggests that available supply and ideal supply are different (Friedman $P = 0.0167$). The Wilcoxon test that compares available with ideal supply estimated by time used ($P = 0.0001$) and ideal supply estimated by time required ($P = 0.0001$) shows differences between them. Also, available with ideal supply estimates by time used and required ($P = 0.0022$) are different in urban PHFs. Therefore, available supply is lower than ideal supply and no differences on HP supply were found in rural PHFs ($P > 0.05$).

For health workers, the median of available supply across PHFs was 5 physicians, the median of ideal supply estimated by time used was 10.4, and the median estimated by time required was 13.76 physicians (Table 5). Results show that the ideal supply of physicians is greater than the available supply for urban and rural PHFs. However, the gap of physicians is greater for urban PHFs. In the case of the nurses, we did not find any differences between available and ideal supply.

In the case of health promoters, the median of the available supply was "zero"; only in two PHFs were these health workers found. The ideal supply in urban PHFs is

Table 3 Estimation of variables

e) Density function $f(x) = \frac{1}{\beta^{\alpha}\Gamma(\alpha)} x^{\alpha-1} e^{x/\beta}$ where $x > 0$; α and β are positive parameters x: used and required time function measured in minutes α: form parameter β: scale parameter $f(x)$: gamma function e: exponential function	h) Sensitivity index: $S = \frac{1}{1-\alpha}$ tu = used time tr = required time

Table 4 Available and ideal supply to deliver the guaranteed package of prevention and health promotion at PHFs. Mexico, 2009

Variables	Physician			Nurses			Health promoters		
	Available supply (As)	Ideal supply (Is)		Available supply (As)	Ideal supply (Is)		Available supply (As)	Ideal supply (Is)	
	Annual hours available 2009	Annual hours estimated time used	Annual hours estimated time required	Annual hours available 2009	Annual hours estimated time used	Annual hours estimated time required	Annual hours available 2009	Annual hours estimated time used	Annual hours estimated time required
	(a)	(a1)	(a2)	(b)	(b1)	(b2)	(c)	(cl)	(c2)
Urban PHFs ($n = 12$)									
Total hours	141 600	373 462.6	562 069.7	220 800	231 150.6	332 150.6	27 600	243 449.9	406 915.0
Median (h)	12 000	22 624.2	35 876.9	17 400	12 654.8	21 913.9	0	16 749.0	32 658.9
As – Is		−10 624.2	−23 876.9		4 475.3	4 513.9		−16 749.0	−32 658.9
Wilcoxon (*P* value)		0.0029	0.002 2		0.209 4*	0.099 5*		0.002 2	0.002 2
Friedman (*P* value)			0.001 3			0.001 2			0.028 0
Rural PHFs ($n = 8$)									
Total hours	30 000	628 853.6	84 632.2	38 400	40 127.2	57 173.1	1 200	35 627.8	52 308.2
Median	1 800	4 079.7	5 460.1	1 200	2 173.6	3 182.4	0	2 151.3	3 714.2
As – Is		−2 279.7	−3 660.1		−973.6	−1 982.4		−2 151.3	−3 714.2
Wilcoxon (*P* value)		0.049 9	0.017 3		NA	NA		NA	NA
Friedman (*P* value)			0.026 2			0.083 7*			0.170 5*
Total PHFs ($n = 20$)									
Total hours	171 600	436 316.2	646 701.9	259 200	271 545.6	389 393.7	28 800	279 077.7	459 223.2
Median	6 000	12 478.5	16 510.6	10 800	7 904.6	11 321.3	0	7 220.7	9 252
As – Is		−6 478.5	−10 510.6		2 895.4	−521.3		−7 220.7	−9 252
Wilcoxon (*P* value)		0.000 4	0.000 1		0.262 7*	0.018 7		0.000 1	0.000 1
Friedman (*P* value)			0.000			0.000 1			0.016 7

* = <0.05

Table 5 Available and ideal supply expressed on number of doctors and primary health promoters. Mexico, 2009

Primary health facilities	Number of doctors			Number of health promoters		
	Available supply	Ideal supply		Available supply	Ideal supply	
		Time used	Time required		Time used	Time required
Urban PHFs						
Tapalpa	6.0	5.5	8.7	0.0	4.0	6.2
Jesus Rosal	11.0	60.6	108.9	0.0	37.3	65.7
Satellite	2.0	3.2	4.7	0.0	1.3	2.4
Coapa	10.0	11.1	16.1	0.0	6.6	8.3
GR. Millan	10.0	15.3	29.5	0.0	6.8	13.3
Zacatecas	10.0	24.8	30.3	0.0	14.0	27.1
W. Escalante	10.0	24.3	36.0	0.0	17.5	27.3
Industrial	13.0	43.2	48.4	0.0	25.3	35.0
Rena II	3.0	4.8	6.1	0.0	3.1	6.5
Pedro Escobedo	23.0	81.0	119.9	1.0	55.2	79.8
Toluca	16.0	22.4	33.4	9.0	17.8	36.7
San Rafael	4.0	13.0	26.3	13.0	13.9	30.9
Median	10.0	18.9	29.9	0.0	14.0	27.2
Rural PHFs						
Juanacatlan	2.0	9.7	11.4			
Mineral Chico	3.0	6.8	10.5			
Cuentepec	4.0	2.0	2.9			
Sta Elena	1.0	2.1	2.2			
Koben	1.0	1.4	2.6			
G. Victoria	12.0	23.6	31.8			
R02 Kilometro 30	1.0	4.3	5.2			
P. Coyote	1.0	2.5	3.9			
Median	1.5	3.4	4.6			
General median PHF	5.0	10.4 −5.4	13.8 −8.8			

9.96 HP when it was estimated by time used and 27.22 HP when it was estimated by time required. We did not estimate health promoters for rural PHFs because the available supply is the same with the ideal supply (Table 4).

Discussion

Our results show that available supply is lower than ideal supply of HR meaning that the amount of HR available is not enough [27] to deliver preventive and health promotion services. However, the real scenario is likely worse, because this study assumed that health personnel are dedicated exclusively to performing activities to deliver the package of prevention and health promotion services, but in reality, they use only part of their time for this service provision. The gap of physicians in urban and rural PHFs [28] is clear but it is important to highlight that it is far greater in urban areas than in rural ones. The larger gap observed in urban areas compared to rural areas can be explained by a higher demand of services due to population density, the fact that services are available more hours a day (12 in urban areas compared to 6 in rural areas) and over weekends [29], implying a greater demand for HR [30]. This highlights the importance of considering demand for services as well as the volume of the catchment population as a criterion when distributing HR for health.

Internationally, the lack of human resources in primary care facilities has been widely documented [31–34], especially on medical staff and rural areas [35, 36]. The absence of prioritization of policies for prevention and health promotion is one possible explanation for this maldistribution of human resources [37]. Despite the transformation of health service demand, dominated today by

chronic diseases [38, 39], in developed and developing countries, health promotion has not yet been properly included in national and local agendas.

Furthermore, international literature has explained the low availability of physicians in rural areas because of attractive job opportunities outside their home country, the lack of professional development [40, 41], the inequalities in the distribution of health workers [42], and a persistent lack of policy to prioritize the distribution of HR to rural areas [43]. On the other hand, physicians have historically expressed low interest to work in rural areas. For example, in Ayacucho, Peru, physicians are five times more likely to choose an urban area than a rural one [44]. In the United States of America, poor recruitment is likely to be the principal reason for short length of stay in rural areas [45], and in Canada, low salary is the main determinant [46].

Based on this trend, international agencies have called for the strengthening of the primary health care model [40, 47]. This model should be centered in health promotion and preventive services [39–48] and needs not only more [42–49] but also well-trained health personnel and the right skill mix [50] to deliver preventive and health promotion services. Therefore, governments should develop strategies and policies for health personnel retention in PHFs [46, 51, 52], which is one of the biggest challenges of health systems.

In the area where this research was conducted, PHF health promoters were not available. This absence can be explained because hiring of these personnel has remained stagnant in recent years. Those who are retired are being replaced by administrative staff. This situation intensifies the lack of this kind of personnel to deliver prevention and health promotion services in PHFs.

One of the limitations of this study is self-reported time team consensus measurements. We were unable to accurately calculate time to perform prevention and promotion activities and thus chose to assume that 100% of time of health workers was dedicated to such activities. This means that our results are likely biased towards the null (no) difference between available and ideal supply since personnel also devote time to curative and administrative activities on PHFs. The Ministry of Health of Mexico should consider to revise the structure of its databases to provide more accurate data that maybe used for research and policy-making purposes.

Conclusions

Based on a conservative analysis, we used data from teams of health care providers and conservative estimates to identify a gap in the current/available and ideal supply of physicians in urban and rural areas, and health promoters in urban areas to deliver a package of prevention and health promotion services. To improve service delivery, several things are needed: (1) an increase of the HR at the PHFs, (2) ensuring complete staff at the PHFs (physicians, nurses, and health promoters), (3) improving their set of skills about prevention and health promotion, and (4) developing policies to retain personnel at PHFs.

Abbreviations

As: Available supply; CAUSES: Package of care interventions; HR: Human resources; Is: Ideal supply; PHC: Primary health care; PHFs: Primary health facilities; PHTs: Primary health technicians; REPSS: Health Social Protection Regime; SPS: Public health insurance (*Seguro Popular de Salud*); WHO: World Health Organization

Acknowledgements

The authors would like to thank the staff of primary health facilities and personnel that participated in this study.

Funding

TB was supported by the Alexander von Humboldt Foundation through the Alexander von Humboldt Professor award, funded by the Federal Ministry of Education and Research; the Wellcome Trust; the European Commission; the Clinton Health Access Initiative; and from NICHD of NIH (R01-HD084233), NIA of NIH (P01-AG041710), NIAID of NIH (R01-AI124389 and R01-AI112339) as well as FIC of NIH (D43-TW009775).

Availability of data and materials

Data is available for further review on request.

Authors' contributions

JA, GN, and TB contributed to the conceptual design and development of the study, including the development the instruments. EV supported the approach to the data analysis with the leadership of JA on the focus of analysis and interpretation. BD checked the internal coherence to report results. All authors contributed to writing and revising the manuscript, and all authors reviewed and approved the final revised version.

Ethics approval and consent to participate

The Ethical Committee of the National Institute of Public Health (Mexico) approved the proposal "Analysis of the HR requirement that take part in delivering health prevention and promotion services within the Popular Health Insurance" with date July 27, 2010.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Author details

[1]Center for Health Systems Research, National Institute of Public Health - Instituto Nacional de Salud Pública, Universidad No. 655 Colonia Santa María Ahuacatitlán, Cerrada Los Pinos y Caminera, CP 62100 Cuernavaca, Morelos, Mexico. [2]Partners in Health, Calle Primera Poniente Sur # 25, Angel Albino Corzo, CP 30370 Chiapas, Mexico. [3]Department of Global Health and Population, Harvard School of Public Health, 677 Huntington Ave, Boston, MA 02115, United States of America. [4]College of Osteopathic Medicine, Touro University California, 1310 Club Drive, Mare Island, Vallejo, CA 94592, United States of America. [5]Department of Obstetrics and Gynecology, Oregon Health and Science University, Portland, OR, United States of America. [6]Institute of Public Health, University of Heidelberg, Heidelberg, Germany.

Received: 1 June 2017 Accepted: 22 June 2017
Published online: 03 August 2017

References

1. Kabene SM, Orchard C, Howard JM, Soriano MA, Leduc R. The importance of human resources management in health care: a global context. Hum Resour Health. 2006;4:20. doi:10.1186/1478-4491-4-20.
2. Frenk J, Sepúlveda J, Gómez-Dantés O, Knaul F. Evidence-based health policy: three generations of reform in Mexico. Lancet. 2003;9396(362):1667–71.
3. López Pardo y Cándido M. La reforma sanitaria en América Latina y el Caribe. Rev Cubana Salud Pública. 1997; 23: 17-31.
4. Frenk J, Robledo-Vera C, Nigenda-López G, Ramírez-Cuadra C, Galván-Martínez O, Ramírez-Avila J. Políticas de formación y empleo de médicos en México: 1917-1988. Salud Publica Mex. 1990;32:440–8.
5. Regan S, Wong ST, Watson DE. Public perspectives on health human resources in primary healthcare: context, choices and change. Healthcare Policy. 2010;5(3):162.
6. World Health Organization. Colaboremos por la salud: Informe sobre la salud del mundo 2006. http://www.who.int/whr/2006/whr06_es.pdf. Accessed 3 Mar 2015.
7. Giraldo Osorio A, Vélez Álvarez C. Primary health care: challenges for implementation in Latin America. Aten Primaria. 2012;45(7):384–92.
8. Soberon G. La reforma de salud en México. Gac Med Mex. 2001;137(5):419–43.
9. Gómez-Dantés O, Gómez-Jáuregui J, Inclán C. La equidad y la imparcialidad en la reforma del sistema mexicano de salud. Salud Pública Mex. 2004;46: 399–416. pp.412.
10. Coordinación Nacional de Prospera Programa de Inclusión Social. Available on: https://www.prospera.gob.mx/swb/es/PROSPERA2015/Quees_PROSPERA. Accessed 7 Apr 2015.
11. INEGI. Derechohabiencia y uso de servicios de salud. Población protegida por los servicios de salud, 2000 a 2015. http://www3.inegi.org.mx/sistemas/sisept/default.aspx?t=msoc01&s=est&c=22594. Accessed 3 Oct 2016.
12. Gómez Dantés O, Ortiz M. Seguro Popular de Salud: siete perspectivas. Salud Publica Mex. 2004;46(6):585–8.
13. Fineberg H. Reforma de salud en México: un trabajo que avanza. Salud Publica Mex. 2007;49 Suppl 1:S10–S1.
14. Frenk J. Tender puentes: lecciones globales desde México sobre políticas de salud basadas en evidencias. Salud Publica Mex. 2007;49 Suppl 1:S14–22.
15. Frenk J, González-Pier E, Gómez-Dantés O, Lezana MA, Knaul FM. Reforma integral para mejorar el desempeño del sistema de salud en México. Salud Publica Mex. 2007;49 Suppl 1:S21–34.
16. Secretaría de Salud. Prevención y Promoción de la salud durante la línea de vida. México 2003. http://www.insp.mx/Portal/Centros/ciss/nls/caravanas/material_didactico/mod2_8.pdf. Accessed 15 Mar 2011.
17. Nigenda G. Servicio social en medicina en México. Una reforma urgente y posible. Salud Publica Mex. 2013;55:519–27.
18. Victora C, Barreto M, do Carmo Leal M, Monteiro C, Schmidt M, Barros F, et al. Health conditions and health-policy innovations in Brazil: the way forward. Lancet (London, England) [serial on the Internet]. 2011;377(9782): 2042–53. [cited July 25, 2017]. Available from: MEDLINE with Full Text.
19. Doubova SV, Ramírez-Sánchez C, Figueroa-Lara A, Pérez-Cuevas R. Recursos humanos para la atención de pacientes con diabetes en unidades de medicina familiar del Instituto Mexicano del Seguro Social. Salud Publica Mex. 2013;55:607–17.
20. Dreesch N, Dolea C, Dal Poz MR, et al. An approach to estimating human resource requirements to achieve the Millennium Development Goals. Health Policy Plan. 2005;20(5):267–76.
21. Chorny A, Novaro S, Stulhman L, Bernachi M. Método para el análisis y la estimación de recursos humanos para los programas de atención materno infantil. Educ Med Salud. 1976;3:254–79.
22. Bärnighausen T, Bloom D. Changing research perspectives on the global health workforce. National Bureau of Economic Research. Massachusetts 2009. Working Paper 15168 http://www.nber.org/papers/w15168. Accessed 14 Sept 2015.
23. Barranquero A y González A. Una revisión de modelos econométricos aplicados al análisis de demanda y utilización de servicios sanitarios. Hacienda Pública Española. 2005;(173):129–62.
24. Comisión Nacional de Protección Social en Salud. Catálogo Universal de Servicios de Salud 2010. http://seguropopular.col.gob.mx/segpop/pdf/causes2010.pdf. Accessed 4 Aug 2010.
25. Secretaria de Salud. Condiciones Generales de trabajo. http://www.inmegen.gob.mx/tema/cms_page_media/589/CONDICIONES%20GENERALES%20DE%20TRABAJO%202011-2013.pdf. Accessed 4 Oct 2012.
26. University of California, Los Angeles. What statistical analysis should I use? Statistical analyses using Stata. http://www.ats.ucla.edu/stat/stata/whatstat/whatstat.htm. Accessed 2 Mar 2016.
27. Chen PG, Mehrotra A, Auerbach DI. Do we really need more physicians? Responses to predicted primary care physician shortages. Med Care. 2014; 52(2):95–6.
28. Kaiyuan Z, Xinyi Z, Yi D, Duolao W, Zhou L, Yu M, et al. Inequality trends of health workforce in different stages of medical system reform (1985-2011) in China. Human Resources For Health [serial on the Internet]. 2015;131–8. [cited July 25, 2017]. Available from: Academic Search Premier.
29. Ensor T, Cooper S. Overcoming barriers to health service access: influencing the demand side. Health Policy Plan. 2004;19(2):69–79.
30. Whitford D, Smith T, Newbury J. The South Australian Allied Health Workforce survey: helping to fill the evidence gap in primary health workforce planning. Aust J Prim Health. 2012;18(3):234–41.
31. Thoresen SH, Fielding A. Inequitable distribution of human resources for health: perceptions among Thai healthcare professionals. Qual Prim Care. 2010;18(1):49–56.
32. Pallikadavath S, Singh A, Ogollah R, Dean T, Stones W. Human resource inequalities at the base of India's public health care system. Health Place. 2013;23:26–32.
33. dos Reis Moreira ÉC, O'Dwyer G. An analysis of actions to promote health in underprivileged urban areas: a case in Brazil. BMC Fam Pract. 2013;14(1):1.
34. Phalkey R, Dash SR, Mukhopadhyay A, Runge-Ranzinger S, Marx M. Prepared to react? Assessing the functional capacity of the primary health care system in rural Orissa, India to respond to the devastating flood of September 2008. Glob Health Action. 2012;5(1):10964.
35. McQuide PA, Kolehmainen-Aitken RL, Forster N. Applying the workload indicators of staffing need (WISN) method in Namibia: challenges and implications for human resources for health policy. Hum Resour Health. 2013;11(1):1.
36. Daviaud E, Chopra M. How much is not enough? Human resources requirements for primary health care: a case study from South Africa. Bull World Health Organ. 2008;86(1):46–51.
37. Nyamhanga T, Frumence G, Mwangu M, Hurtig AK. 'We do not do any activity until there is an outbreak': barriers to disease prevention and health promotion at the community level in Kongwa District, Tanzania. Global health action. 2014;7(1):23878.
38. Córdova-Villalobos JÁ, Barriguete-Meléndez JA, Lara-Esqueda A, Barquera S, Rosas-Peralta M, Hernández-Ávila M, Aguilar-Salinas CA. Las enfermedades crónicas no transmisibles en México: sinopsis epidemiológica y prevención integral. Salud Publica Mex. 2008;50(5):419–27.
39. Bodenheimer T, Chen E, Bennett HD. Confronting the growing burden of chronic disease: can the US health care workforce do the job? Health Aff. 2009;28(1):64–74.
40. Alameddine M, Saleh S, El-Jardali F, Dimassi H, Mourad Y. The retention of health human resources in primary healthcare centers in Lebanon: a national survey. BMC Health Serv Res. 2012;12(1):1.
41. Garson JR. New systems of care can leverage the health care workforce: how many doctors do we really need? Acad Med. 2013; 88(12):1817–21.
42. Gravelle H, Sutton M. Inequality in the geographical distribution of GPs in England and Wales 1974-1995. J Health Serv Res Policy. 2013;6:6–13.
43. Gupta N, Zurn P, Diallo K, Dal Poz MR. Uses of population census data for monitoring geographical imbalance in the health workforce: snapshots from three developing countries. Int J Equity Health. 2003;2:11.
44. Miranda J, Diez-Canceco F, Lema C, Lescano A, Legarde M, Blaauw D, Hicho L. Stated preference of doctors for choosing a job in rural areas of Peru: a discrete choice experiment. PloS One. 2012;7(12):e50567.
45. Pathman DE, Konrad TR, Dann R, Koch G. Retention of primary care physicians in rural health professional shortage areas. Am J Public Health. 2004;94(10):1723–9.
46. Wranik DW, Durier-Copp M. Physician remuneration methods for family physicians in Canada: expected outcomes and lessons learned. Health Care Anal. 2010;18(1):35–59.
47. Organización Panamericana de la Salud.Atención primaria de salud y desarrollo de recursos humanos. Unidad de desarrollo de recursos humanos. 2003. Accessed 20 Oct 2013.
48. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. Milbank Q. 2005;83(3):457–502.
49. Schwartz MD. Health care reform and the primary care workforce bottleneck. J Gen Intern Med. 2012;27(4):469–72.

50. Rey-Gamero AC, Acosta-Ramírez N. El enfoque de competencias para los equipos de Atención Primaria en Salud. Una revisión de literatura. Rev Gerencia Pol Salud. 2013;12(25):28–39.
51. Shroff ZC, Murthy S, Rao KD. Attracting doctors to rural areas: a case study of the post-graduate seat reservation scheme in Andhra Pradesh. Indian J Community Med. 2013;38(1):27.
52. Russel DJ, McGrail MR, Humphreys JS, Wakerman J. What factors contribute most to the retention of general practitioners in rural and remote areas? Aust J Prim Health. 2012;18(4):289–94.

Submit your next manuscript to BioMed Central and we will help you at every step:

- We accept pre-submission inquiries
- Our selector tool helps you to find the most relevant journal
- We provide round the clock customer support
- Convenient online submission
- Thorough peer review
- Inclusion in PubMed and all major indexing services
- Maximum visibility for your research

Submit your manuscript at
www.biomedcentral.com/submit

BioMed Central

OPEN ACCESS Freely available online

PLOS | ONE

Primary Health Care Utilization by the Mexican Indigenous Population: The Role of the *Seguro Popular* in Socially Inequitable Contexts

Rene Leyva-Flores, Edson Servan-Mori*, Cesar Infante-Xibille, Blanca Estela Pelcastre-Villafuerte, Tonatiuh Gonzalez

Centre for Health Systems Research of the National Institute of Public Health, Cuernavaca, Morelos, Mexico

Abstract

Objective: To analyze the relationship between primary health care utilization and extended health insurance coverage under the Seguro Popular (SP) among Mexican indigenous people.

Methodology: A cross-sectional analysis was conducted using data from the Mexican National Nutrition Survey 2012 (n = 194,758). Quasi-experimental matching methods and nonlinear regression probit models were used to estimate the influence of SP on primary health care utilization.

Results: 25% of the Mexican population reported having no health insurance coverage, while 59% of indigenous versus 35% of non-indigenous reported having SP coverage. Health problems were reported by 13.9% of indigenous vs. 10.5% of non-indigenous; of these, 52.8% and 57.7% respectively, received primary health care ($p<0.05$). Economic barriers were the most frequent reasons for not using primary health care services. The probability of utilizing primary health care services was 11.5 percentage points higher ($p<0.01$) for indigenous SP affiliates in comparison with non-indigenous, in similar socioeconomic conditions.

Conclusion: Socioeconomic conditions, not ethnicity per-se, determine whether people utilize primary health care services. Therefore, SP can be conceived as a public policy strategy which acts as a social *buffer* by enhancing health care utilization regardless of ethnicity. Further analysis is required to explore the potential gaps as a result of SP coverage among socially vulnerable groups.

Citation: Leyva-Flores R, Servan-Mori E, Infante-Xibille C, Pelcastre-Villafuerte BE, Gonzalez T (2014) Primary Health Care Utilization by the Mexican Indigenous Population: The Role of the *Seguro Popular* in Socially Inequitable Contexts. PLoS ONE 9(8): e102781. doi:10.1371/journal.pone.0102781

Editor: Joan A Caylà, Public Health Agency of Barcelona, Spain

Received December 20, 2013; **Accepted** June 22, 2014; **Published** August 6, 2014

Copyright: © 2014 Leyva-Flores et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Funding: The authors have no funding or support to report.

Competing Interests: The authors have declared that no competing interests exist.

* Email: eservan@insp.mx

Introduction

Worldwide, access to health care for indigenous groups has always been limited due to social inequity [1–3]. Although representing 5% of the world's population, indigenous peoples account for approximately 15% of global poverty [4] and one-third of extreme poverty in rural areas [4].

Mexican indigenous people (~7% of the Mexican population in 2010) [5] are characterized by steep marginalization levels and wide social gaps [6,7]. In 2010, 44.2% of those residing in indigenous municipalities [8] suffered from extreme poverty (according to the Mexican National Council for the Evaluation of Social Development Policy or CONEVAL, extreme poverty is a condition characterized by such meager incomes that, even when destined entirely to purchasing food, they prove insufficient for acquiring the necessary nutrients to lead a healthy life); 78.6% earned less than three minimum wages; 83.3% were below the well-being threshold or under an income equivalent to the total value of the consumption food and non-food bundle per person per month (according to CONEVAL at April 2013: US$122.1 in localities with less than 2500 inhabitants or rural and US$190.3 and localities with more than 2,500 inhabitants or rural), and 75.6% lived in marginalized communities [6]. Additionally, in 2010, the infant mortality rate was 63% higher among indigenous versus non-indigenous municipalities, and prevalence of stunting was threefold in indigenous in comparison with non-indigenous communities [9]. These figures relate directly to the living conditions of indigenous peoples and the countless obstacles they face in accessing primary health care services.

The Mexican government has responded by stepping up social policies that seek greater access to education, food and health [10], particularly for populations stricken by acute social vulnerability, such as the indigenous communities.

Since 2003, Seguro Popular (SP) has constituted one of several social health protection strategies created to remove economic barriers and improve access to health care [11], with the SP program providing public funds for populations in the first income deciles who lack social security [11–14]. Since its inception, public resources allocated to SP have grown 13.3 times, that is, from $382.6 million USD in 2004 to $5,087.6 million USD in 2012

Leyva-Flores R, Serván-Mori E, Infante-Xibille C, Pelcastre-Villafuerte BE, González T. Primary health care utilization by the mexican indigenous population: the role of the Seguro Popular in socially inequitable contexts. PLoS ONE. 2014;9(8):e102781. https://doi.org/10.1371/journal.pone.0102781

($4,315.3 million MXN-2004- vs. $67,004 million MXN-2012, according to BANXICO, average monthly peso/dollar exchange rates were 11.28 in 2004 and 13.17 in 2012), when the annual average reached $100 USD per affiliate [15].

Seguro Popular impact assessment studies have demonstrated its protective effect against catastrophic health spending among its beneficiaries [12–14,16–18], and analyses on health care utilization have sighted a number of contributions [19,20]. However, evidence regarding performance in rural indigenous communities at the lowest economic levels [21,22] suggests that results have been less favorable among these beneficiaries. *SP* coverage increased from 14% to 61.9% for the indigenous population from 2006 to 2012, but from 10% to 35.7% for the non-indigenous population throughout the ten years following its implementation [23]. In order to establish the relationship between primary health care utilization and extended insurance coverage for Mexico's poorest, specifically for the indigenous population, this study analyzed the role of *SP* as a socioeconomic *buffer* against barriers to health care services in 2012.

Methodology

A cross-sectional study was conducted with data from the Mexican National Nutrition Survey (ENSANUT) 2012, a probabilistic survey providing evidence not only at national and state levels, but also by urban and rural strata [24]. Data from the survey's household module were retrieved specifically with regard to socio-demographic indicators, health status and primary health care utilization. This survey was approved by the Research and Ethics Committees of the National Institute of Public Health. ENSANUT was applied to 194,758 persons in 50,528 households, excluding individuals who provided incomplete socio-demographic data (0.74%); already benefited from private health insurance (0.34%), or lacked information on morbidity, type of health problem, or attendance at primary health care services (0.4%). With a sampling loss of 1.5%, analyses were performed on a final sample of 191,849 individuals (N = 113,039,438).

The variable of interest was primary health care utilization. This is an indicator that has proved sensitive to shifts in economic capacities influencing the regulation of health care demand [25–27]. Congruent with previous studies, primary health care utilization was defined according to the respondents' self-reported health problems - both experienced within two weeks prior to ENSANUT, and treated by medical personnel on an outpatient basis [28]. People who reported being attended to by non-medical personnel (13.9%) were classified as non-users.

The indigenous population was identified according to the definition proposed by the National Commission for the Development of Indigenous Peoples (CDI for its initials in Spanish), whereby a household is considered indigenous if the head of the family, a spouse and/or an ascendant self-identifies as a speaker of an indigenous language [29]. 24,090 people (~10.8 million individuals, or 9.6% of the total Mexican population) were thus identified as indigenous.

Analyses were performed on individual and community-related factors linked by former studies [28,30–34] to the likelihood of receiving health care and/or utilizing health services. Individual variables included: gender, age, education, employment, marital status, number of household members, annual spending (per resident per capita) and receipt of cash transfers from the Mexican Oportunidades anti-poverty program. Places of residence included locality sizes: (i) rural (<2,500 inhab.); (ii) urban (2,500–100,000 inhab.), and (iii) metropolitan (>100,000 inhab.). Lastly, marginalization levels were classified as: (i) very low/low; (ii) medium, and (iii) high/very high [35].

In terms of processed data, the study began by describing the socio-demographic characteristics of the indigenous/non-indigenous groups. Statistically different group traits were obtained by applying statistical independence tests (χ^2 for categorical variables and t-student for continuous variables). Additionally, health assurance categories were determined as: (i) having Social Security (SS), (ii) having SP, and (iii) having no SS or insurance whatsoever.

The SS population was then excluded from the study sample to achieve more homogeneous groups, given that 86% of the indigenous population reported having no SS. At this point, the analytical sample was circumscribed exclusively to SP versus non-SP subjects (63% of the total population). Analyses were then performed on primary health care utilization for the self-reported health problems mentioned above (defined as chronic, acute or others) [33]. In the case of problems unattended to by health personnel, impediments cited by respondents were classified as: (i) factors related to service demand (lack of money); (ii) factors related to service supply (ie. lack of confidence, ill-treatment, unavailability and remoteness), and (iii) other causes. Results were then estimated for the sample population, bearing in mind the impact of design on the survey.

Assessing the impact of being indigenous on the likelihood of obtaining primary health care was subject to confounding factors and potential differences inherent in a self-selected study sample marked by the nonrandom assignment of indigenous subjects and the non-experimental design of ENSANUT. Propensity score matching (PSM) was thus applied, as it is one of the methods most frequently used for recreating experimental conditions and obtaining causal inference. PSM allows constructing an appropriate comparison group vis-à-vis the treatment group, as well as controlling for biases indicated by observable variables [36–39].

The indigenous/non-indigenous populations were thus matched according to the co-variables described above, using the one-to-one nearest neighbor algorithm [39]. This and further analyses on matching confirmed statistical similarity between the two groups and bias correction. Non-linear probability probit models [40] were then applied to the matched sample to assess how the attainment of primary health care from medical personnel (adjusted by PSM) was influenced, not only by ethnicity, but also by the interaction of ethnicity with SP affiliation. Marginal effects (in percentage points or pp) and 95% confidence intervals were obtained. All analyses were carried out with STATA SE v13.1 software [41].

Results

Table 1 illustrates the socio-demographic characteristics of the indigenous/non-indigenous study populations. While men and women were distributed proportionately between the groups, indigenous respondents belonged to a younger age bracket (0–19 yrs., 45.3%) than their non-indigenous counterparts (20–49 yrs., 43.3%), and presented lower education levels, participation in the labor market, and per capita spending (~$68.1 USD/month *vs.* $128.9 USD/month). Additionally, significantly more indigenous (44.1%) than non-indigenous (14.1%) respondents occupied Quintile I of per capita spending, belonged to *Oportunidades* households (58.2% *vs.* 22%), and dwelled in both rural localities (53.5% *vs.* 19.4%) and highly marginalized areas (71.3% *vs.* 17%).

On comparing indigenous with non-indigenous health insurance enrollment (Table 2), the former proved lower (2.8 times) with *SS*, but higher with *SP* (58.7% and 34.5%, respectively). Furthermore, 27% of the indigenous and 25.5% of the non-

Table 1. Socio-demographic conditions of the indigenous and non-indigenous Mexican population, 2012.

	Non-indigenous	Indigenous	Differences in means or percentages p value
n	**168,263**	**24,163**	
N	**102,600,000**	**10,855,299**	
%	**90.4**	**9.57**	
Socio-demographic characteristics			
Men	48.9 [48.6,49.1]	49.0 [48.2,49.7]	0.85
Age group			
0–4	9.45 [9.24,9.66]	10.5 [9.88,11.0]	**0.00**
5–19	29.5 [29.1,29.8]	34.8 [33.7,35.9]	
20–49	43.3 [43.0,43.6]	38.0 [37.1,38.8]	
50–69	13.8 [13.4,14.1]	12.7 [12.0,13.4]	
Over 69	4.05 [3.84,4.27]	4.15 [3.71,4.64]	
Education (yrs.)*			
0	9.56 [9.32,9.81]	19.7 [18.6,20.7]	**0.00***
1–6	30.7 [30.2,31.2]	38.4 [37.2,39.5]	
7–9	24.0 [23.6,24.3]	18.6 [17.7,19.5]	
10–12	16.1 [15.7,16.5]	9.04 [8.26,9.88]	
13 or more	10.2 [9.69,10.8]	3.96 [3.40,4.61]	
Not applicable: < 5 years of age	9.45 [9.24,9.66]	10.5 [9.88,11.0]	
Employed*			
No	47.6 [47.2,48.0]	51.5 [50.6,52.3]	**0.00***
Yes	37.1 [36.7,37.5]	31.4 [30.4,32.4]	
Not applicable: < 8 years of age	15.3 [15.0,15.6]	17.2 [16.4,18.0]	
Marital status*			
Married or living together	41.3 [41.0,41.6]	39.9 [39.1,40.8]	**0.00***
Divorced	4.11 [3.96,4.26]	2.14 [1.86,2.47]	
Widow(er)	3.31 [3.18,3.45]	3.18 [2.89,3.49]	
Single	28.0 [27.6,28.4]	27.7 [26.7,28.7]	
Not applicable: <12 years of age	23.4 [23.0,23.7]	27.1 [26.0,28.1]	
Household			
Receives Oportunidades transfers	22.0 [21.2,22.8]	58.2 [55.4,61.0]	0.00
Total number of members	4.73 [4.69,4.78]	5.41 [5.29,5.53]	**0.00**
Annual spending per capita (MXN 000)	19.7 [19.2,20.2]	10.4 [9.79,10.9]	**0.00**
Annual spending per capita (quintiles)			
I	14.1 [13.3,14.9]	44.1 [40.8,47.5]	**0.00**
II	17.8 [17.2,18.4]	21.0 [19.2,22.9]	
III	20.2 [19.5,20.9]	15.4 [13.8,17.3]	
IV	22.5 [21.9,23.2]	11.6 [10.2,13.1]	
V	25.5 [24.5,26.5]	7.93 [6.78,9.25]	
Locality or municipality of residence			
Rural (<2500 inhab.)	19.4 [18.6,20.3]	53.5 [48.2,58.7]	**0.00**
Urban (2500–100 thousand inhab.)	18.6 [18.0,19.3]	22.9 [18.6,27.9]	
Metropolitan (>100 thousand inhab.)	61.9 [60.9,62.9]	23.6 [19.7,28.1]	
Level of marginalization			
Very low/low	71.7 [70.0,73.3]	21.2 [18.1,24.6]	**0.00**
Medium	11.3 [9.90,13.0]	7.53 [5.08,11.0]	
High/very high	17.0 [15.6,18.4]	71.3 [66.8,75.4]	

Source: Mexican National Nutrition Survey 2012.
Note: Estimates take into account the effect of survey design.
*p value calculation excludes non-applicable categories.
doi:10.1371/journal.pone.0102781.t001

Table 2. Health Insurance among indigenous and non-indigenous Mexican population, 2012.

	Non-indigenous	Indigenous	Differences in percentages p value
n	**168,263**	**24,163**	
N	**102,600,000**	**10,855,299**	
%	**90.4**	**9.57**	
Individual enrollment institution			
Social security	40.1 [39.0,41.1]	14.2 [12.6,16.0]	**0.00**
Seguro Popular health insurance	34.5 [33.6,35.4]	58.7 [55.9,61.5]	
None	25.5 [24.8,26.2]	27.0 [24.9,29.3]	

Source: Mexican National Nutrition Survey, 2012.
Note: Estimates take into account the effect of survey design.
doi:10.1371/journal.pone.0102781.t002

indigenous study population reported having no health insurance whatsoever.

Of the total number of individuals affiliated (or not) to *SP* who reported health problems in the two weeks prior to *ENSANUT*, 13.9% were indigenous and 10.5% non-indigenous. Also, slight differences were observed with regard to health problems (Figure 1). Indigenous people suffered more from acute problems while their non-indigenous counterparts suffered more from chronic problems (Panel A). Additionally, fewer indigenous (52.8%) than non-indigenous subjects (57.7%) received any kind of health care (Panel B). Lastly, 10.6% of indigenous against 4.1% of non-indigenous attended *SS* facilities. 57.4% of indigenous and 42.6% of non-indigenous subjects received health care by the Ministry of Health (*SSA* according to its initials in Spanish) while 32% of indigenous and 53.3% of non-indigenous people utilized private physicians (Panel C). Regarding those who did not utilize primary health care services, 59.7% of non-indigenous and 55.9% of indigenous respondents cited reasons associated with lack of money as the main barrier. Other reasons referred to service supply (37.6%) and perception of services (40.9%), including lack of confidence, poor treatment, unavailability and remoteness. No significant differences were observed between the groups in this regard (Panel D).

Considering similar socioeconomic conditions, Table 3 shows the estimated impact of ethnicity on the probability of primary health care utilization. In general, Model 1 yielded a 5.69 pp higher probability for indigenous versus non-indigenous subjects. However, after including *SP* enrollment, Model 2 yielded the same probability for both populations, but a 10.2 pp higher probability for *SP* beneficiaries. Lastly, after adding the interaction between the two variables, Model 3 yielded an 11.5 pp higher probability of primary health care utilization for individuals who were both indigenous and *SP* affiliates. The variables proved statistically insignificant when analyzed independently.

Discussion

Social inequity has been a persistent problem among ethnic groups throughout the world [1–3]. Mexico, a country with an array of indigenous communities historically marked by deep social gaps, is not spared from this reality. To overcome social inequity and improve the living conditions of vulnerable groups, namely the indigenous communities [11,42], the Mexican government has implemented a host of initiatives. For example, in the early 1940's there was an emergence of social development programs, some of which followed an ''assistentialist'' approach and have remained untouched in their content since then (see catalog of Federal Social Development Programs and Actions published by the CONEVAL). In 2011, only 14 (5.1%) out of 273 Federal Programs and Actions for Social Development were aimed specifically at the indigenous population, representing a scant 1.4% of total financial resources allocated to national social policy, or ~0.1% of GDP (Federal Programs and Actions for Social Development were budgeted $730,581.47 million MXN). Moreover, although 40% of the 273 programs related to health care, none were targeted to the indigenous population (see Social Policies in Mexico: Progress and Challenges in 2012, CONEVAL).

Currently, SP is one of the most ambitious social programs undertaken by the Mexican government. It aims to provide financial protection regarding health for the poorest and non-Social Security insured. It also aims to provide opportune and quality access to medical, surgical, pharmaceutical and hospital services required to comprehensively meet the health needs of its beneficiaries [43]. This study focused on primary health care utilization by indigenous people, underscoring the role of SP in facilitating these services in acutely inequitable contexts. Based on quasi-experimental methods, our findings endorse the hypothesis that SP offsets the barriers preventing the use of primary health care services by indigenous and non-indigenous in similar socioeconomic conditions. Our findings suggest that it is not being indigenous per se, but rather the lack of financial assurance for accessing health care, that hinders primary health care utilization. In principle, from this perspective, SP can be conceived as a public policy strategy that acts as a buffer by enhancing primary health care utilization regardless of ethnicity. However, given the persistence of countless uninsured Mexicans [22], the SP social policy may be having an adverse effect by widening the gap between those who utilize and not health services in the poorest population segments. In other words, having or not SP benefits may actually be shaping a new social gap within the vulnerable population segments. Socio-political outlooks on this matter span the gradualist spectrum. Some outlooks have the hope that universal coverage will eventually occur and contribute to social equity in health, while public statements from recent governments [11] affirm that this goal has already been met. To the contrary, however, evidence published by Laurell [22], the National Council for the Evaluation of Social Development Policy (CONEVAL for its initials in Spanish) [12] and, more recently, by ENSANUT 2012, demonstrates that as many as 21.4% of the Mexican population do not benefit from any health insurance whatsoever [44].

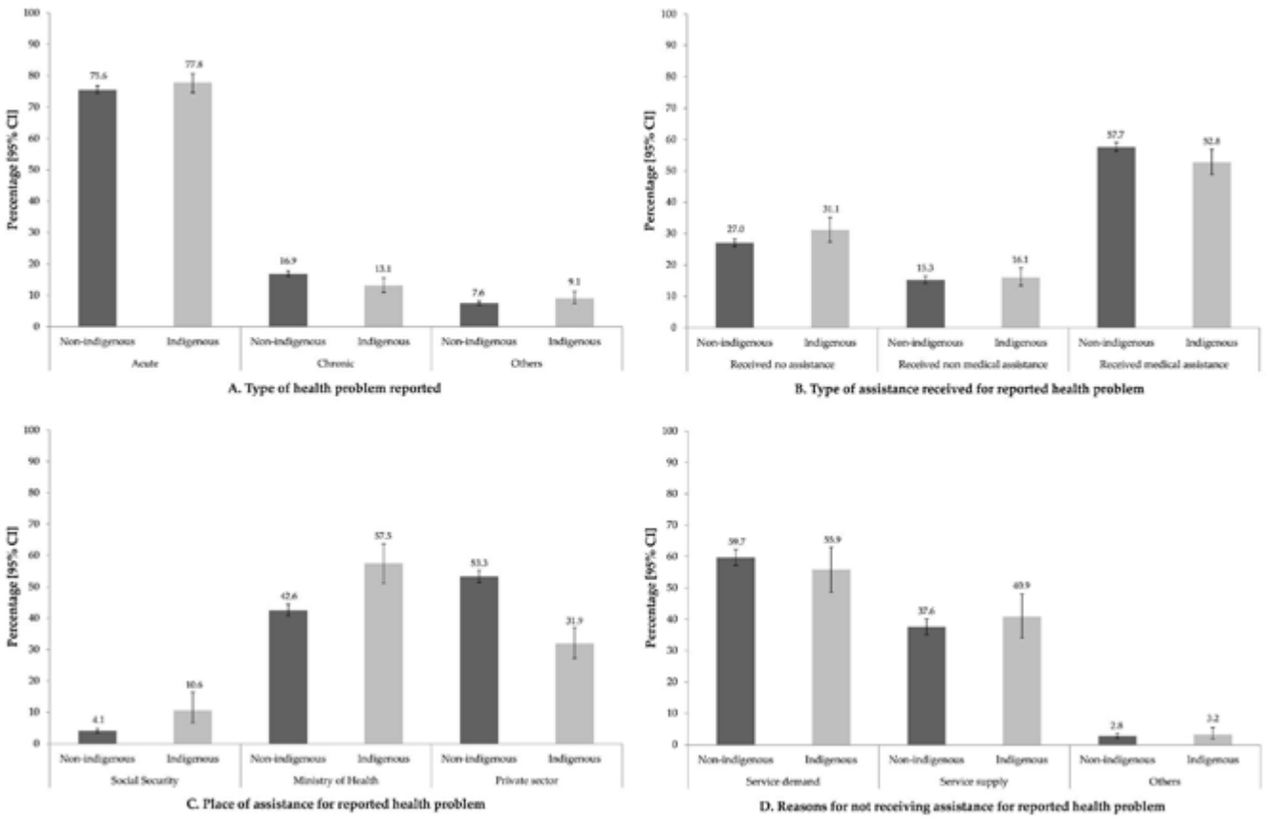


Figure 1. Indigenous population: morbidity, type and place of healthcare, and reasons for not using primary health care services. A. Type of health problem. B. Type of assistance received for reported health problem. C. Place of assistance for reported health problem. D. Reasons for not receiving assistance for reported health problem. Source: Mexican National Nutrition Survey, 2012. Note: Estimates take into account the effect of survey design. Social security beneficiaries were excluded.
doi:10.1371/journal.pone.0102781.g001

While recognizing that "SP has achieved 51.8 million affiliates," CONEVAL reports that "there is a population group that turns elsewhere for its health-related financial risk management" [12]. For instance, in the case of indigenous communities, one out of ten individuals is covered by the Mexican SS system, a mechanism for providing expanded services, that is, services unrestricted to a catalog such as the one established under SP financing.

What exactly is the contribution of the SP financial insurance plans to socially vulnerable groups? Studies have identified that their greatest contribution lies in the reduction of household catastrophic health spending [12,13], although exclusively for the health problems listed under the General Health Services Catalog (CAUSES for its initials in Spanish) [22]. CONEVAL [12] and Laurell [22] have indicated the following shortcomings in SP's organization as being potentially responsible for the observed gaps in primary health care utilization: inadequate distribution of physicians, insufficient accreditation mechanisms to ensure quality care, long wait times, and limited access to information on the rights of beneficiaries. According to CONEVAL, the claims in the official SP publications differ from the public perception, particularly as regards effective access and service quality" [12].

Finally, this study did not intend (and was therefore not designed) to assess either the effect of SP on population health status or the impact of SP organization on health care utilization.

Table 3. Impact of being indigenous on the probability of using primary health care services.

	Probit Model – Percentage points [95% CI] reported		
	(1)	**(2)**	**(3)**
Indigenous	**5.69 [2.38,9.00]****	**5.73 [2.40,9.05]****	−3.19 [−10.1,3.72]
Seguro Popular Health Insurance		**10.2 [6.25,14.1]****	4.41 [−1.18,10.0]
Indigenous x Seguro Popular Health Insurance			**11.5 [3.78,19.3]****
Observations	3,490	3,490	3,490

Source: Mexican National Nutrition Survey, 2012.
*$p<0.01$.
doi:10.1371/journal.pone.0102781.t003

Studies with a distinct focus on these variables are required to meet the growing interest in the results of government programs for social development and poverty reduction. The ensuing analyses and existing evidence on these programs would contribute to a deeper understanding of their scope, functionality and role in public well-being.

Author Contributions

Conceived and designed the experiments: RL ESM CIX BEPV TG. Analyzed the data: ESM. Wrote the paper: RL ESM CIX BEPV TG.

References

1. Hall G, Patrinos H (2006) Indigenous Peoples, Poverty and Human Development in Latin America: 1994-2004. Hall, Gillette Patrinos, Harry Anthony edn. Great Britain: Palgrave Macmillan Publishers; 2005.
2. Partridge W, Uquillas J, Johns K (1998) Including the Excluded: Ethnodevelopment in Latin America Description. In Poverty and Inequality: Proceedings of the Annual World Bank Conference on Development in Latin America and the Caribbean. Washington, DC: The World Bank; 1998: 229–250.
3. Plant R (1998) Issues in Indigenous Poverty and Development, IDB Working Paper [http://www.iadb.org/sds/doc/952eng.pdf.].
4. International Fund for Agricultural Development (IFAD) (2007) Statistics and key facts about indigenous peoples. Rome: IFAD. Available: http://www.ruralpovertyportal.org/web/guest/topic/statistics/tags/indigenous%20peoples
5. Instituto Nacional de Estadística Geografía e Informática (2010) Principales resultados del Censo de Población y Vivienda del 2010. Available: http://www.inegi.org.mx/default.aspx. Accessed 2013 June 17.
6. Handa A (2007) Indigenous Health in Mexico. In Racial and Ethnic Disparities in Health in Latin America and the Caribbean. Edited by Giuffrida A, Bernal R, Cárdenas M, Handa A, Trujillo AJ, Vernon JA, Rodriguez Wong L, Angeles G, Mayer-Foulkes D, Larrea C. Washington, D.C.: Inter-American Development Bank; 2007: 65–93.
7. Consejo Nacional de Población (CONAPO) (2013) República Mexicana: Indicadores demográficos de la población indígena, 2000–2010. Available: http://www.portal.conapo.gob.mx/index.php?option = com_content&view = article&id = 37&Itemid = 235. Accessed 2013 June 17.
8. Comisión Nacional para el Desarrollo de los Pueblos Indígenas (CDI) (2006) Regiones indígenas de México. Comisión Nacional para el Desarrollo de los Pueblos Indígenas, Programa de las Naciones Unidas para el Desarrollo; coord. Enrique Serrano Carreto. México: CDI: PNUD, 2006.
9. Berrío L, Reyes N (2008) Las mujeres guerrerenses y la muerte materna. En: Coalición por la Salud de las Mujeres. La Salud de las Mujeres Guerrerenses. Retos Legislativos. México, 2008.
10. The World Bank (WB) (2012) México: Panorama de la Protección Social. Washington, D.C.: The World Bank; 2012.
11. Knaul F, González-Pier E, Gómez-Dantés O, García-Junco D, Arreola-Ornelas H, et al. (2012) The quest for universal health coverage: Achieving social protection for all in Mexico. The Lancet, 380(9849), 1259–1279. doi: 10.1016/S0140-6736(12)61068-X.
12. Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL) (2013) Informe de evaluación específica de desempeño 2012-2013: Seguro Popular. Available: http://www.coneval.gob.mx/Evaluacion/Eval_Especificas/Paginas/EED_2012-2013/EED_2012_2013_SALUD.aspx.
13. King G, Gakidou E, Imai K, Lakin J, Moore R, et al. (2009) Public policy for the poor? A randomised assessment of the Mexican universal health insurance programme. The Lancet, 373(9673), 1447–1454. doi: 10.1016/S0140-6736(09)60239-7.
14. Knaul F, Arreola-Ornelas H, Méndez-Carniado O, Bryson-Cahn C, Barofsky J, et al. (2006). Evidence is good for your health system: Policy reform to remedy catastrophic and impoverishing health spending in Mexico. The Lancet, 368(9549), 1828–1841. doi: 10.1016/S0140-6736(06)69565-2.
15. Sistema de Protección Social en Salud (2013) Informe de resultados del SPSS Enero-Diciembre 2012. Secretaría de Salud. Available: http://www.seguro-popular.salud.gob.mx/index.php?option = com_content&view = article&id = 277&Itemid = 293. Accessed 2013 June 17.
16. Galárraga O, Sosa-Rubí S, Salinas-Rodríguez A, Sesma-Vázquez S (2010) Health insurance for the poor: Impact on catastrophic and out-of-pocket health expenditures in Mexico. The European Journal of Health Economics, 11(5), 437–447. Available: http://www.jstor.org/stable/40963266.
17. Sosa-Rubí S, Salinas-Rodríguez A, Galárraga O (2011) Impacto del seguro popular en el gasto catastrófico y de bolsillo en el México rural y urbano, 2005–2008. Salud Pública De México, 53, 425–435.
18. Wirtz V, Santa-Ana-Tellez Y, Servan-Mori E, Avila-Burgos L (2012) Heterogeneous effects of health insurance on out-of-pocket expenditure on medicines in Mexico. Value in Health, 15(5), 593–603. doi: 10.1016/j.jval.2012.01.006.
19. Sosa-Rubí S, Galárraga O, Harris J (2009) Heterogeneous impact of the "Seguro popular" program on the utilization of obstetrical services in Mexico, 2001–2006: A multinomial probit model with a discrete endogenous variable. Journal of Health Economics, 28(1), 20–34. doi: 10.1016/j.jhealeco.2008.08.002.
20. González-Block M, Sauceda-Valenzuela A, Santa-Ana-Téllez Y (2010) Factores asociados a la demanda de servicios para la atención del parto en México. Salud Pública de México, 52(5), 416–423.
21. Grogger J, Arnold T, León A, Ome A, Triyana M. (2012) Identificación y análisis de los efectos del Seguro Popular en el gasto en salud de los afiliados. CIDE. Unpublished manuscript.
22. Laurell AC (2013) Impacto del seguro popular en el sistema de salud mexicano. Buenos Aires, Argentina: CLACSO, 2013.
23. Leyva-Flores R, Infante-Xibille C, Gutiérrez-Reyes JP, Quintino-Pérez F (2013) Inequidad persistente en salud en los pueblos indígenas de México, 2006-2012: retos para el sistema de protección social. Salud Publica Mex 2013;55:S1-23-S128.
24. Gutierrez JP, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, et al. (2012) Encuesta Nacional de Salud y Nutrición 2012. Resultados Nacionales. Cuernavaca, México: Instituto Nacional de Salud Pública (MX), 2012.
25. Martinez G, Aguilera N, Chernichovsky D (2009) The Mexican health care system and the emerging paradigm in modern systems. Department of Health Systems Management. Faculty of Health Science. Ben-Gurion, University of the Negev, 2009.
26. Molina-Rodríguez J, Poblano-Verastegui O, Carrillo-Díaz C, Saucedo-Valenzuela (2006) A Utilización de servicios de salud en México. Salud Tabasco; 2006, 12, 427–432.
27. Céspedes-Londoño J, Jaramillo-Pérez I (2002) Impacto de la reforma del sistema del sistema de seguridad social sobre la equidad en los servicios de salud en Colombia. Cad. Saude Publica; 2002, 18 (4), 1003–1024.
28. Danese-De los Santos L, Valencia-Mendoza A, Sosa-Rubí S (2011) Analysis of Changes in Health-Care Service Access and Choice of Provider in Mexico: The Utilization of Curative Health Services 2000–2006. BMC Public Health 2011, 11:771doi:10.1186/1471-2458-11-771.
29. Comisión Nacional para el Desarrollo de los Pueblos Indígenas (CDI) (2012) Los hogares y la población indígena. Available: http://www.cdi.gob.mx/index.php?id = 211&option = com_content&task = view, 2009. Accessed 2012 October 1.
30. Brown C, Pagán J, Rodríguez-Oreggia E (2005) The decision-making process of health-care utilization in Mexico. Health Policy 2005, 72:81–91.
31. López-Ceballos D, Chunhuei C (2009) Health-care utilization in Ecuador: a multilevel analysis of socio-economic determinants and inequality issues. Health Policy and Planning 2009:1–10.
32. Valdivia M (2002) Public health infrastructure and equity in the utilization of outpatient health-care services in Peru. Health Policy and Planning 2002, 17:12–19.
33. Andersen RM (1995) Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav 1995; 36:1–10.
34. Sahn D, Younger S, Genicot G (2003) The Demand for Health Care Services in Rural Tanzania. Oxford Bulletin Economics and Statistics. 65(2): 241–260.
35. Consejo Nacional de Población (CONAPO) (2012) Índice de marginación por localidad. Available: http://www.conapo.gob.mx/es/CONAPO/Indice_de_Marginacion_por_Localidad_2010. Accessed 2012 November 11.
36. Wirtz V, Serván-Mori E, Heredia-Pi I, Dreser A, Ávila-Burgos L (2013) Utilización y gasto en medicamentos en México: avances y retos en el acceso equitativo a medicamentos. Salud Publica Mex 2013; 55:00-00.
37. Rosenbaum P, Rubin D (1983) The central role of the propensity score in observational studies for causal effects. Biometrika 70, 1:41–55.
38. Dehejia R, Wahba S (2002) Propensity Score Matching Methods for Non-experimental Causal Studies. The Review of Economics and Statistics 2002; 84(1): 151–161.
39. Caliendo M, Kopeinig S (2008) Some Practical Guidance for the Implementation of Propensity Score Matching, Journal of Economic Surveys, 22(1), pp. 31–72.
40. Cameron A, Trivedi P (2010) Microeconometrics using Stata A. College Station, Texas: Stata Press, 2010.
41. Stata Corp LP (2009) Stata/SE 13.0 for Windows XP 64 bits. College Station, Texas, USA: Stata Corp LP, 2009.
42. OMS (2012) Social Protection: Shared interests in vulnerability reduction and development. Social determinants of health sectorial briefing series, 4. WHO Document Production Services, Geneva, Switzerland, 2012.
43. Comisión Nacional de Protección Social en Salud (2013) Historia del Seguro Popular. Available: http://www.seguro-popular.salud.gob.mx/index.php?option = com_content&view = article&id = 332&Itemid = 326. Accessed 2013 August 28.
44. Gutiérrez JP, Hernández-Ávila M (2013) Cobertura de protección en salud y perfil de la población sin protección en México, 2000-2012. Salud Pública de México; 2013, 55 (sp 2), 83–96.

Capítulo 8.
Salud de las poblaciones indígenas

La creación del Programa Institucional Salud de los Pueblos Indígenas (PISP) en 2019 marcó un hito en la historia del INSP. Por primera vez, se estableció como prioridad institucional el compromiso de comprender e incidir en las condiciones de salud de los pueblos indígenas, así como en sus determinantes sociales, en particular, las estructuras de desigualdad sustentadas en ideologías racistas.

El PISPI emergió en la confluencia de tres fuerzas: el interés del Gobierno federal iniciado en diciembre de 2018, que dio prioridad a la atención de los pueblos indígenas; la misión del INSP por "Contribuir a la equidad social y la protección de la salud pública", y el trabajo sostenido de un grupo de investigadores que, desde la fundación del CISS, han desarrollado una línea de investigación centrada en las necesidades de salud de las poblaciones indígenas y en la respuesta del sistema de salud para atenderlas.

No obstante, la investigación en este campo ha enfrentado importantes desafíos. Entre ellos, la falta de criterios unificados para la identificación de población indígena, el subregistro en los sistemas de información en salud, y los enfoques reduccionistas que atribuyen los rezagos en salud únicamente a "diferencias culturales", sin examinar críticamente las desigualdades estructurales ni el racismo sistémico. Estas limitaciones han contribuido a la invisibilización de estas poblaciones y han obstaculizado la eficacia de las estrategias orientadas a mejorar su salud.

Hemos seleccionado cinco artículos representativos de esta línea de investigación. Cada uno responde a los desafíos mencionados y, desde una perspectiva de equidad en salud e interseccionalidad, analiza distintos ejes de desigualdad que afectan a los pueblos indígenas de México.

El artículo más reciente constituye el primer esfuerzo académico por cuantificar el impacto de la discriminación étnica en las brechas entre población indígena y no indígena, utilizando la cobertura efectiva en salud materna como indicador del desempeño del sistema. El segundo analiza una intervención pedagógica innovadora para capacitar al personal de salud en el reconocimiento y prevención del maltrato por razones étnicas, como parte de una respuesta institucional al racismo en el sistema de salud.

El tercer artículo ofrece una panorámica nacional de las condiciones de salud y del uso de servicios entre la población indígena, a partir de datos de la Encuesta Nacional de Salud y Nutrición (Ensanut). El cuarto se enfoca en la población indígena envejecida, y destaca el valor del trabajo comunitario y participativo para una atención más adecuada a sus necesidades. Por último, el artículo que presentamos examina la violencia de pareja hacia

mujeres indígenas en diversas regiones del país. Fue uno de los primeros trabajos en señalar la urgencia de establecer mecanismos eficaces para proteger a estas mujeres de situaciones de riesgo.

Estas contribuciones no sólo reflejan el compromiso del CISS con la salud de los pueblos indígenas, sino que también delinean una agenda crítica para avanzar hacia un sistema de salud más justo, inclusivo y respetuoso de la diversidad cultural en México.

Serván-Mori *et al. International Journal for Equity in Health* (2025) 24:10
https://doi.org/10.1186/s12939-024-02374-2

International Journal for Equity in Health

RESEARCH Open Access

Ethnic and racial discrimination in maternal health care in Mexico: a neglected challenge in the search for universal health coverage

Edson Serván-Mori[1], Sergio Meneses-Navarro[1*], Rocío García-Díaz[2], Diego Cerecero-García[1,3], David Contreras-Loya[4,5], Octavio Gómez-Dantés[1] and Arachu Castro[6]

Abstract

Background Ethnic and racial discrimination in maternal health care has been overlooked in academic literature and yet it is critical for achieving universal health coverage (UHC). There is a lack of empirical evidence on its impact on the effective coverage of maternal health interventions (ECMH) for Indigenous women in Mexico. Documenting progress in reducing maternal health inequities, particularly given the disproportionate impact of the Covid-19 pandemic on ethnic minorities, is essential to improving equity in health systems.

Methods We conducted a population-based, pooled cross-sectional, and retrospective analysis for 2009–2023, using data from the last three waves (2014, 2018, and 2023) of a nationally representative demographic survey (ENADID). Our study included $n = 72{,}873$ ($N = 23{,}245{,}468$) Mexican women aged 12–54 with recent live births. We defined ECMH as adequate antenatal care (ANC), skilled and/or institutional delivery care, timely postpartum care, and complication-free postpartum/puerperium. After describing sociodemographic characteristics and maternal health coverage by Indigenous status, we estimated a pooled fixed-effects multivariable regression model to adjust ECMH for relevant covariates. We used the Blinder-Oaxaca decomposition for nonlinear regression models to quantify inequities in ECMH due to ethnic-racial discrimination, defined as differences in outcomes attributable to differential treatment.

Findings Indigenous women had lower education, labor market participation, and socioeconomic position, higher parity, and more rural, poorer state residence than non-Indigenous women. They faced significant health coverage loss due to the dismantling of *Seguro Popular*, a public health insurance mechanism in place until the end of 2019, right before the start of the Covid pandemic. Adjusted ECMH was 25.3% for non-Indigenous women and 18.3% for Indigenous women, peaking at 28.8% and 21.2% in 2013–2018, declining to 25.7% and 18.7% pre-Covid (January 2019 to March 2020), and further declining to 24.0% and 17.4% during Covid, with an increase to 26.6% for non-Indigenous women post-Covid, while remaining similar for Indigenous women. Decomposition analyses revealed that during the analyzed period, 30.8% of the gap in ECMH was due to individual characteristics, 51.7% to ethnic-racial discrimination, and 17.5% to their interaction. From 2009 to 2012, 42.2% of the gap stemmed from observable differences, while 40.4% was due to discrimination. In the pre-Covid-19 phase, less than 1% was from observable characteristics, with 75.3% attributed to discrimination, which remained in the post-Covid-19 stage (78.7%).

*Correspondence:
Sergio Meneses-Navarro
sergio.meneses@insp.mx

Full list of author information is available at the end of the article

© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

Serván-Mori E, Meneses-Navarro S, García-Díaz R, Cerecero-García D, Contreras-Loya D, Gómez-Dantés O, Castro A. Ethnic and racial discrimination in maternal health care in Mexico: a neglected challenge in the search for universal health coverage. Int J Equity Health. 2025;24(1):10. https://doi.org/10.1186/s12939-024-02374-2

Conclusions Despite modest health policy successes, the ethnic gap in ECMH remains unchanged, indicating insufficient action against inequity-producing structures. Ethnic and racial discrimination persists, exacerbated during the pandemic and coinciding with the government's cancellation of targeted social programs and public health insurance focused on the poorest populations, including Indigenous peoples. Thus, prioritizing maternal and child health underscores the need for comprehensive policies, including specific anti-racist interventions. Addressing these inequities requires the recognition of both observable and unobservable factors driven by discriminatory ideologies and the implementation of targeted measures to confront the complex interactions driving discrimination in maternal health care services for Indigenous women.

Keywords Ethnic discrimination, Racism, Maternal health care, Equity, Universal health coverage, Mexico

Background

Social organization is a fundamental determinant of population health [1]. In Latin America and the Caribbean (LAC), deep forms of social stratification based on racist ideologies towards Indigenous populations persist, reinforcing and perpetuating their marginalization [2] and creating barriers to accessing healthcare, which significantly impacts their health status [3, 4]. Historically, however, most studies have focused on cultural differences to explain health inequalities such as higher maternal or infant mortality [3, 5, 6], thus invisibilizing the impact of ethnic and racial discrimination on life course outcomes, including health [7]. Few academic studies in LAC acknowledge the effects of this type of discrimination against Indigenous populations health system performance [3, 7, 8]. Most available evidence comes from qualitative case studies documenting discriminatory practices [9]. To our knowledge, there is limited research to measure ethnic discrimination within health systems [10].

Covid-19 has exacerbated health inequalities faced by Indigenous populations [11–13]. In particular, the pandemic contributed to increases in maternal mortality [14, 15] and other maternal and child health indicators such as antenatal care (ANC) [16]. Despite this, little attention has been paid to more comprehensive measures, such as effective coverage of maternal health interventions (ECMH) and their interaction with ethnic and racial discrimination. The disproportionately high burden of Covid-19 in minority communities reflects these existing health disparities and preexisting health disparities and systemic inequities [17, 18]. However, the extent to which these gaps in maternal care have been widened remains unclear.

In Mexico, according to the most recent 2020 Census, 6.1% of the population aged three years and older spoke an Indigenous language, representing approximately 7.4 million people [19]. These speakers belong to 68 linguistic groups and 364 linguistic variants distributed among 70 Indigenous Peoples. The states of Chiapas, Oaxaca, Mexico, Puebla, and Veracruz—some of the poorest in the country—concentrate over half (56.2%) of the Indigenous population [19]. These population groups experience marked inequalities in essential rights. For instance, in 2020, eight out of ten Indigenous people were not affiliated with any social health insurance. Most (87.5%) relied on publicly subsidized programs like the now-defunct *Seguro Popular* and *Progresa*, *Oportunidades-Prospera* (POP, for its acronym in Spanish) to access health services [19]. Furthermore, inequities in education are notable: 20% of Indigenous women and 11.8% of Indigenous men aged 15 and older were unable to read or write, compared to 4.1% and 3.1% among the non-Indigenous, respectively [19].

Our analysis tracks the temporal evolution of inequities and the impact of ethnic and racial discrimination on effective coverage in maternal healthcare (ECMH) in Mexico from 2009 to 2023, with particular emphasis on the Covid-19 pandemic period. Using data from the 2014, 2018, and 2023 National Survey of Demographic Dynamics (ENADID), which provides representative information at national and state levels, we examine disparities in ECMH—defined as adequate ANC, skilled and/or institutional delivery care, timely postpartum care, and postpartum/puerperium without complications—among 74,279 women aged 12–54, whose last pregnancy resulted in a stillbirth, live birth, or early infant death. The study explores pre- and post-Covid-19 periods, offering lessons for low- and middle-income countries in implementing post-pandemic health system reforms to achieve the Sustainable Development Goals (SDGs, Target 3) and Universal Health Coverage (UHC).

To assess differences in ECMH between Indigenous and non-Indigenous women, we drew from the labor economics literature and applied the Oaxaca-Blinder decomposition method. This method separates inequities into two components: differences in characteristics, such as educational attainment, and differences in how these characteristics affect healthcare access (e.g., the varying impact of education on health outcomes across groups). Our analysis is adjusted for individual, household, and contextual factors to uncover the underlying contributors to these healthcare inequities.

The study period covers three federal administrations with different party affiliations: 2006–2012, with the National Action Party (right-wing); 2012–2018, with

the Institutional Revolutionary Party (center-right); and 2018–2024, with the National Regeneration Movement (left) [20]. During this period, we identify two general approaches to social and health policies: continuity between 2006 and 2018 and a significant change from 2018 onwards [21, 22]. In social policy, the POP program was implemented between 1997 and November 2018—the first of its kind in the world to provide conditional cash transfers to incentivize school attendance, use of health services, and monitoring of children's nutrition [23, 24], with a focus on women's empowerment by allocating transfers to women and prioritizing girls education [24]. This program benefited over 6.8 million families until its abolition in December 2018 [25]. It was replaced by *Programas para el Bienestar*, which included cash transfers that were not conditional on using health services and, despite its focalization on marginalized groups, no longer privileged women's participation [22]. By 2024, 79% of Mexican households received benefits from at least one cash-transfer program [26].

Regarding access to healthcare, the first phase (2003–2019) focused on extending coverage through *Seguro Popular* (SP). This decentralized system offered public health insurance to the population without formal employment who had no access to social security health insurance [27] and prioritized maternal health [28]. As of December 2018, 82% of the population was covered by public health insurance [29]. In 2020, the government recentralized health services, abolished SP, and took over providing and financing health care for the population without formal employment [20]. Initially, this function was taken over by the *Instituto de Salud para el Bienestar* (INSABI) and, in 2023, by *IMSS-Bienestar* [20, 30].

Methods

Design and study population

We conducted a population-based, pooled cross-sectional, and retrospective analysis for 2009-23 using data from the 2014, 2018, and 2023 National Survey of Demographic Dynamics (ENADID) [31]. Conducted every five years between August and October, ENADID collects comprehensive data on demographic characteristics, maternal, newborn, and reproductive health, including contraceptive use and healthcare service utilization. It also provides updated information on fertility, mortality, reproductive preferences, nuptiality, internal and external migration, and insights into household and housing characteristics [31]. Based on a complex, multistage, and probabilistic sampling design, ENADID provides retrospective and population-based information representative at the national and state levels, including rural/urban stratification. Data were collected using a face-to-face household questionnaire [32, 33]. Across the three analyzed rounds, the survey included a total of 74,279 women aged 12–54 years at the time of their last delivery and whose most recent pregnancy resulted in a stillbirth, live birth, or the death of a child within the first year of life. For this study, we excluded women with private or mixed health insurance (5.1%) to focus on the population with significant Indigenous representation. After excluding an additional 2% of women with incomplete data on key variables such as ANC, delivery, or postpartum care, the final analytical sample comprised 72,873 women, representing nearly 24 million Mexican women when all survey rounds were combined.

Effective coverage in maternal healthcare

Based on our previous work [10, 34–36], we defined ECMH as the receipt of essential interventions across the continuum of maternal care [34], including adequate ANC, skilled or institutional delivery, timely postpartum care, and the absence of postpartum complications. Adequate ANC was defined as having at least five prenatal visits, the first occurring within the first twelve weeks, and the provision of at least 75% of recommended care processes based on national and international guidelines (e.g., administration of tetanus vaccine, testing for sexually transmitted diseases or abnormal blood glucose) [37–39]. Skilled delivery referred to childbirth attended by trained personnel and/or occurring in a health facility, while timely postpartum care was defined as a consultation within fifteen days of delivery. Postpartum complications were self-reported and included common maternal health issues such as excessive bleeding, high blood pressure, and infections.

Covariates

The primary independent variable was Indigenous status. The ENADID collects information related to language, which may overlook important cultural, social, and historical factors essential for fully understanding Indigenous groups. Nevertheless, this Indigenous identification criterion, although limited, allowed us to make three assumptions. First, women who speak primarily an Indigenous language self-identify as Indigenous. Second, they face similar barriers to healthcare access that could affect their utilization and timely receipt of the continuum of care [40–42]. Third, speaking an Indigenous language is a proxy for occupying a similar position in a stratified social structure based on ethnic identity criteria. Accordingly, we classified women as Indigenous if they reported speaking an Indigenous language; 7.6% fell into this category, representing 1.7 million women aged 12–54 years at the time of their last delivery during the study period.

We also recovered several individual, household, and contextual factors. (i) *At the individual level*: age at the time of last birth (12–19, 20–29, 30–39, and 40–54), the period of the last obstetric event, based on the month and

year (2009–12, 2013–18, and the pre-Covid ——January 2019 to March 2020——, Covid ——April 2020 to March 2022——, and post-Covid ——April 2022 to October 2023). These cut-off dates were informed by the evolution of Covid-19 waves, considering trends in infections, hospitalizations, and mortality reported by Mexico's health authorities [43] and their implications for healthcare service utilization. Specifically, Mexico's fourth Covid-19 wave, which began in April 2022, marked a de facto return to normality in healthcare service delivery); head of household status (yes = 1/no = 0); marital status (single, married or in union, and divorced, separated, or widowed); schooling level (none/elementary, middle, high or bachelor's/higher school) whether the respondent was recently employed; health insurance coverage at the time of the survey —none, Social Security, or *Seguro Popular/INSABI* (a single category, as *INSABI* took over the population without social security in 2020 [30, 44])—; obstetric information including parity (primiparous, one, two, or three or more); history of perinatal losses (stillbirth or death within the first year of life or at least one miscarriage or abortion), and the diagnosis of a health problem during pregnancy or childbirth. (ii) *At the household level*: a factorial asset and housing material index as a measure of socioeconomic status [45–47]. The index categorized women into five groups (from lowest to highest) using the Dalenius and Hodges method [48], where higher categories indicate more assets and better housing conditions. (iii) *At the place of residence levels*: the area of residence by population size (rural: <2500 inhabitants, urban: 2,500 – 100,000, and metropolitan: >100,000), as well as the socioeconomic region of residence according to the official Mexican definition [49].

Analysis

Considering the complex survey design, all statistical analyses were conducted using Stata MP v17.1 [50]. First, we summarized the sociodemographic, sexual, and reproductive characteristics of our study population using descriptive statistics (expressed as percentages and 95% confidence intervals, CI) according to Indigenous status and the index of last delivery (2009–12, 2013–18, pre-Covid, Covid and post-Covid). We then estimated unadjusted and conditional coverage rates for each dimension of ECMH independently. Independent coverage was the percentage of the population receiving each healthcare intervention, while ECMH refers to full compliance with these healthcare interventions. Third, we adjusted the ECMH rate by Indigenous status for the pre-post Covid-19 period using a pooled fixed-effects logistic regression [51]. This model included all previously mentioned covariates, including the last delivery period and socioeconomic region dummy variables. Specification and goodness-of-fit were assessed using the Hosmer-Lemeshow and link tests [52].

Finally, to analyze ethnic inequities in ECMH attributable to ethnoracial discrimination, we implemented the adapted version of the Blinder-Oaxaca (BO) decomposition technique for nonlinear regression models [53, 54]. This method allows for a ceteris paribus breakdown of the outcome difference between two groups into three components: endowment (explained by group characteristics), coefficient (differences in returns to characteristics), and interaction (the combined effect of both).

Let $E\left[ECMH_i|X_i\right] = g\left(X_i\beta\right)$ be the expected outcome for individual i given characteristics X_i, where $g(\cdot)$ is a nonlinear link function (in our case, logistic), and β is a vector of coefficients. If separate regression models for (ind) and $(\bar{ind})$ are fit, it is possible to separate the total gap in ECMH into three quantities:

i) The *endowments component* reflects the part of the outcome difference due to differences in the characteristics X between the two groups (Indigenous (ind) and non-Indigenous $(\bar{ind})$), holding the regression coefficients constant ($[g(X_{ind}\beta_{\bar{ind}}) - g(X_{\bar{ind}}\beta_{\bar{ind}})]$). This component tells us how much of the outcome difference can be explained by the different characteristics between groups ind and $\bar{ind}$, using the coefficients from the least disadvantaged group ($\bar{ind}$).
ii) The *coefficients component* captures the part of the outcome difference due to differences in the coefficients β between the two groups, holding the characteristics constant ($[g(X_{ind}\beta_{ind}) - g(X_{ind}\beta_{\bar{ind}})]$). This component represents the structural differences between the two groups and may include factors like discrimination or unobserved variables. It reflects how the same characteristics are "valued" differently between groups ind and $\bar{ind}$.
iii) The *interaction component* accounts for the differences in characteristics and coefficients. This means the impact of the difference in characteristics could change depending on the differences in coefficients, and vice versa ($[g(X_{ind}\beta_{ind}) - g(X_{\bar{ind}}\beta_{ind}) - g(X_{ind}\beta_{\bar{ind}}) - g(X_{\bar{ind}}\beta_{\bar{ind}})]$). This component represents the combined effect of having different characteristics and coefficients across the two groups. Thus, the total outcome difference between both groups ind and $\bar{ind}$ can be expressed as:

Table 1 Main characteristics of Mexican women studied by indigenous status, 2009–2023

	Estimated percentage of weighted population (95% CI)											
	Overall		2009–2012		2013–2018		Pre-Covid-19[a]		Covid-19[b]		Post-Covid-19[c]	
	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous
N	21,513,681	1,731,787	5,045,725	365,820	11,063,753	875,119	1,286,649	98,781	2,352,354	225,568	1,764,220	167,478
%	92.6	7.5	93.2	6.8	92.7	7.3	92.9	7.1	91.3	8.8	91.3	8.7
Age at time of last delivery birth, years												
12——19	15.7 [15.3, 16.1]	13.9 [12.8, 15.1]	14.8 [14.1, 15.6]	11.6 [9.6, 13.6]	17.0 [16.4, 17.5]	15.3 [13.7, 16.9]	13.7 [12.1, 15.2]	12.8 [8.3, 17.3]	13.8 [12.7, 15.0]	11.7 [8.8, 14.5]	14.4 [13.1, 15.6]	15.7 [11.9, 19.5]
20——29	53.6 [53.0, 54.1]	51.0 [49.4, 52.7]	53.1 [52.1, 54.2]	53.6 [49.9, 57.3]	53.6 [52.9, 54.3]	51.6 [49.4, 53.8]	52.5 [50.3, 54.6]	46.8 [39.7, 53.8]	53.8 [52.1, 55.4]	48.1 [43.3, 52.9]	54.8 [52.9, 56.6]	49.0 [44.0, 54.0]
30——39	28.0 [27.5, 28.4]	30.9 [29.2, 32.6]	29.4 [28.4, 30.4]	30.8 [27.3, 34.4]	26.7 [26.1, 27.4]	29.4 [27.1, 31.8]	30.8 [28.8, 32.8]	33.3 [26.5, 40.2]	28.9 [27.4, 30.4]	35.8 [30.7, 40.9]	28.4 [26.7, 30.1]	31.1 [26.7, 35.6]
40——54	2.8 [2.6, 2.9]	4.1 [3.4, 4.8]	2.7 [2.3, 3.0]	4.0 [2.5, 5.4]	2.7 [2.5, 2.9]	3.7 [2.8, 4.6]	3.0 [2.3, 3.7]	7.1 [3.7, 10.5]	3.5 [2.9, 4.1]	4.4 [2.3, 6.6]	2.5 [1.9, 3.2]	4.2 [2.1, 6.3]
Head of household	10.1 [9.7, 10.4]	9.9 [8.8, 10.9]	9.6 [9.0, 10.1]	11.9 [9.6, 14.3]	9.4 [9.0, 9.8]	8.1 [6.9, 9.2]	13.9 [12.5, 15.4]	17.1 [11.4, 22.8]	13.1 [12.0, 14.2]	12.7 [9.1, 16.2]	8.7 [7.7, 9.7]	6.6 [4.0, 9.1]
Marital status												
Single	8.3 [8.0, 8.6]	4.1 [3.4, 4.7]	8.4 [7.8, 9.0]	4.5 [3.1, 5.9]	8.3 [7.9, 8.8]	3.9 [3.1, 4.7]	8.8 [7.5, 10.1]	4.0 [1.6, 6.5]	8.1 [7.2, 9.1]	4.4 [2.2, 6.6]	7.3 [6.3, 8.4]	3.4 [1.2, 5.7]
Married/free union	81.0 [80.6, 81.5]	89.6 [88.7, 90.6]	80.9 [80.0, 81.7]	88.7 [86.6, 90.8]	81.4 [80.8, 82.0]	90.9 [89.6, 92.1]	75.5 [73.6, 77.4]	86.7 [82.2, 91.1]	80.0 [78.6, 81.3]	86.6 [83.2, 90.1]	84.8 [83.4, 86.1]	90.9 [87.9, 94.0]
Divorced/separated/widowed	10.7 [10.4, 11.0]	6.3 [5.6, 7.1]	10.8 [10.1, 11.4]	6.8 [5.2, 8.5]	10.2 [9.8, 10.7]	5.2 [4.3, 6.2]	15.7 [14.1, 17.3]	9.3 [5.5, 13.0]	11.9 [10.9, 13.0]	9.0 [6.2, 11.7]	7.9 [7.0, 8.8]	5.6 [3.3, 7.9]
Schooling, years												
0——6 (none/elementary school)	15.4 [15.0, 15.9]	44.9 [42.6, 47.2]	21.2 [20.3, 22.1]	56.4 [51.7, 61.1]	15.0 [14.4, 15.6]	46.4 [43.3, 49.5]	11.9 [10.4, 13.3]	35.8 [28.9, 42.7]	10.8 [9.7, 11.8]	32.9 [28.4, 37.5]	10.3 [9.0, 11.5]	33.2 [27.7, 38.7]

Table 1 (continued)

	Estimated percentage of weighted population (95% CI)											
	Overall		2009–2012		2013–2018		Pre-Covid-19[a]		Covid-19[b]		Post-Covid-19[c]	
	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous
7——9 (middle school)	37.7 [37.1, 38.2]	36.3 [34.4, 38.2]	38.2 [37.1, 39.2]	29.9 [25.7, 34.2]	38.3 [37.6, 39.0]	35.2 [32.7, 37.8]	36.3 [34.2, 38.4]	40.8 [34.4, 47.3]	36.5 [34.9, 38.1]	44.1 [40.0, 48.1]	35.1 [33.2, 36.9]	42.6 [36.9, 48.3]
10——12 (high school)	28.1 [27.6, 28.6]	14.3 [12.9, 15.6]	23.9 [23.0, 24.9]	9.6 [7.3, 11.9]	28.2 [27.5, 28.8]	14.2 [12.3, 16.1]	30.0 [27.9, 32.2]	16.4 [11.2, 21.6]	31.7 [30.2, 33.3]	18.1 [14.6, 21.7]	33.1 [31.2, 34.9]	18.4 [14.3, 22.5]
13——24 (bachelor's or higher)	18.8 [18.4, 19.3]	4.5 [3.8, 5.3]	16.7 [15.9, 17.5]	4.0 [2.6, 5.5]	18.6 [18.0, 19.2]	4.2 [3.1, 5.2]	21.8 [20.0, 23.7]	7.0 [3.9, 10.2]	21.0 [19.6, 22.3]	4.8 [3.1, 6.6]	21.6 [19.9, 23.2]	5.8 [3.0, 8.5]
Employed in the last week	40.4 [39.8, 40.9]	27.9 [26.1, 29.6]	40.4 [39.3, 41.5]	29.4 [26.1, 32.7]	38.6 [37.9, 39.4]	23.9 [21.6, 26.2]	53.3 [51.0, 55.5]	37.1 [30.5, 43.8]	46.3 [44.7, 48.0]	38.7 [34.0, 43.4]	34.1 [32.3, 35.9]	25.3 [20.1, 30.4]
Health insurance												
None	22.5 [21.9, 23.0]	23.0 [21.0, 25.0]	16.0 [15.2, 16.9]	11.7 [9.2, 14.2]	16.2 [15.6, 16.8]	14.3 [12.4, 16.3]	40.3 [38.0, 42.6]	44.7 [37.2, 52.3]	41.8 [40.0, 43.5]	47.6 [42.3, 52.8]	41.2 [39.2, 43.2]	47.1 [41.3, 53.0]
Seguro Popular/ INSABI[d]	42.8 [42.1, 43.4]	68.4 [66.2, 70.6]	49.7 [48.5, 50.9]	80.8 [77.8, 83.8]	49.5 [48.6, 50.3]	77.4 [75.0, 79.8]	20.8 [19.0, 22.5]	41.3 [33.8, 48.8]	21.9 [20.5, 23.2]	43.7 [38.6, 48.9]	24.8 [23.1, 26.4]	43.3 [37.4, 49.3]
Social Security	34.8 [34.2, 35.4]	8.6 [7.6, 9.6]	34.3 [33.2, 35.4]	7.5 [5.7, 9.3]	34.3 [33.5, 35.1]	8.3 [6.9, 9.6]	38.9 [36.7, 41.1]	14.0 [9.4, 18.6]	36.4 [34.7, 38.0]	8.7 [5.7, 11.7]	34.0 [32.2, 35.9]	9.6 [6.0, 13.1]
Parity at time of last delivery birth												
Primiparous	35.8 [35.3, 36.4]	28.4 [26.7, 30.0]	32.4 [31.5, 33.4]	25.1 [21.9, 28.3]	37.0 [36.3, 37.7]	28.8 [26.5, 31.2]	35.7 [33.5, 37.8]	29.7 [23.6, 35.7]	35.3 [33.8, 36.9]	28.6 [24.2, 33.0]	39.0 [37.2, 40.8]	32.0 [26.9, 37.1]
One	32.7 [32.2, 33.2]	27.2 [25.7, 28.7]	32.4 [31.4, 33.4]	26.4 [23.3, 29.5]	32.5 [31.8, 33.1]	26.4 [24.5, 28.4]	34.2 [32.1, 36.3]	27.1 [20.6, 33.6]	33.4 [31.8, 34.9]	29.8 [25.4, 34.2]	33.4 [31.6, 35.2]	29.8 [24.7, 34.9]
Two	20.3 [19.9, 20.7]	18.5 [17.2, 19.8]	21.3 [20.5, 22.2]	17.5 [15.0, 20.1]	19.8 [19.3, 20.4]	18.2 [16.4, 20.1]	20.5 [18.7, 22.2]	20.4 [15.1, 25.7]	21.5 [20.1, 22.9]	19.9 [15.9, 23.9]	18.3 [16.9, 19.7]	19.0 [14.6, 23.3]

Table 1 (continued)

	Estimated percentage of weighted population (95% CI)											
	Overall		2009–2012		2013–2018		Pre-Covid-19[a]		Covid-19[b]		Post-Covid-19[c]	
	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous
Three or over	11.1 [10.8, 11.5]	25.9 [24.3, 27.6]	13.8 [13.1, 14.6]	31.0 [27.7, 34.3]	10.7 [10.2, 11.1]	26.5 [24.2, 28.9]	9.7 [8.5, 10.9]	22.8 [16.6, 29.1]	9.8 [8.8, 10.7]	21.7 [17.3, 26.2]	9.3 [8.3, 10.3]	19.2 [14.7, 23.8]
Perinatal losses[e]	15.5 [15.1, 15.9]	11.4 [10.3, 12.4]	14.9 [14.2, 15.7]	12.5 [10.2, 14.8]	15.1 [14.6, 15.6]	10.7 [9.4, 12.0]	16.1 [14.5, 17.7]	10.9 [6.9, 14.8]	16.5 [15.3, 17.6]	10.3 [7.7, 13.0]	17.8 [16.4, 19.2]	14.1 [10.3, 18.0]
Health problem diagnosed during pregnancy												
None	33.7 [33.2, 34.2]	49.4 [47.4, 51.4]	36.5 [35.4, 37.6]	52.4 [48.5, 56.2]	32.9 [32.2, 33.6]	51.3 [48.7, 53.9]	34.0 [32.0, 36.1]	42.1 [35.1, 49.2]	34.0 [32.4, 35.6]	44.2 [39.0, 49.4]	30.0 [28.2, 31.9]	44.1 [37.9, 50.3]
One	26.4 [25.9, 26.9]	23.0 [21.6, 24.4]	26.2 [25.2, 27.1]	21.1 [18.4, 23.8]	26.8 [26.1, 27.4]	23.3 [21.4, 25.3]	25.6 [23.7, 27.5]	27.5 [21.3, 33.8]	26.5 [25.0, 27.9]	22.7 [18.9, 26.6]	25.0 [23.4, 26.6]	23.0 [18.0, 28.0]
Two	18.3 [17.9, 18.7]	12.8 [11.7, 14.0]	17.6 [16.7, 18.4]	13.0 [10.6, 15.4]	18.7 [18.1, 19.2]	11.7 [10.3, 13.2]	18.3 [16.8, 19.9]	12.4 [7.8, 17.0]	17.4 [16.2, 18.6]	16.8 [13.3, 20.4]	19.5 [17.9, 21.0]	13.2 [9.4, 17.0]
Three or over	21.6 [21.1, 22.0]	14.8 [13.6, 16.1]	19.8 [18.9, 20.6]	13.5 [11.2, 15.9]	21.6 [21.0, 22.2]	13.7 [12.0, 15.3]	22.0 [20.1, 23.9]	17.9 [12.8, 23.0]	22.1 [20.8, 23.4]	16.2 [12.5, 19.9]	25.5 [23.9, 27.2]	19.8 [15.1, 24.4]
Health problem diagnosed during childbirth												
None	61.2 [60.7, 61.7]	62.9 [61.1, 64.8]	63.3 [62.2, 64.4]	67.7 [64.3, 71.1]	60.7 [60.0, 61.4]	64.7 [62.2, 67.1]	61.1 [59.0, 63.2]	54.7 [47.5, 61.9]	61.0 [59.4, 62.6]	57.6 [52.6, 62.5]	58.7 [56.9, 60.6]	55.6 [49.9, 61.2]
One	24.9 [24.5, 25.4]	23.0 [21.5, 24.4]	23.6 [22.7, 24.4]	20.4 [17.7, 23.2]	25.0 [24.4, 25.7]	22.6 [20.5, 24.7]	25.1 [23.2, 27.0]	26.3 [20.3, 32.3]	25.2 [23.8, 26.6]	24.8 [21.0, 28.6]	27.5 [25.9, 29.2]	25.7 [21.0, 30.5]

Table 1 (continued)

	Estimated percentage of weighted population (95% CI)											
	Overall		**2009–2012**		**2013–2018**		**Pre-Covid-19[a]**		**Covid-19[b]**		**Post-Covid-19[c]**	
	Non-Indigenous	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**	**Indigenous**
Two	9.1 [8.8, 9.4]	9.0 [8.0, 10.1]	8.4 [7.9, 9.0]	7.8 [5.9, 9.7]	9.3 [8.9, 9.7]	8.2 [6.9, 9.5]	10.1 [8.8, 11.3]	12.9 [8.3, 17.4]	9.1 [8.1, 10.1]	11.3 [8.1, 14.6]	9.2 [8.1, 10.4]	10.8 [6.6, 15.0]
Three or over	4.8 [4.5, 5.0]	5.1 [4.3, 5.8]	4.7 [4.2, 5.3]	4.1 [2.8, 5.3]	5.0 [4.7, 5.3]	4.5 [3.6, 5.4]	3.8 [3.1, 4.5]	6.1 [2.4, 9.9]	4.6 [4.0, 5.3]	6.3 [3.5, 9.1]	4.5 [3.7, 5.3]	7.9 [5.0, 10.7]
Socioeconomic level												
Lowest	5.9 [5.5, 6.2]	40.4 [38.0, 42.8]	6.9 [6.3, 7.6]	47.6 [42.9, 52.3]	6.3 [5.8, 6.7]	42.1 [38.9, 45.2]	3.4 [2.3, 4.4]	26.9 [20.9, 32.9]	4.3 [3.6, 5.1]	33.1 [27.9, 38.2]	4.5 [3.6, 5.3]	33.5 [27.9, 39.2]
Low	16.2 [15.8, 16.7]	32.0 [30.3, 33.7]	19.3 [18.3, 20.3]	29.2 [25.6, 32.7]	16.5 [15.8, 17.1]	31.0 [28.7, 33.4]	12.4 [10.9, 13.8]	37.9 [31.3, 44.6]	13.5 [12.2, 14.7]	32.9 [28.5, 37.4]	12.4 [11.1, 13.7]	37.9 [32.6, 43.3]
Middle	19.6 [19.1, 20.0]	14.8 [13.5, 16.1]	21.8 [20.9, 22.7]	14.7 [11.8, 17.6]	19.6 [19.0, 20.2]	13.9 [12.2, 15.6]	17.1 [15.4, 18.7]	16.7 [11.9, 21.6]	17.6 [16.3, 18.8]	17.8 [14.1, 21.6]	17.4 [16.0, 18.9]	14.1 [10.5, 17.8]
High	26.2 [25.7, 26.8]	8.5 [7.5, 9.6]	26.8 [25.8, 27.8]	5.6 [4.2, 7.0]	26.2 [25.5, 26.9]	8.6 [7.2, 10.0]	26.2 [24.3, 28.2]	9.6 [5.5, 13.8]	25.5 [24.1, 26.9]	12.0 [8.5, 15.5]	26.1 [24.5, 27.8]	9.5 [6.4, 12.5]
Highest	32.1 [31.5, 32.6]	4.3 [3.6, 5.0]	25.2 [24.2, 26.2]	2.9 [1.8, 4.0]	31.5 [30.7, 32.3]	4.4 [3.4, 5.4]	41.0 [38.7, 43.2]	8.8 [5.2, 12.5]	39.1 [37.4, 40.8]	4.1 [2.2, 6.0]	39.6 [37.6, 41.6]	5.0 [2.4, 7.5]
Area of residence												
Rural	26.8 [25.9, 27.6]	61.2 [58.0, 64.3]	24.4 [23.4, 25.4]	58.2 [53.0, 63.4]	26.3 [25.2, 27.5]	61.7 [57.5, 65.8]	28.9 [26.3, 31.5]	58.3 [50.3, 66.4]	29.9 [27.8, 32.0]	64.3 [57.7, 70.9]	30.6 [28.3, 33.0]	62.5 [55.1, 69.9]
Urban	31.7 [30.9, 32.5]	26.3 [23.4, 29.2]	31.8 [30.8, 32.8]	29.7 [24.8, 34.5]	31.4 [30.2, 32.5]	25.2 [21.3, 29.2]	32.5 [30.0, 35.0]	27.2 [20.2, 34.2]	32.5 [30.3, 34.6]	25.0 [19.0, 31.0]	31.9 [29.5, 34.2]	25.9 [19.4, 32.4]
Metropolitan	41.5 [40.8, 42.3]	12.5 [11.0, 14.0]	43.8 [42.8, 44.8]	12.2 [9.6, 14.7]	42.3 [41.2, 43.4]	13.1 [11.0, 15.1]	38.6 [36.1, 41.0]	14.4 [9.1, 19.8]	37.7 [35.7, 39.6]	10.7 [7.1, 14.3]	37.5 [35.3, 39.7]	11.6 [7.3, 16.0]
Economic Region												

Table 1 (continued)

	Estimated percentage of weighted population (95% CI)											
	Overall		2009–2012		2013–2018		Pre-Covid-19[a]		Covid-19[b]		Post-Covid-19[c]	
	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous
Lowest	10.1 [9.6, 10.7]	43.8 [40.3, 47.3]	9.2 [8.6, 9.8]	39.2 [33.9, 44.6]	10.1 [9.4, 10.8]	44.5 [40.0, 49.0]	10.7 [9.3, 12.1]	41.4 [32.9, 49.9]	11.1 [9.8, 12.4]	45.4 [38.0, 52.8]	11.4 [9.9, 12.9]	49.0 [40.8, 57.2]
2nd	19.5 [18.9, 20.2]	26.3 [23.3, 29.3]	19.6 [18.8, 20.4]	31.3 [25.9, 36.8]	19.8 [18.9, 20.8]	25.7 [22.0, 29.4]	19.4 [17.4, 21.3]	26.5 [18.8, 34.1]	19.2 [17.6, 20.9]	23.3 [17.6, 29.0]	18.4 [16.5, 20.3]	22.4 [16.2, 28.7]
3rd	15.1 [14.5, 15.7]	3.8 [2.2, 5.4]	14.6 [14.0, 15.2]	3.6 [1.5, 5.6]	15.0 [14.2, 15.8]	2.7 [1.4, 3.9]	16.0 [14.2, 17.7]	5.6 [1.5, 9.7]	15.4 [13.9, 16.8]	6.2 [1.8, 10.6]	16.1 [14.5, 17.7]	5.9 [1.0, 10.7]
4th	23.8 [22.9, 24.6]	18.2 [15.8, 20.6]	24.7 [23.7, 25.8]	19.0 [15.2, 22.7]	23.7 [22.5, 24.9]	19.1 [15.5, 22.6]	23.6 [20.9, 26.4]	14.3 [9.5, 19.2]	23.1 [20.9, 25.4]	16.9 [11.8, 22.0]	22.5 [20.2, 24.9]	16.1 [11.1, 21.2]
5th	11.5 [11.2, 11.9]	3.9 [3.1, 4.7]	11.8 [11.3, 12.3]	4.3 [2.9, 5.7]	11.5 [11.0, 12.1]	3.7 [2.6, 4.7]	11.4 [10.1, 12.7]	4.6 [2.0, 7.3]	11.6 [10.6, 12.7]	4.1 [2.1, 6.1]	11.1 [9.9, 12.3]	3.2 [1.3, 5.1]
Highest	19.9 [19.3, 20.5]	4.1 [3.2, 4.9]	20.2 [19.4, 20.9]	2.6 [1.4, 3.9]	19.9 [19.0, 20.7]	4.4 [3.3, 5.5]	18.9 [16.9, 20.9]	7.6 [3.2, 11.9]	19.6 [17.9, 21.2]	4.1 [1.9, 6.4]	20.4 [18.5, 22.4]	3.3 [0.9, 5.7]

[a]Pre-Covid-19 period: Jan 2019 to Mar 2020; [b]Covid-19 period: Apr 2020 to Mar 2022; [c]post-Covid-19 period: Apr 2022 to Oct 2023. [d]The Seguro Popular de Salud operated from 2004 until 2019. This programme was cancelled by the current government in 2019 and replaced by the Instituto de Salud para el Bienestar (or INSABI). [e]Stillbirth or death within the first year of life or at least one miscarriage or abortion

$$\begin{aligned}\Delta &= \left[g(X_{ind}\beta_{ind}) - g(X_{_ind}\beta_{_ind})\right] \\ &= \left[g(X_{ind}\beta_{_ind}) - g(X_{_ind}\beta_{_ind})\right] \\ &+ \left[g(X_{ind}\beta_{ind}) - g(X_{ind}\beta_{_ind})\right] \\ &+ \left[g(X_{ind}\beta_{ind}) - g(X_{_ind}\beta_{ind})\right] \\ &- \left[g(X_{ind}\beta_{_ind}) - g(X_{_ind}\beta_{_ind})\right]\end{aligned}$$

The decomposition analysis used Stata's *nldecompose* command [53], with standard errors calculated via Bootstrap with 1,000 replications with replacement. Sensitivity analyses incorporated interaction terms between Indigenous status and several key variables to identify potential effect modifiers and reinforce robustness through the estimation of additive models.

Our research did not require approval from the ethics committees of our institutions, as it was based solely on publicly available secondary data. All study materials are available at https://www.inegi.org.mx/programas/enadid.

Results

In the fifteen years of the analysis, the percentage of Indigenous women grew almost 29%, from 6.8% in 2009-12 to 7.3% in the pre-Covid-19 stage and to 8.8% during the pandemic (Table 1). Indigenous women (vs. non-Indigenous women) recorded older age at the time of their last pregnancy (35% vs. 30.8% aged 30–54 years), were more likely to be married (89.6% vs. 81%), had lower educational attainment (44.9% with elementary or no schooling vs. 15.4%)—although this percentage decreased notably from 56.4% vs. 21.2% in 2009-12 to 33.2% vs. 10.3% during the post-Covid-19—stage, and had lower participation in the labor market (27.9% vs. 40.4%). The percentage of Indigenous women without any health insurance grew 302% (vs. 157% among non-Indigenous women) during the period of analysis, from 11.7% (vs. 16%) in 2009-12 to 44.7 (40.3%) in the pre-Covid-19 stage (the period when SP disappeared) and to 47.1% (41.2%) in the post-Covid-19 stage. The percentage of Indigenous women who reported having three or more children at the time of their last obstetric event was also consistently higher (25.9% vs. 11.1%), with a clear downward trend going from 31% in 2009-12 to 19.2% in the last period. Among Indigenous women, self-reported perinatal loss was less frequent (11.4% vs. 15.5%), while reports of health issues detected during pregnancy were more common (49.4% vs. 33.7%), and similar frequency of reported health issues during childbirth across groups (62%). A higher percentage of Indigenous women reported residing in very low socioeconomic housing (40.4% vs. 5.9%), in rural communities (61.2% vs. 26.8%), and in more socially deprived communities (43.8% vs. 10.1%).

The crude and independent coverage of adequate ANC in Indigenous women was 76.6%, 11% points lower than that of non-Indigenous women (87.4%) (Table 2-Panel A). These estimates were similar across analysis periods, with the most significant gaps in timely (70.6% vs. 82.4%) and frequent (84.4% vs. 93.5%) prenatal care. However, improvements were observed mainly in the timeliness of prenatal care. In contrast, while receipt of skilled and institutional ANC remained around 98% among non-Indigenous women, such coverage dropped from 92% before the disappearance of SP to 84.6% in the post-Covid-19 stage among Indigenous women. Coverage of skilled and institutional delivery care and timely postpartum care were also persistently lower among Indigenous women (80.1% vs. 98.2% and 59.9% vs. 65.2%, respectively). In particular, coverage of timely postpartum care among non-Indigenous women decreased from 66.4% in 2009-12 to 59.9% in the pre-Covid-19 stage and 57.7% during the pandemic, and then recovered to 62.3% after the pandemic, while among Indigenous women, coverage dropped significantly with the disappearance of SP, from 62.9% in 2009-12 to 61.2% before the disappearance of SP insurance, to 53.6% in the post-Covid-19 stage. With respect to postpartum complications, we found higher rates among Indigenous women (78% vs. 71.1%).

The unadjusted percentage of women who received all maternal health interventions and did not present postpartum complications or ECMH was 28.6% lower among Indigenous women (24.3% vs. 33.9%), a difference that was maintained throughout the study period (Table 2-Panel B). Timely ANC with adequate content, institutional and skilled delivery care, and timely postpartum care were the main bottlenecks in the continuum of care.

Figure 1 presents the results of the estimated multiple logistic regression model for ECMH. Over the fifteen years of analysis, Indigenous women, compared to non-Indigenous, had lower ECMH (26.5%, 95%CI: 24.8%, 28.2% vs. 32.8%, 95%CI: 32.4%, 33.3%). In both groups, the highest level of ECMH was reached during the period 2013-18— right before the disappearance of SP (28.2%, 95%CI: 26.4%, 30.0% vs. 34.8%, 95%CI: 34.2%, 35.5%), only to decline during the pandemic among more Indigenous women (23. 8%, 95%CI: 21.9%, 25.8% vs. 29.9%, 95%CI: 28.4%, 31.4%); it remained unchanged for Indigenous women and bounced back to pre-Covid-19 levels for non-Indigenous women (25.9%, 95%CI: 23.7, 28.1% vs. 32.2%, 95%CI: 30.5, 33.9%).

Table 3 shows the results of BO's non-linear decomposition of the ethnic and racial inequity in the ECMH. Throughout the analysis period, 30.8% of the gap in ECMH was attributed to observable characteristics, 51.7% to discrimination against Indigenous women, and

Table 2 Pre-post-Covid-19 crude effective coverage of maternal health care components by indigenous status

	Estimated percentage of weighted population [95% CI]					
	Overall	**2009–2012**	**2013–2018**	**Pre-Covid-19[a]**	**Covid-19[b]**	**Post-Covid-19[c]**
	23,245,468 (100.0%)	**5,411,545 (23.3%)**	**11,938,872 (51.4%)**	**1,385,430 (6.0%)**	**2,577,922 (11.1%)**	**1,931,698 (8.3%)**
Panel A. Independent						
Antenatal care						
Skilled and/or institutional						
Non-Indigenous	98.6 [98.5, 98.8]	98.9 [98.7, 99.1]	98.7 [98.5, 98.9]	98.6 [98.0, 99.1]	98.2 [97.7, 98.6]	98.1 [97.6, 98.6]
Indigenous	89.7 [88.2, 91.1]	90.6 [88.0, 93.1]	90.5 [88.7, 92.3]	92.0 [87.5, 96.5]	87.7 [84.1, 91.4]	84.6 [79.8, 89.3]
Timely						
Non-Indigenous	82.4 [82.0, 82.8]	73.0 [72.0, 74.0]	83.8 [83.2, 84.3]	89.7 [88.3, 91.1]	88.3 [87.3, 89.4]	88.0 [86.8, 89.3]
Indigenous	70.6 [68.8, 72.5]	59.0 [54.9, 63.1]	72.5 [70.1, 74.8]	81.4 [75.9, 87.0]	75.6 [70.6, 80.6]	73.3 [68.1, 78.4]
Frequent						
Non-Indigenous	93.5 [93.2, 93.7]	93.9 [93.4, 94.4]	93.6 [93.2, 93.9]	93.7 [92.6, 94.8]	92.6 [91.8, 93.5]	92.6 [91.5, 93.7]
Indigenous	84.4 [82.8, 86.0]	86.0 [83.3, 88.7]	84.7 [82.5, 86.9]	88.3 [83.5, 93.2]	80.5 [75.9, 85.1]	82.4 [78.3, 86.5]
Adequate						
Non-Indigenous	87.4 [87.0, 87.8]	85.8 [85.0, 86.5]	88.0 [87.5, 88.5]	88.4 [87.1, 89.8]	86.6 [85.5, 87.7]	88.5 [87.3, 89.8]
Indigenous	76.6 [74.5, 78.6]	74.3 [70.6, 78.0]	78.3 [75.6, 81.0]	71.6 [65.1, 78.1]	75.1 [70.2, 80.0]	77.3 [72.3, 82.4]
Skilled delivery						
Non-Indigenous	98.2 [98.0, 98.4]	97.7 [97.3, 98.1]	98.3 [98.1, 98.5]	98.8 [98.3, 99.3]	98.3 [97.9, 98.7]	98.5 [98.1, 99.0]
Indigenous	80.1 [77.7, 82.6]	77.1 [72.7, 81.5]	79.9 [76.8, 83.0]	84.8 [78.6, 91.0]	83.1 [78.5, 87.6]	81.4 [75.8, 87.1]
Timely postpartum care						
Non-Indigenous	65.2 [64.6, 65.7]	66.4 [65.3, 67.4]	67.3 [66.5, 68.0]	59.9 [57.7, 62.0]	57.7 [56.1, 59.3]	62.3 [60.5, 64.2]
Indigenous	59.9 [58.0, 61.8]	62.9 [59.2, 66.7]	61.2 [58.5, 63.8]	61.1 [53.4, 68.7]	54.4 [49.7, 59.2]	53.6 [47.9, 59.3]
Complication-free postpartum						
Non-Indigenous	71.1 [70.6, 71.6]	73.3 [72.3, 74.3]	70.4 [69.8, 71.1]	71.3 [69.3, 73.4]	70.8 [69.3, 72.3]	68.9 [67.1, 70.6]
Indigenous	78.0 [76.6, 79.4]	78.5 [75.7, 81.4]	78.0 [76.1, 80.0]	76.1 [70.3, 81.9]	76.5 [71.6, 81.3]	79.8 [75.2, 84.4]
Panel B. Conditional						
Antenatal care						
Skilled and/or institutional						
Non-Indigenous	98.6 [98.5, 98.8]	98.9 [98.7, 99.1]	98.7 [98.5, 98.9]	98.6 [98.0, 99.1]	98.2 [97.7, 98.6]	98.1 [97.6, 98.6]
Indigenous	89.7 [88.2, 91.1]	90.6 [88.0, 93.1]	90.5 [88.7, 92.3]	92.0 [87.5, 96.5]	87.7 [84.1, 91.4]	84.6 [79.8, 89.3]
(+) Timely						
Non-Indigenous	82.1 [81.7, 82.5]	72.6 [71.6, 73.6]	83.4 [82.9, 84.0]	89.3 [87.8, 90.7]	87.8 [86.8, 88.9]	87.6 [86.3, 88.9]
Indigenous	67.0 [65.1, 68.9]	57.2 [53.1, 61.3]	69.2 [66.6, 71.7]	78.3 [72.4, 84.2]	70.6 [65.4, 75.8]	65.7 [60.1, 71.2]
(+) Frequent						
Non-Indigenous	79.8 [79.4, 80.2]	71.3 [70.2, 72.3]	81.1 [80.5, 81.7]	86.6 [85.0, 88.2]	84.8 [83.6, 85.9]	84.6 [83.1, 86.0]
Indigenous	63.6 [61.6, 65.6]	55.7 [51.6, 59.8]	65.6 [62.9, 68.3]	74.3 [68.0, 80.6]	64.1 [58.8, 69.4]	63.1 [57.7, 68.5]
(+) Appropriate						
Non-Indigenous women	71.1 [70.7, 71.6]	62.4 [61.4, 63.5]	72.6 [72.0, 73.3]	78.1 [76.2, 80.0]	75.1 [73.7, 76.5]	76.6 [74.9, 78.3]
Indigenous women	54.7 [52.6, 56.9]	46.2 [42.0, 50.3]	57.1 [54.0, 60.1]	58.6 [51.4, 65.7]	55.1 [49.8, 60.4]	58.2 [52.5, 63.9]
(+) Skilled delivery						
Non-Indigenous	70.5 [70.0, 71.0]	61.6 [60.6, 62.7]	71.9 [71.3, 72.6]	77.5 [75.6, 79.4]	74.6 [73.2, 75.9]	75.9 [74.2, 77.6]
Indigenous	49.7 [47.4, 52.1]	41.6 [37.3, 46.0]	51.6 [48.4, 54.9]	53.2 [45.9, 60.6]	51.5 [46.0, 57.0]	52.8 [46.5, 59.1]
(+) Timely postpartum care						
Non-Indigenous	47.4 [46.9, 48.0]	42.7 [41.6, 43.8]	50.1 [49.3, 50.8]	47.4 [45.3, 49.6]	44.2 [42.6, 45.8]	48.8 [46.8, 50.7]
Indigenous	32.5 [30.5, 34.5]	26.9 [23.5, 30.3]	35.5 [32.5, 38.5]	32.0 [25.2, 38.9]	31.9 [27.3, 36.5]	29.9 [24.8, 35.0]
(+) Complication-free postpartum (Effective coverage)						
Non-Indigenous	33.9 [33.3, 34.4]	31.4 [30.4, 32.5]	35.5 [34.8, 36.2]	33.9 [31.9, 35.9]	31.6 [30.2, 33.1]	33.4 [31.6, 35.3]
Indigenous	24.3 [22.5, 26.2]	21.0 [17.9, 24.0]	26.0 [23.1, 28.8]	23.9 [17.9, 29.8]	24.0 [19.8, 28.2]	24.1 [19.3, 28.9]

[a]Pre-Covid-19 period: Jan 2019 to Mar 2020; [b]Covid-19 period: Apr 2020 to Mar 2022; [c]post-Covid-19 period: Apr 2022 to Oct 2023

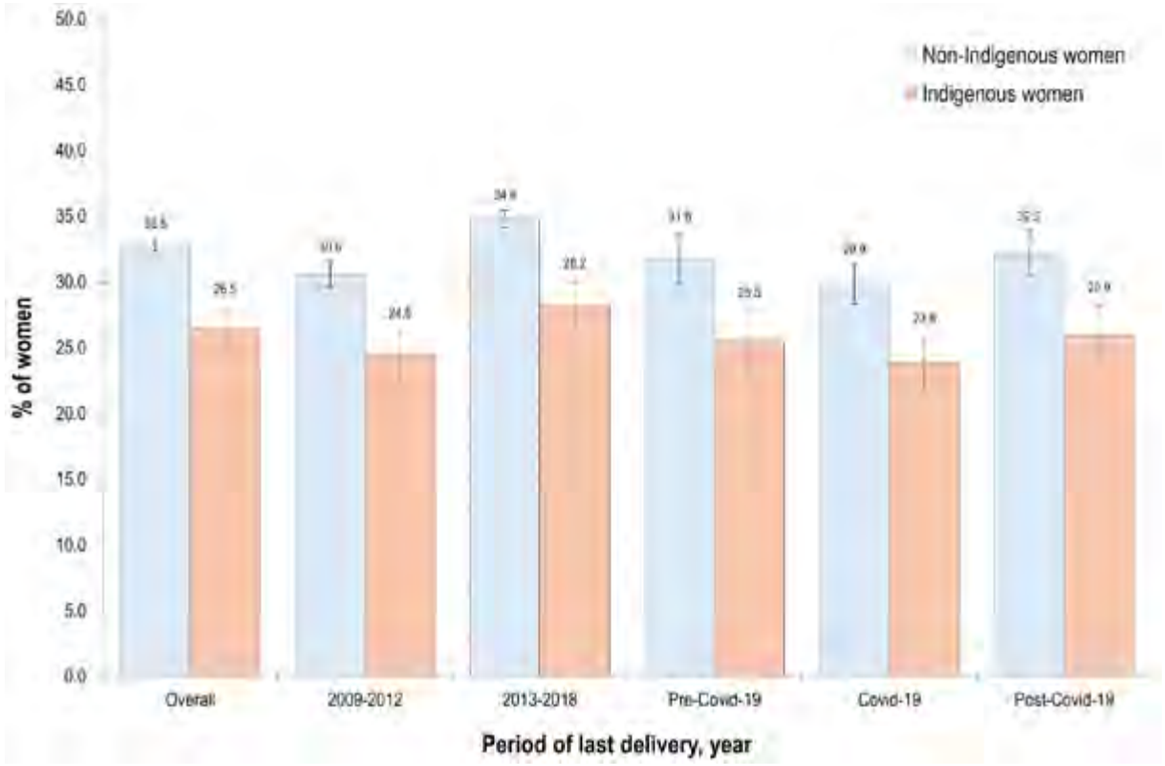


Fig. 1 Pre-post-Covid-19 adjusted effective coverage of maternal health care by Indigenous status. [a]Pre-Covid-19 period: Jan 2019 to Mar 2020; [b]Covid-19 period: Apr 2020 to Mar 2022; [c]post-Covid-19 period: Apr 2022 to Oct 2023

Table 3 Pre-post-Covid-19 decomposition of ethnic gaps in effective coverage of maternal health care

Period of last delivery, year	Raw	Attributable to endowment	Attributable to discrimination	Attributable to interaction between endowment and discrimination
Overall	-0.095	-0.029 (30.82%)	-0.049 (51.66%)	-0.017 (17.52%)
2009–2012	-0.105	-0.044 (42.21%)	-0.042 (40.37%)	-0.018 (17.42%)
2013–2018	-0.095	-0.036 (37.68%)	-0.053 (56.12%)	-0.006 (6.20%)
Pre-Covid-19[a]	-0.100	-0.0002 (0.16%)	-0.075 (75.27%)	-0.024 (24.58%)
Covid-19[b]	-0.077	0.009 (-11.69%)	0.018 (-22.80%)	-0.103 (134.48%)
Post-Covid-19[c]	-0.094	-0.006 (6.83%)	-0.074 (78.72%)	-0.014 (14.45%)

[a]Pre-Covid-19 period: Jan 2019 to Mar 2020; [b]Covid-19 period: Apr 2020 to Mar 2022; [c]post-Covid-19 period: Apr 2022 to Oct 2023

the remaining 17.5% to the interaction between both components. In the first period of analysis (2009–2012), 42.2% of the gap was due to observable differences, 40.4% to ethnic-racial discrimination, and 17.4% to the interaction between these factors. For the 2013–2018 period, these percentages were 37.7%, 56.1%, and 6.2%, respectively. In the pre-Covid-19 stage, the contribution of observable characteristics to the gap was less than 1%, while 75.3% was attributed to discrimination and 24.6% to the interaction of both components. During the pandemic, a slight reduction in the Indigenous-non-Indigenous gap was observed, with the fractions attributable to observable differences and discrimination changing signs (-11.7% and −22.8%, respectively), while the interaction component exceeded 100% (134.5%). Finally, in the post-Covid-19 stage, the percentage of the gap attributable to discrimination returned to levels similar to pre-pandemic levels (78.7%), with 14.5% of the gap explained by the interaction between individual characteristics and discrimination.

Discussion

This population-based study shows the persistence of ethnic and racial inequities in the provision and outcomes of maternal care in Mexico between 2009 and 2023. Ethnic and racial discrimination, exacerbated by

the pandemic and the elimination of social programs and health insurance for the poorest populations, including Indigenous peoples, highlights the urgent need for comprehensive policies with targeted anti-racist interventions with a strong gender component.

The ECMH indicator we assessed considers the gains in maternal health that result from the health system's performance [55–57]. As the duration of pregnancy is less than one year and the demand for maternal health services is constant, the ECMH is sensitive to measurable changes annually. The low levels of ECMH throughout the study period are a strong indicator of poor health system performance [56] and outdated structures. However, the steady trend of improvement between 2009 and 2018 shows the effectiveness of several measures implemented during this period, which did not achieve optimal results but strengthened the health system's response to maternal needs. These include POP and SP. In addition to placing women in charge of cash transfers, POP prioritized women's health and, in particular, maternal health interventions [24]. Furthermore, it generated additional demand for services because pregnant women affiliated with the program were co-responsible for using them [58]. This program led to a sustained increase in antenatal care, delivery care, and postnatal follow-up services among women affiliated women to POP from 1997 to 2018 [34]. On the other hand, SP expanded the availability and coverage of health services, improving their accessibility [34], although it has also been particularly associated with greater use of antenatal care services [59]. Thus, POP and SP instituted a synergy that strengthened the demand, on the one hand, and the supply of maternal health services, on the other [34]. Additionally, the program Fair Start in Life (*Arranque Parejo en la Vida* in Spanish), which was created in 2001 and was active for three administrations, had a strong maternal health component and included initiatives in maternal care aimed at achieving the objectives in this field of the Millenium Development Goals [35, 60]. This program was discontinued in 2019 as part of the restructuring of social programs in Mexico. Finally, in 2016, the official Mexican standard for the care of women during pregnancy, childbirth, puerperium, and newborns was renewed [39], which contributed to improving the technical content of maternal health actions and strengthening their regulation.

The rates of ECMH dropped in the pre-Covid-19 period, from December 1, 2018, to March 30, 2020. This decrease is explained by political factors endogenous to the health system, particularly the decision to disappearance of POP and SP Programs [20]. These measures had two effects: on the one hand, the dramatic increase in the number of persons without access to health services (15.6 million) between 2018 and 2020 [61] and, on the other, the decrease in the use of public services for antenatal care, skilled birth attendance, and postnatal follow-up [62]. The disappearance of POP also dismantled an extensive network of community health assistants and promoters built up over more than two decades, mainly in Indigenous, rural, and highly marginalized regions, who devoted their work to the health of women and children [63]. This social infrastructure dedicated to the promotion of the use of health and educational services was replaced by another program—the so-called *Siervos de la Nación* (Servants of the Nation)—whose essential function is political clientelism [64].[1]

The additional fall in ECMH coverage during the pandemic resulted from the health contingency itself (e.g., hospital reconversion, stay-at-home orders, or commuting restrictions). These rates recovered modestly for non-Indigenous women in the post-pandemic period but remained practically unchanged for Indigenous women.

By linking the need for healthcare with the ability to access the services that satisfy it, the ECMH indicator is also sensitive to structural inequalities [65], as the exercise of rights is conditioned by the type of social organization. Throughout the study period, we identified systematic gaps in the ECMH to the detriment of Indigenous women compared to non-Indigenous women. This is a consequence of structural discrimination against Indigenous people, which is reflected in the performance of the health system. While the gap itself can be seen as a consequence of discrimination, it is partly due to the covariates included in the statistical model shown in Table 1, so the remaining part can be attributed to the exclusive effect of discrimination. The beauty of this methodology is that it attempts to measure precisely a phenomenon of extraordinary complexity, at once pervasive and elusive.

Over the study period, 51.6% of the gap in the ECMH can be attributed to ethnic-racial discrimination, a figure that increased from 40.3% in 2009–2012 to 75.3% in the pre-Covid period and to 78.7% during the post-Covid period. This means that ethnoracial discrimination related to ECMH almost doubled in the analysis period. Endogenous political factors, such as the decision to abolish POP and SP, may have been responsible for the increase in the proportion of inequity attributable to discrimination in the ECMH. Although these programs did not include anti-racist measures, they explicitly prioritized the coverage of Indigenous and populations living

[1] The *Siervos de la Nación*, affiliated with the Secretaría del Bienestar, were initially tasked with promoting the Morena party during its electoral campaigns, which led to its presidential victories in 2018 and 2024. Under Morena's administration, the *Siervos de la Nación* became responsible for conducting the census of beneficiaries for federal social programs and monitoring their implementation. However, they do not perform technical roles in the delivery of education or health services. [64].

in poverty, and adopted intercultural approaches [66]. The cancellation of these programs led to a decrease in maternal health coverage and an increase in maternal deaths and health discrimination against Indigenous populations. The pandemic seems to have exacerbated inequities as a result of structural discrimination.

Other indicators confirm the effects of structural discrimination: Indigenous women systematically have lower levels of education, lower paid labor force participation, lower socio-economic position, higher parity, and are more likely to live in rural and impoverished areas. These women suffer three types of discrimination: for being women, Indigenous, and poor [3]. This limits their access to health services and determines various forms of mistreatment, such as contempt, neglect, abuse, and blame for the deterioration of their health [2, 8, 67]. These conditions create a hostile environment in health services, reinforcing stereotypes that discourage their use, creating a slippery slope that increases inequities generally and in maternal health specifically.

The decomposition analysis results for the pandemic period require further interpretation. During the pandemic, structural inequalities and discriminatory effects showed a temporary reduction in the gap, probably due to the redistribution of resources, emerging universal access policies, and the lowering of traditional barriers. However, the interaction between endowments and discrimination intensified, reflecting the structural vulnerability of Indigenous communities, which exposed them more to the adverse effects of the crisis, which ended up widening the gap as observed in the post-Covid-19 period. This suggests that the pandemic exacerbated health inequalities and modified the interaction between these factors, making this interaction the primary driver of inequity. First, the restructuring of the health system and the redistribution of resources during the pandemic reduced some infrastructure and access gaps. However, this impact was uneven, and Indigenous communities affected by the disruption of non-emergency services faced greater barriers to care other than Covid-19. This is consistent with the evidence of higher mortality risk among the Indigenous population during the pandemic [18, 68, 69]. Second, although temporary measures alleviated specific barriers, the structural vulnerability of Indigenous communities remained. Factors such as geographic distance and technological limitations worsened health outcomes, showing that the crisis aggravated pre-existing inequalities. Third, the interaction between endowments and discrimination added to and amplified each other. The lack of basic resources in Indigenous communities exacerbated the effects of discrimination in health care, as these already disadvantaged populations suffered more severely from the overburdening of the health system. Thus, although emerging policies attempted to reduce inequalities, structural vulnerabilities, such as poverty, geographic isolation, and limited access to health infrastructure remained a significant obstacle. This scenario deepened the effects of discrimination, making it even more difficult for Indigenous women to access emergency obstetric services. The combination of poor infrastructure and persistent discrimination intensified the adverse effects on this group.

Our study should be interpreted with some limitations in mind. First, although the ENADID is a robust and high-quality population-based survey, this observational analysis is subject to possible omitted variable biases, which limit the strength of the causal inferences we can make. Second, while we assessed a significant event, such as the birth of a child and that the reference period spanned the five years before the survey, which helps mitigate recall bias, self-reported variables, such as the timing of the first prenatal visit, may be subject to this type of bias. Third, the temporalities of events and covariates were recorded at the time of the survey rather than at the time of delivery. Fourth, data on postnatal care are limited: women may confuse their postpartum visits with visits for their newborns, and the survey does not capture details about the content of those visits. Fifth, although we analyzed a single survey, the different waves did not prioritize the same ANC processes. Based on previous studies, we defined the appropriate ANC [10, 34] assuming 75% coverage for the procedures considered. This could have led to an overestimation of coverage in the early years and an underestimation of the increase over time. Sixth, identifying the Indigenous population was based solely on language, which probably underestimates its size. Other criteria, such as living in an Indigenous household or self-identification, might have shown a different proportion of the Indigenous population. We were also unable to analyze the various ethnic groups within the Indigenous population, although we recognize their heterogeneity, with some groups probably facing lower levels of effective health coverage. Seventh, it is important to recognize that the BO decomposition could be sensitive to model specification [53] because BO assumes a model of mediation where the inclusion of post-birth variables lie on the causal pathway between ethnicity and health outcomes. Even if the exercise is purely descriptive, the outcome-mediator confounding problem can impose a bias on regression coefficients [70], effectively distorting the magnitude of the explained components of inequities. To partially address these issues, we conducted several sensitivity analyses, incorporating interaction terms between the Indigenous condition and multiple key variables to identify possible effect modifiers; by estimating additive models, we confirmed the robustness of the results. Finally, while this method helps explore the causes of the ECMH gap, it has limitations in

identifying the leading cause of the unexplained portion. Although it is possible to propose several reasons behind this gap, the decomposition does not provide sufficient information to determine which is most likely to cause the gap [71]. Additionally, other confounding factors—whether observed or unobserved—could also influence these uncontrolled differences. Nevertheless, we have used a broad set of variables that allow us to obtain an overview of the magnitude of the gap likely related to structural racial-ethnic discrimination.

Despite its limitations, our study has several notable strengths. It leverages a robust, decade-long population-based dataset to comprehensively analyze ethnic and racial inequities in maternal healthcare in Mexico. By applying the ECMH indicator, the study provides a nuanced understanding of health system performance and its response to structural inequalities. Decomposition analysis quantifies the contribution of ethnic and racial discrimination to these inequities with methodological rigor. Additionally, the study contextualizes its findings within major policy changes and the Covid-19 pandemic, illustrating how systemic changes, exacerbated by the pandemic, have disproportionately impacted Indigenous women. The originality of this paper lies in its exploration of how these inequities have evolved and deepened during the global health crisis, offering new insights into the intersections of race, gender, and health policy in the post-pandemic era.

The variety of ways in which racist and discriminatory practices manifest themselves and their consequences in terms of mistreatment, personal suffering, barriers to access to services, lower quality of these services, dissatisfaction of users, and poor health outcomes make them difficult to quantify. For this reason, multifaceted approaches are needed to question and attempt to discern the role of cultural differences, social stratification, and the discriminatory ideologies that sustain them. This is the main contribution of the metric used in this analysis.

To improve Indigenous women's ECMH and move towards UHC, the health system must, firstly, prioritize this agenda and, secondly, incorporate anti-discriminatory and anti-racist measures in all its areas —clinical and administrative spaces, rules and regulations, and monitoring and evaluation systems— to ensure dignified, patient-centered treatment at all times within a human rights framework. At the same time, specific strategies should be designed and implemented to counteract the negative stereotypes that characterize sexual and reproductive health services and discourage their use, especially among Indigenous populations.

If efforts to achieve UHC do not specifically address inequality-generating structures based on discriminatory ideologies, they risk regressing, benefiting mainly the most advantaged sectors and postponing attention to those with greater vulnerabilities. These efforts must be accompanied by enforcement mechanisms that guarantee the exercise of rights, cultural adaptation, and respectful treatment of the most vulnerable individuals and groups. In addition, the criterion for access to health care must recognize cultural diversity and equality.

To improve the health system's performance in addressing the needs of Indigenous populations and achieve UHC, it is not enough to propose cultural (or intercultural) adaptations [72, 73]. It is imperative to recognize and monitor the toll of discrimination in health system performance indicators that separate Indigenous and non-Indigenous populations and to implement anti-racist and anti-discrimination policies to ensure the dignified treatment of all people, especially members of social groups that have been historically discriminated against [72, 74]. Only by implementing health policies that effectively address the structures of inequality will it be possible to move towards an equitable and universal health system in Mexico. Tackling structures of inequality based on racist ideologies requires not only explanatory frameworks that help us to understand how stratified social organization impacts the performance of the health system but also concrete organizational proposals that allow us to address them effectively. In this sense, the participation of affected communities can enhance our understanding of the problem and help formulate comprehensive solutions.

Abbreviations

UHC	Universal Health Coverage
ECMH	Effective coverage of maternal health interventions
ENADID	Encuesta Nacional de la Dinámica Demográfica
LAC	Latin America and the Caribbean
POP	Progresa-Oportunidades-Prospera Program
SP	Seguro Popular
IMSS	Instituto Mexicano de Seguridad Social
SDGs	Sustainable Development Goals
ANC	Antenatal care
INSABI	Instituto de Salud para el Bienestar
BO	Blinder-Oaxaca decomposition

Acknowledgements
We would like to express our special thanks to Blanca Laura Ortega Román for her role as general coordinator and research assistant of this project.

Author contributions
ESM conceived the idea for this study. ESM designed the study. ESM and SMN wrote the first draft of the manuscript, with RGD, DCG, DCL, OGD and AC providing critical input on multiple drafts. All authors were involved in the review of the paper and approved the final version. ESM is the guarantor of the work; as such, he had full access to all the data in the study and accepts responsibility for the integrity of the data and the accuracy of the data analysis.

Funding
No external funding was received for this study.

Data availability
The final database underlying this study has been uploaded to Figshare and is freely accessible using the following link: https://doi.org/10.6084/m9.figshare.27245664.v1.

Declarations

Ethics approval and consent to participate
Not applicable. This study involved no human participants.

Memorial dedication
We dedicate this manuscript to our colleague and friend Sandra Sosa-Rubí, Ph.D., who inspired us to analyse equity during her fruitful lifetime and passed away in March 2021.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Morelos, Mexico
[2]Department of Economics, Tecnológico de Monterrey, Monterrey, Nuevo León, Mexico
[3]Department of Primary Care and Public Health, Public Health Policy Evaluation Unit, School of Public Health, Imperial College London, London, UK
[4]School of Government and Public Transformation, Tecnológico de Monterrey, Ciudad de México, Mexico
[5]Public Policy Unit, Institute for Obesity Research, Tecnológico de Monterrey, Ciudad de México, Mexico
[6]Center for Health Equity in Latin America, Celia Scott Weatherhead School of Public Health and Tropical Medicine, Tulane University, Louisiana, USA

Received: 28 October 2024 / Accepted: 30 December 2024
Published online: 12 January 2025

References

1. Chunara R, Gjonaj J, Immaculate E, Wanga I, Alaro J, Scott-Sheldon LAJ, et al. Social determinants of health: the need for data science methods and capacity. Lancet Digit Heal. 2024;6:e235–7.
2. Braveman PA, Arkin E, Proctor D, Kauh T, Holm N. Systemic and structural racism: definitions, examples, health damages, and approaches to dismantling. Health Aff. 2022;41:171–8.
3. Castro A, Savage V, Kaufman H. Assessing equitable care for indigenous and afrodescendant women in Latin America. Pan Am J Public Heal. 2015;38:96–109.
4. Anderson I, Robson B, Connolly M, Al-Yaman F, Bjertness E, King A, et al. Indigenous and tribal peoples' health (the Lancet–Lowitja Institute Global collaboration): a population study. Lancet. 2016;388:131–57.
5. Gall A, Anderson K, Howard K, Diaz A, King A, Willing E, et al. Wellbeing of indigenous peoples in Canada, Aotearoa (New Zealand) and the United States: a systematic review. Int J Environ Res Public Health. 2021;18:1–31.
6. Davy C, Harfield S, McArthur A, Munn Z, Brown A. Access to primary health care services for indigenous peoples: a framework synthesis. Int J Equity Health. 2016;15:1–9.
7. Menéndez E. Salud Intercultural: propuestas, acciónes y fracasos. Cien Saude Colet. 2016;2:109–18.
8. Cerón A, Ruano A, Sánchez S, Chew A, Díaz D, Hernández A, et al. Abuse and discrimination towards indigenous people in public health care facilities: experiences from rural Guatemala. Int J Equity Health. 2016;15:1–7.
9. Samuel J, Flores W, Frisancho A. Social exclusion and universal health coverage: health care rights and citizen-led accountability in Guatemala and Peru. Int J Equity Health. 2020;19:1–9.
10. Serván-Mori E, Juárez-Ramírez C, Meneses-Navarro S, Heredia-Pi I, Armenta-Paulino N, Orozco-Núñez E, et al. Ethnic disparities in effective coverage of maternal healthcare in Mexico, 2006–2018: a decomposition analysis. Sex Res Soc Policy. 2023;20:561–74.
11. Estrada LV, Levasseur JL, Maxim A, Benavidez GA, Pollack Porter KM. Structural racism, place, and COVID-19: a narrative review describing how we prepare for an endemic COVID-19 future. Heal Equity. 2022;6:356–66.
12. Coates A, Castro A, Marmot M, Mújica OJ, Eijkemans G, Victora CG. Just societies: a new vision for health equity in the Americas after COVID-19. Pan Am J Public Heal. 2020;44:1–4.
13. Power T, Wilson D, Best O, Brockie T, Bourque Bearskin L, Millender E et al. COVID-19 and Indigenous peoples: an imperative for action. J Clin Nurs [Internet]. 2020;29:2737–41. Available from: https://doi.org/10.1111/jocn.15320
14. Townsend R, Chmielewska B, Barratt I, Kalafat E, van der Meulen J, Gurol-Urganci I, et al. Global changes in maternity care provision during the COVID-19 pandemic: a systematic review and meta-analysis. eClinicalMedicine. 2021;37:1–19.
15. United Nations Children's Fund (UNICEF). Health Equity Report 2016: Analysis of reproductive, maternal, newborn, child and adolescent health inequities in Latin America and the Caribbean to inform policymaking [Internet]. Panama City, Panama. 2016. Available from: https://www.unicef.org/lac/media/386/file/Publication.pdf
16. Aguilar-Rodríguez MA, Castro-Porras LV. COVID-19 and the adequacy of antenatal care among Indigenous women: a retrospective crossover analysis. Birth [Internet]. 2024;51:432–40. Available from: https://doi.org/10.1111/birt.12799
17. Ibarra-Nava I, Flores-Rodriguez KG, Ruiz-Herrera V, Ochoa-Bayona HC, Salinas-Zertuche A, Padilla-Orozco M, et al. Ethnic disparities in COVID-19 mortality in Mexico: a cross-sectional study based on national data. PLoS ONE. 2021;16:e0239168.
18. Serván-Mori E, Seiglie JA, Gómez-Dantés O, Wirtz VJ. Hospitalisation and mortality from COVID-19 in Mexican indigenous people: a cross-sectional observational study. J Epidemiol Community Health. 2022;76:16–23.
19. Lara Castañeda E. Población indígena en México. Características sociodemográficas 2020 [Internet]. Cioudad de Mexico; 2024. Available from: https://www.gob.mx/cms/uploads/attachment/file/907689/Conapo.__2024_._Poblacion_indigena._Caracteristicas_sociodemograficas_2020.pdf
20. Knaul FM, Arreola-Ornelas H, Touchton M, McDonald T, Blofield M, Avila Burgos L, et al. Setbacks in the quest for universal health coverage in Mexico: polarised politics, policy upheaval, and pandemic disruption. Lancet. 2023;402:731–46.
21. Rodríguez Gómez K. De Progresa-Oportunidades-Prospera a las Becas Benito Juárez: un análisis preliminar de Los cambios en la política social en El Sexenio 2018–2024 en México. Rev Mex Análisis Político Y Adm Pública. 2020;9:81–91.
22. Martínez Espinoza MI. Política social y pobreza en la 4T. Rev Mex Sociol. 2023;85:41–69.
23. Araujo CM, Ibarrarán P. Veinte años no es nada: logros y desafíos de Progresa-Oportunidades-Prospera. In: Hernández Licona G, De la Garza Navarrete TP, Zamudio JC, Yaschine Arroyo I, editors. El Progresa-Oportunidades-Prospera, a 20 años su creación [Internet]. 1st ed. Ciudad de Mexico, Mexico: Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL); 2019. pp. 192–219. Available from: https://www.coneval.org.mx/EvaluacionDS/PP/CEIPP/IEPSM/Documents/Libro_POP_20.pdf
24. Ordoñez-Barba GM, Silva-Hernández AL. Progresa-Oportunidades-Prospera: avatares, alcances y resultados de un programa paradigmático contra la pobreza. Papeles De población. 2019;25:77–111.
25. Bonilla Yarzábal LF, Patiño Peña M. Evaluación De consistencia y resultados 2017–2018 PROSPERA programa de inclusión social. Mexico: Ciudad de Mexico; 2019.
26. Gobierno de México. Programas para el Bienestar. Avances 2024 [Internet]. 2024. pp. 1–46. Available from: https://programasparaelbienestar.gob.mx/wp-content/uploads/2024/01/25012024-Avances-Programas-Para-El-Bienestar.pdf
27. Knaul F, Arreola-Ornelas H. Justicia financiera y gastos catastróficos en salud: impacto del seguro Popular de salud en México. Salud Publica Mex. 2015;47:s54–65.
28. Rouvier M, González-Block MA, Becerril-Montekio V, Sesia P, Duarte MB, Flores-Collins E. Mapeo De problemas para la atención a la salud materna por actores estatales y federales. Salud Publica Mex. 2011;53:48–56.
29. Shamah-Levy T, Vielma-Orozco E, Heredia-Hernández O, Romero-Martínez M, Mojica-Cuevas J, Cuevas-Nasu L et al. Encuesta Nacional de Salud y Nutrición 2018-19: resultados nacionales [Internet]. Cuernavaca, Morelos, México; 2020.

Available from: https://ensanut.insp.mx/encuestas/ensanut2018/doctos/informes/ensanut_2018_informe_final.pdf
30. Gómez-Dantés O, Flamand L, Cerecero-García D, Morales-Vazquez M, Serván-Mori E. Origin, impacts, and potential solutions to the fragmentation of the Mexican health system: a consultation with key actors. Heal Res Policy Syst. 2023;21:1–8.
31. Instituto Nacional de Estadística y Geografía (INEGI). Encuesta Nacional de la Dinámica Demográfica (ENADID) 2023 [Internet]. Inf. Demográfica y Soc. Mexico City: Instituto Nacional de Estadística y Geografía (INEGI). 2009. Available from: https://www.inegi.org.mx/programas/enadid/2023/#microdatos
32. Instituto Nacional de Estadística y Geografía (INEGI). Encuesta Nacional de la Dinámica Demográfica 2023. ENADID. Informe operativo y de procesamiento [Internet]. Ciudad de Mexico, Mexico. 2024. Available from: https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=889463916406
33. Instituto Nacional de Estadística y Geografía (INEGI). Encuesta Nacional de la Dinámica Demográfica 2023. ENADID. Diseño muestral [Internet]. Ciudad de Mexico, Mexico. 2024. Available from: https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=889463916413
34. Serván-Mori E, Heredia-Pi I, García-Cerecero D, Nigenda G, Sosa-Rubí SG, Seiglie J, et al. Assessing the continuum of care for maternal health in Mexico, 1994–2018. Bull World Health Organ. 2021;99:190–200.
35. Serván-Mori E, Cerecero-García D, Heredia-Pi I, Pineda-Antúnez C, Sosa-Rubí S, Nigenda G. Improving the effective maternal-child health care coverage through synergies between supply and demand-side interventions: evidence from Mexico. J Glob Health. 2019;9:1–12.
36. Heredia-Pi I, Serván-Mori E, Darney BG, Reyes-Morales H, Lozano R. Measuring the adequacy of antenatal health care: a national cross-sectional study in Mexico. Bull World Health Organ. 2016;94:452–61.
37. World Health Organization (WHO). WHO recommendations on antenatal care for a positive pregnancy experience. 1st ed. Luxembourg: World Health Organization; 2016.
38. World Health Organization (WHO). WHO recommendations on maternal health: Guidelines approved by the WHO Guidelines Review Committee. 1st ed. Geneva 27, Switzerland: World Health Organization; 2017.
39. Secretaría de Gobernación (SEGOB). Norma Oficial Mexicana NOM-007-SSA2-2016, para la atención De La Mujer Durante El Embarazo, parto y puerperio, y de la persona recién nacida. 007-SSA2-2016 México; 2016 p. 1–20.
40. Paulino NA, Vázquez MS, Bolúmar F. Indigenous language and inequitable maternal health care, Guatemala, Mexico, Peru and the Plurinational State of Bolivia. Bull World Health Organ. 2019;97:59–67.
41. Popolo F, Del. Los Pueblos indígenas en América (Abya Yala): desafíos para la igualdad en la diversidad [Internet]. Naciones Unidas, Comisión Económica para América Latina y el Caribe (CEPAL); 2017. Available from: https://books.google.com.mx/books?id=de8CugEACAAJ
42. Serván-Mori E, Orozco-Núñez E, Heredia-Pi I, Armenta-Paulino N, Wirtz V, Meneses-Navarro S, et al. Public health insurance and ethnic disparities in maternal health-care: the case of vulnerable Mexican women over the last 25 years. Health Policy Plan. 2021;36:1671–80.
43. Secretaría de Salud (SSa). Subsecretaría De Prevención Y Promoción De La Salud. Informe integral de COVID-19 en México. Número 04-2023. Mexico: Ciudad de Mexico; 2023.
44. Becerril-Montekio V, Meneses-Navarro S, Pelcastre-Villafuerte BE, Serván-Mori E. Segmentation and fragmentation of health systems and the quest for universal health coverage: conceptual clarifications from the Mexican case. J Public Health Policy. 2024;45:164–74.
45. Poirier MJP, Grépin KA, Grignon M. Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: a critical interpretive synthesis. Soc Indic Res. 2020;148:1–46.
46. McKenzie DJ. Measuring inequality with asset indicators. J Popul Econ. 2005;18:229–60.
47. Filmer D, Pritchett LH. Estimating wealth effects without expenditure data-or tears: an application to educational enrollments in states of India. Demography. 2001;38:115–32.
48. Dalenius T, Hodges J Jr. Minimum variance stratification. J Am Stat Assoc. 1959;54:88–101.
49. Instituto Nacional de Estadística y Geografía (INEGI). Regiones socioeconómicas de México [Internet]. Clasif. Entidades Fed. 2004 [cited 2020 Jun 16]. Available from: https://sc.inegi.org.mx/niveles/
50. StataCorp, Texas. USA: College Station, TX: StataCorp LLC; 2021.
51. Agresti A, Kateri M. Logistic regression. In: Lovric M, editor. Categ Data Anal. 3rd ed. Berlin, Heidelberg: Springer Berlin Heidelberg; 2011. pp. 163–96.
52. Surjanovic N, Lockhart RA, Loughin TM. A generalized Hosmer–Lemeshow goodness-of-fit test for a family of generalized linear models. TEST [Internet]. 2024;33:589–608. Available from: https://doi.org/10.1007/s11749-023-00912-8
53. Sinning M, Hahn M, Bauer TK. The Blinder–Oaxaca decomposition for nonlinear regression models. Stata J. 2008;8:480–92.
54. Rahimi E, Hashemi Nazari SS. A detailed explanation and graphical representation of the Blinder-Oaxaca decomposition method with its application in health inequalities. Emerg Themes Epidemiol. 2021;18:1–15.
55. Shengelia B, Tandon A, Adams OB, Murray CJL. Access, utilization, quality, and effective coverage: an integrated conceptual framework and measurement strategy. Soc Sci Med. 2005;61:97–109.
56. Serván-Mori E, Contreras-Loya D, Gomez-Dantés O, Nigenda G, Sosa-Rubí S, Lozano R. Use of performance metrics for the measurement of universal coverage for maternal care in Mexico. Health Policy Plan. 2017;32:625–33.
57. Martínez S, Carrasquilla G, Guerrero R, Gómez-Dantés H, Castro V, Arreola-Ornelas H, et al. Cobertura efectiva de las intervenciones en salud de América Latina Y El Caribe: métrica para evaluar Los sistemas de salud. Salud Publica Mex. 2011;53:s78–84.
58. Antía F, Rossel C, Karsaclian S. Welfare conditionality in Latin America's conditional cash transfers: models and trends. Int J Soc Welf. 2024;33:1144–67.
59. Serván-Mori E, Wirtz V, Avila-Burgos L, Heredia-Pi I. Antenatal care among poor women in Mexico in the context of universal health coverage. Matern Child Health J. 2015;19:2314–22.
60. Frenk J, Gómez-Dantés O, Langer A. A comprehensive approach to women's health: lessons from the Mexican health reform. BMC Womens Health. 2012;12:1–7.
61. Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). Nota técnica sobre la carencia por acceso a los servicios de salud, 2018–2020 [Internet]. Ciudad de México, México. 2021. Available from: https://www.coneval.org.mx/Medicion/MP/Paginas/Notas-pobreza-2020.aspx
62. Morales-Domínguez. M Del CP. Percepciones De Salud materno-infantil y efectos de incentivos económicos en Los Altos De Chiapas, México: Análisis Post-prospera. Horiz Sanit. 2024;23:83–92.
63. Cortés Campos I, Peniche Moreno P. Políticas De salud para la atención a pueblos indígenas. El caso de las auxiliares de salud mayas en la región oriente del estado de Yucatán, México. Estud Cult Maya. 2023;62:327–58.
64. Martínez Espinoza MI. La política social de la cuarta transformación en México. Un balance Del primer año de gobierno de López Obrador. Rev Española Cienc Política. 2021;121–42.
65. Ferede Gebremedhin A, Dawson A, Hayen A. Evaluations of effective coverage of maternal and child health services: a systematic review. Health Policy Plan. 2022;37:895–914.
66. Hernández SE. La interculturalidad en las políticas públicas en México [Internet]. Santiago de Chile, Chile; 2022. Available from: https://repositorio.cepal.org/server/api/core/bitstreams/5623279a-df84-4e5a-bf2d-84d355ff3cc1/content
67. Wylie L, McConkey S. Insiders' insight: discrimination against Indigenous peoples through the eyes of Health Care professionals. J Racial Ethn Heal Disparities. 2019;6:37–45.
68. Muñoz-del-Carpio-Toia A, Bartolo-Marchena M, Benites-Zapata VA, Herrera-Añazco P. Mortality from COVID-19 in amazonian and andean original indigenous populations of Peru. Travel Med Infect Dis. 2023;56:1–6.
69. Little BB, Shakib S, Pena Reyes ME, Karimi S, Vu GT, Dupré N, et al. COVID-19 infection and mortality among non-pregnant indigenous adults in Mexico 2020–2022: impact of marginalisation. J Glob Health. 2023;13:1–14.
70. Huber M. Causal pitfalls in the decomposition of wage gaps. J Bus Econ Stat. 2015;33:179–91.
71. Sen B. Using the oaxaca–blinder decomposition as an empirical tool to analyze racial disparities in obesity. Obesity. 2014;22:1750–5.
72. Meneses-Navarro S, Serván-Mori E, Heredia-Pi I, Pelcastre-Villafuerte B, Nigenda G. Ethnic disparities in sexual and reproductive health in Mexico after 25 years of social policies. Sex Res Soc Policy. 2022;19:975–90.
73. Serván-Mori E, Meneses-Navarro S, Garcia-Diaz R, Flamand L, Gómez-Dantés O, Lozano R. Inequitable financial protection in health for indigenous populations: the Mexican case. J Racial Ethn Heal Disparities. 2023.
74. Hernández A, Ruano A, Marchal B, San Sebastián M, Flores W. Engaging with complexity to improve the health of indigenous people: a call for the use of systems thinking to tackle health inequity. Int J Equity Health. 2017;16:1–5.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

ARTÍCULO ORIGINAL

Innovación pedagógica para mejorar la calidad del trato en la atención de la salud de mujeres indígenas

Sergio Meneses-Navarro, D en C,[1] Blanca Estela Pelcastre-Villafuerte, D en Psic Soc,[1]
Óscar Arturo Bautista-Ruiz, L en Pedg,[2] Rafael Josaphat Toledo-Cruz, L en Soc,[2] Sergio Aarón de la Rosa-Cruz, M en C,[1]
Jaqueline Alcalde-Rabanal, D en C,[1] Juana de los Ángeles Mejía-Marenco, M en C.[3]

Meneses-Navarro S, Pelcastre-Villafuerte BE, Bautista-Ruiz OA, Toledo-Cruz RJ, de la Rosa-Cruz SA, Alcalde-Rabanal J, Mejía-Marenco JA. Innovación pedagógica para mejorar la calidad del trato en la atención de la salud de mujeres indígenas. Salud Publica Mex. 2021;63:51-59.
https://doi.org/10.21149/11362

Resumen

Objetivo. Presentar los resultados de una intervención pedagógica para mejorar la calidad en el trato que brindan los prestadores de servicios de salud en regiones indígenas. **Material y métodos.** Se diseñó una metodología didáctica con enfoque crítico-constructivista dirigida a personal de salud que atiende a población indígena en cinco entidades de México. **Resultados.** Entre 09/2016 a 01/2020 se capacitó a 1 825 trabajadores de la salud que deconstruyeron las creencias que determinan prácticas de discriminación y maltrato durante la atención a la salud de los usuarios indígenas. La intervención logró un aprendizaje significativo transformador de las valoraciones y prácticas sociales, con propuestas para evitar cualquier forma de maltrato y garantizar el trato digno. **Conclusiones.** Para la construcción de un sistema de salud universal y equitativo, es necesario incluir intervenciones que actúen sobre las creencias determinantes de las prácticas de discriminación y maltrato en los servicios de salud hacia grupos sociales vulnerables.

Palabras clave: pueblos indígenas; calidad de la atención de salud; pedagogía; satisfacción del paciente; racismo; discriminación social; desigualdades en salud

Meneses-Navarro S, Pelcastre-Villafuerte BE, Bautista-Ruiz OA, Toledo-Cruz RJ, de la Rosa-Cruz SA, Alcalde-Rabanal J, Mejía-Marenco JA. Pedagogical innovation to improve the quality-responsiveness in the health care of indigenous women. Salud Publica Mex. 2021;63:51-59.
https://doi.org/10.21149/11362

Abstract

Objective. Present the results of a pedagogical intervention to improve the quality-responsiveness in healthcare provided by health service providers in indigenous regions. **Materials and methods.** A didactic methodology with a critical-constructivist approach was designed aimed to health personnel who attend to the indigenous population in five entities of Mexico. **Results.** Between 09/2016 and 01/2020, 1 825 health workers were trained, who deconstructed the beliefs that determine practices of discrimination and abuse during the health care of indigenous users. The intervention achieved significant transformative learning of social beliefs and practices, with proposals to avoid any form of abuse and guarantee dignified treatment. **Conclusions.** For the construction of a universal and equitable health system, it is necessary to include interventions that act on the beliefs that determine discrimination and mistreatment practices in health services towards vulnerable social groups.

Keywords: indigenous peoples; quality of health care; teaching; patient satisfaction; racism; social discrimination; health disparities

(1) Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
(2) Consultor independiente.
(3) Centro Regional de Investigaciones Multidisciplinarias, Universidad Nacional Autónoma de México. Ciudad de México, México.

Fecha de recibido: 2 de abril de 2020 • **Fecha de aceptado:** 22 de junio de 2020 • **Publicado en línea:** 11 de diciembre de 2020
Autor de correspondencia: Blanca Estela Pelcastre-Villafuerte. Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
Correo electrónico: blanca.pelcastre@insp.mx

Licencia: CC BY-NC-SA 4.0

Meneses-Navarro S, Pelcastre-Villafuerte BE, Bautista-Ruiz OA, Toledo-Cruz RJ, de la Rosa-Cruz SA, Alcalde-Rabanal J, Mejía-Marenco JA. Innovación pedagógica para mejorar la calidad del trato en la atención de la salud de mujeres indígenas. Salud Publica Mex. 2021;63(1):51-59. https://doi.org/10.21149/11362

Los pueblos indígenas de Latinoamérica han ocupado históricamente los últimos peldaños de la estratificación social.[1-4] En México, estos pueblos concentran los mayores rezagos sociales y de salud; por ejemplo, 71% se encuentra en condiciones de pobreza,[5] duplica la razón de mortalidad materna[6] y tiene una esperanza de vida al nacimiento ocho años menor que la media nacional y hasta 20 años menor en los 100 municipios indígenas más pobres.[7,8]

Al mismo tiempo, los pueblos indígenas afrontan más barreras para el acceso a los servicios de salud. Además de las barreras geográficas, financieras y lingüísticas, éstos encaran formas de discriminación y maltrato sistemáticas por parte de los trabajadores de la salud,[9-17] lo que algunos investigadores atribuyen a problemas éticos o psicológicos que han de corregirse individualmente.[18,19] Otros estudiosos en el tema consideran estos problemas como rasgos de la formación autoritaria en el campo médico, cuya solución sería intervenir en los programas docentes.[19] Unos más los consideran fallas gerenciales de la calidad del trato en los servicios de salud, de modo que la solución apunta a reorganizarlos.[20]

Sin negar los aportes de estas aproximaciones, parecería que estos investigadores incurren en cierto reduccionismo al pasar por alto que también se trata de un conflicto socioantropológico determinado por la estructura estratificada de la sociedad y los sistemas ideológicos que la sustentan,[21,22] en referencia específica a las ideas racistas, clasistas y sexistas. A grandes rasgos, estas ideologías dan por sentada una inferioridad biológica, cultural y moral en las personas indígenas, los pobres y las mujeres. Estas ideas son hegemónicas y están presentes en diversos ámbitos de la vida social, que incluyen el ámbito de la atención de los procesos de salud-enfermedad en detrimento de la calidad en el trato que reciben los miembros de estos sectores de la población (figura 1).

Para impedir estas prácticas de discriminación y maltrato durante la atención médica, derivadas de tales ideologías imperantes, un primer paso es reconocerlas y deconstruirlas. Esto permite comprender 1) el modo en que se ha sustentado históricamente la estratificación social en favor de ciertos grupos y en detrimento de otros; 2) que esta forma de organización es artificial (no natural), puesto que se ha construido socialmente, y 3) que dicha estructura puede ser modificada. Una vez deconstruidas las creencias y visiones que determinan las prácticas de discriminación y maltrato, es preciso examinar cuáles son las dimensiones y las acciones concretas que permitirían brindar un trato digno con pertinencia cultural durante la atención obstétrica de las mujeres indígenas.

A partir de las consideraciones anteriores se diseñó e implementó una intervención pedagógica para, por un lado, identificar y deconstruir las creencias y prácticas discriminatorias que sustentan las estructuras de desigualdad y sus efectos en la calidad del trato durante la atención de las mujeres indígenas en los servicios de salud y, por el otro, proponer acciones específicas para evitar cualquier forma de maltrato y discriminación durante la atención y garantizar el trato digno. Esta intervención, implementada entre septiembre de 2016 y enero de 2020, tuvo por objetivo contribuir a mejorar la calidad del trato que brindan los prestadores de servicios de salud a las poblaciones indígenas en cinco regiones del país: Tarahumara, en Chihuahua; Altos y Frailesca, en Chiapas; Nahua, en Morelos, y Nahua, en el norte de Puebla,* así como en cuatro hospitales: tres públicos en Chiapas, y uno privado, sin fines de lucro, en la Ciudad de México.

Material y métodos

La intervención se basa en la pedagogía crítico-constructivista[23,24] y consiste en un curso-taller dirigido a trabajadores que brindan servicios de salud, principal-

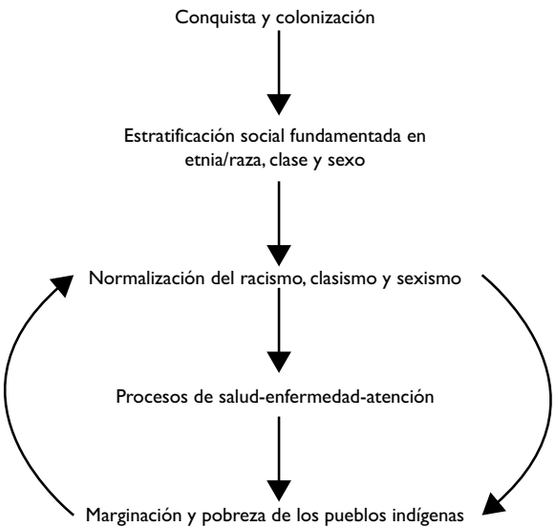


Figura 1. Estructura social estratificada empleada en la intervención pedagógica con trabajadores de la salud de Chiapas, Chihuahua, Ciudad de México, Morelos y Puebla. México, 2016-2020

* En la sierra norte de Puebla la intervención pedagógica se implementó sólo con promotoras de salud afiliadas a una cooperativa indígena y campesina que cuenta con un área dedicada a la salud.

mente a mujeres indígenas.[22] El propósito del curso-taller es dar lugar a un aprendizaje significativo que propicie cambios de comportamiento para garantizar un trato digno, sin discriminación ni maltrato, a las usuarias de los servicios de salud.[25] El curso-taller propicia una reflexión profunda que permite reconocer las creencias y visiones que determinan prácticas de discriminación y maltrato hacia las mujeres indígenas durante la atención obstétrica, para posteriormente deconstruirlas. La deconstrucción es una estrategia analítica para desarmar una estructura conceptual (asumida como inalterable) a través del examen intelectual de los discursos o prácticas sociales.[26] Este ejercicio de desmontaje conceptual pretende transformar o "desplazar" las estructuras de poder hegemónicas. En el caso del curso-taller, la deconstrucción consistió, primero, en identificar las creencias o visiones de los participantes respecto a las mujeres indígenas durante el embarazo, parto y puerperio en relación con los servicios institucionales de salud.[22] En segundo lugar, analizar la forma en que estas ideas o visiones pueden manifestarse en valoraciones y prácticas de discriminación o maltrato durante la atención médica, como expresión de las ideologías que sustentan la estructura social estratificada. Posteriormente, a partir de las dimensiones del trato digno propuestas por la Organización Mundial de la Salud (OMS),[27-29] se provoca una discusión sobre las acciones específicas que permitirían brindar una atención exenta de discriminación y maltrato.

La pedagogía de los talleres es crítico-constructivista,[23,24] es decir, promueve la reflexión individual y colectiva para analizar diversas problemáticas con una orientación hacia la transformación social. El pensamiento crítico parte de identificar las relaciones de dominación/subordinación que establecen la estratificación social y que se construyen a partir de las desigualdades de género, etnia y clase. Esto permite confrontar los saberes previos de los participantes con los nuevos significados provistos por la reflexión.

Así, el conocimiento se construye a partir de la deliberación de los participantes. La metodología fomenta que todos intervengan en la discusión a partir de sus propias reflexiones, sugerencias y recomendaciones, e involucra sus experiencias en un doble sentido: por un lado, porque invita a reflexionar sobre la propia biografía –circunstancias de vida, pertenencia étnica, de clase y género, entre otras características que determinan su posición de superioridad o subordinación en la estructura social–, y por el otro, porque la dinámica pedagógica no sólo apela a la experiencia personal, sino también a la comprensión de los temas analizados a partir de la utilización del cuerpo mismo, de los sentidos y las emociones, lo que suscita entre los participantes una reflexión que va más allá de la cognición. De esta manera se obtiene un aprendizaje significativo, resultado del proceso individual y colectivo de deconstrucción de las visiones que sustentan la estructura social estratificada y que determinan las posibles formas de maltrato durante la atención médica. Es así como la actividad pedagógica estimula la acción para la transformación social.[23]

Por otra parte, se diseñaron dos modalidades del curso-taller con los mismos módulos. Una de 16 horas repartidas en dos sesiones de ocho horas cada una. La otra de 60 horas, repartidas en cuatro módulos de 15 horas, impartidos en tres sesiones por módulo. En los talleres de 60 horas, el módulo final incluyó el desarrollo de propuestas para mejorar el trato en los establecimientos de salud donde trabajan los participantes y material didáctico para deconstruir las estructuras de desigualdad. En todos los casos, los talleres cerraron con la recomendación de acciones específicas de trato digno[22] y su ejecución mediante sociodramas.

El proyecto fue aprobado por la comisión de ética del Instituto Nacional de Salud Pública (INSP). Todos los participantes firmaron una carta de consentimiento y al terminar recibieron una constancia de participación con valor curricular.

Resultados

Características

El curso-taller se impartió con 104 grupos de prestadores de servicios de salud. En total participaron 1 825 personas: 1 230 mujeres (67.4%) y 595 hombres (32.6%), y se impartieron 1 884 horas efectivas frente a grupos durante el desarrollo del programa (cuadro I).

El curso-taller tuvo aceptación en todas las entidades en donde se impartió. Si bien al principio se manifestaron actitudes de resistencia entre los participantes, con el transcurso de las primeras dinámicas hubo más bien beneplácito e interés.

Creencias, visiones y prácticas de discriminación y maltrato

Entre las principales creencias y visiones estereotipadas de discriminación y maltrato identificadas entre los participantes se encuentran las siguientes:

- En las comunidades indígenas prevalecen usos y costumbres incompatibles con los saberes y la práctica médica, especialmente respecto a la atención

Cuadro I
Implementación de la intervención pedagógica con trabajadores de la salud de Chiapas, Chihuahua, Ciudad de México, Morelos y Puebla. México, 2016-2020

	*Personal del primer nivel de atención, Chiapas**,‡		*Personal hospitalario en Chiapas*‡		*Cooperativa, sierra norte de Puebla*§		*Pasantes del área de la salud en regiones indígenas de Chiapas, Morelos y Chihuahua*§		*Personal hospitalario en la Ciudad de México*‡		*Total*	
Periodo de implementación	09/2016-08/2017		06/2017-01/2020		09/2018		10/2017-07/2018		09-10/2018		09/2016-01/2020	
Número de grupos	50		44		1		4		5		104	
Horas frente al grupo	800 h		704 h		60 h		240 h		80 h		1 884 h	
Número de participantes	906	100%	734	100%	11	100%	64	100%	110	100%	1 825	100%
Mujeres	539	59.5%	554	75.5%	10	90.9%	32	50%	95	86.4%	1 230	67.4%
Hombres	367	40.5%	180	24.5%	1	9.1%	32	50%	15	13.6%	595	32.6%
Personal médico	298	32.9%	125	17.0%	0	0	24	31.2%	12	10.9%	459	25.1%
Personal de enfermería	495	54.6%	273	37.2%	0	0	28	43.7%	19	17.3%	815	44.7%
Otro personal	113	12.5%	336	45.8%	11	100%	12	18.7%	79	71.8%	551	30.2%

* Jurisdicciones 2 (San Cristóbal de Las Casas), 5 (Pichucalco), 6 (Palenque) y 9 (Ocosingo)
‡ Modalidad de curso taller de 16 horas
§ Modalidad de curso taller de 60 horas

obstétrica; por eso las mujeres indígenas muestran resistencia para acudir a solicitar los servicios respectivos.
- Los trabajadores de la salud tienen el deber de "convencer" a las mujeres indígenas y a sus familias de aceptar los servicios de atención obstétrica (revisión ginecológica, atención del parto, operación cesárea, uso de métodos de planificación familiar, transfusiones sanguíneas) porque es lo que les conviene.

Algunas prácticas de discriminación y maltrato identificadas por los trabajadores de la salud son:

- El regaño hacia las mujeres indígenas (adolescentes embarazadas, multíparas, que acuden con alguna complicación o en condiciones poco higiénicas).
- Negar algún método anticonceptivo (especialmente el definitivo) a mujeres que no demuestran la autorización de su esposo.
- Solicitar la firma de documentos en blanco como forma de consentimiento informado.
- Tomar como firma de consentimiento la huella digital de las usuarias analfabetas o que se encuentran bajo los efectos de la anestesia.
- Negar la posibilidad de que las mujeres decidan en qué posición quieren parir.

Reorganización conceptual

Las reflexiones de los participantes respecto a estas creencias, visiones y prácticas les condujeron a las siguientes conclusiones a modo de desplazamiento o deconstrucción conceptual:

- Más allá de las diferencias culturales, estamos inmersos en una estructura social estratificada que se sustenta en ideas racistas, clasistas y sexistas. Las mujeres indígenas ocupan los últimos peldaños dentro de esta estructura.
- Las personas –incluyendo a los trabajadores de la salud– interiorizan las estructuras de dominación/subordinación, lo que da pie a valoraciones discriminatorias y prácticas de maltrato –también en los servicios de salud– como las que ilustran las creencias y visiones identificadas.

Propuestas de acciones de trato digno

A partir de estas conclusiones, en la última parte de los talleres los participantes propusieron definiciones propias de las dimensiones del trato digno y acciones específicas para garantizar el trato digno con pertinencia cultural durante la prestación de sus servicios (cuadro II).[26]

Asimismo, en el cuadro III se presentan las propuestas y recomendaciones de los trabajadores para algunas de las dimensiones del trato digno.

Atención pronta

Respecto a la atención pronta, se presentaron observaciones de circunstancias que la dificultan. Por ejemplo, las limitaciones de la estructura física del hospital ("¿Cómo vamos a brindar una atención pronta si no hay espacio?, ¿en el suelo?"), la falta de un trabajo coordinado entre los miembros del personal de salud ("Para dar atención pronta se necesita un equipo de trabajo y eso no siempre sucede") y la necesidad de que todas las personas que forman parte del hospital se comprometan con el propósito de brindar una atención pronta y mejor trato ("Para la atención pronta es necesario capacitar a todos, desde la recepción hasta los vigilantes, que son quienes reciben a los pacientes y pueden facilitar u obstaculizar el acceso"). Los participantes propusieron también posibles soluciones, que incluyen promover el trabajo en equipo e impartir periódicamente los talleres de trato digno con todo el personal.

Trato respetuoso

El trato respetuoso se refirió a las acciones del personal hospitalario al dirigirse a las usuarias desde el primer contacto y durante toda la atención, respetando la dignidad de la persona. El respeto comienza con el saludo y la presentación del prestador de servicios e incluye una comunicación clara, amable y completa respecto de todas las impresiones y procedimientos diagnósticos y terapéuticos. Los participantes resaltaron la importancia de emplear expresiones como "por favor", "gracias", "¿me permite?", "¿qué puedo hacer por usted?", "¿tiene alguna duda?", "¿está satisfecha con la atención?"

Comunicación

La comunicación se identificó como un aspecto relevante, sobre todo cuando se atiende a usuarias indígenas cuya lengua materna no es el español. Los participantes reconocieron que las personas utilizan diversos recursos para transmitir mensajes, como el lenguaje no verbal, que se sirve de señales y gestos. En este sentido, la comunicación de los prestadores de servicios con las usuarias

Cuadro II
DIMENSIONES DEL TRATO DIGNO CON PERTINENCIA CULTURAL EN SALUD Y SUS DEFINICIONES SEGÚN LOS PARTICIPANTES DE LOS CURSOS-TALLER EN CHIAPAS. MÉXICO, 2019-2020

Dimensión	*Definición*
Trato respetuoso	Significa tratar a todos los usuarios de los servicios como personas iguales, con el mismo valor esencial. No debe haber valoraciones ni actitudes que discriminen por género, pertenencia étnica, condición social, religión, preferencia sexual, nacionalidad o singularidad de cualquier otra índole; tampoco prácticas que humillen o impliquen otras formas de violencia, como la infantilización y el regaño. Implica mostrar respeto por las personas, sus creencias, valores y preferencias.
Comunicación	Se refiere a garantizar el derecho de las personas usuarias a recibir toda la información sobre su situación de salud de manera oportuna, clara, completa y veraz, y en un lenguaje comprensible. Cuando las usuarias son indígenas, esto implica que la información se brinde en su lengua materna.
Autonomía	Significa que los usuarios tienen la libertad de participar en la toma de decisiones respecto a su salud y los procedimientos preventivos, diagnósticos o terapéuticos que deseen realizarse.
Confidencialidad y privacidad	Aluden al derecho de las personas usuarias a decidir quién puede y quién no puede tener acceso a la información sobre su salud. Esto incluye la privacidad de la consulta médica, es decir, que sólo quien la usuaria determine puede presenciar el interrogatorio y la exploración clínica, y tener acceso a la información de su expediente.
Atención pronta	Se refiere a que, en casos de urgencia, la atención debe brindarse de inmediato, y cuando no haya urgencia, en un tiempo razonable. La OMS señala que "las necesidades médicas deben ser atendidas con la rapidez suficiente para que la espera no represente una molestia adicional al problema de salud".[26]
Calidad de las instalaciones y los servicios adicionales	La buena calidad de las instalaciones y los servicios adicionales –como la alimentación o el albergue– contribuye a evitar riesgos adicionales para la salud, producto de condiciones insalubres de los alimentos, el agua, los sanitarios y el resto de los espacios de atención, y genera un sentimiento de seguridad y confort en las usuarias.
Acceso a redes sociales de apoyo durante la hospitalización	Se refiere a la posibilidad de que las personas hospitalizadas estén acompañadas por sus familiares y amigos durante su internamiento, no sólo para recibir sus cuidados y apoyo práctico, sino también para tratar de minimizar el desarraigo, la angustia, la incertidumbre y la soledad.
Elección del proveedor de servicios	Implica la posibilidad de elegir tanto el establecimiento como al personal de salud para recibir la atención. Algunas usuarias tienen preferencias respecto al sexo o la edad del prestador de servicios. Por ejemplo, una mujer indígena joven que acude a consulta por motivos relativos a su sexualidad puede preferir ser atendida por una médica que, de preferencia, hable su lengua. La posibilidad de ajustar los servicios a las necesidades, las preferencias y las expectativas de las usuarias también contribuye a brindar un trato digno en salud.

Cuadro III
Acciones específicas por cada dimensión del trato digno propuestas por los participantes de los cursos-taller en Chiapas. México, 2019-2020

Atención pronta
Tener acceso libre de barreras físicas, administrativas o burocráticas, sobre todo al servicio de urgencias. Disponer de ambulancias con gasolina y conductor para el traslado de urgencias del hospital básico al hospital de referencia y, en caso necesario, de éste a otro de mayor capacidad resolutiva. Disponer de plantillas completas de personal en cada uno de los turnos, los 365 días al año. Disponer de sistemas de referencia y contrarreferencia del primero al segundo nivel y a otros hospitales resolutivos. Garantizar la continuidad y la integralidad en la atención de la usuaria y el neonato en su tránsito por distintos servicios. Promover y consolidar el trabajo en equipo para asegurar la atención pronta. Mantener una comunicación efectiva y oportuna con las usuarias, sus familiares y los miembros del equipo de salud.
Trato respetuoso
Saludar a las usuarias y llamarlas por su nombre. Evitar referirse a las usuarias con diminutivos ("pacientita", "mujercita"), apodos u otras expresiones paternalistas ("hijita", "gordita", "chaparrita") que pueden representar un trato que aminora su autonomía y dignidad. Presentarse el prestador de servicios señalando su nombre y su función, por ejemplo: "Buenos días, señora Juana, mi nombre es Roberto y yo soy el médico que se encargará de atenderla". Escuchar activa y respetuosamente. Individualizar la atención reconociendo que cada usuaria es única. Reconocer y respetar los valores, los sentimientos y las preferencias de las usuarias. Ser empáticos. Procurar la comodidad de la usuaria.
Comunicación
"La información debe ser oportuna, precisa, completa, asertiva, clara, respetuosa, efectiva; todo esto nos lleva a una comunicación segura".* "Debemos dar una comunicación sin tecnicismos, en el propio idioma, de manera oportuna", "asegurarse que nuestra información fue entendida", "dar una comunicación adecuada y clara a los familiares".* Explicar en qué consiste el consentimiento informado de todo procedimiento diagnóstico o terapéutico. Brindar información directa a la persona usuaria y a la persona responsable de ella.
Autonomía
Favorecer el lugar y el momento para la libre decisión de las usuarias respecto a la aceptación o el rechazo de procedimientos diagnósticos o terapéuticos. Solicitar a la persona usuaria su consentimiento informado previo a cada procedimiento diagnóstico o terapéutico. Usar un traductor institucional en todo momento para brindar información clara, precisa y oportuna a las personas usuarias sobre sus condiciones de salud y la atención. Preguntar siempre la opinión de la persona usuaria. Proporcionar a las personas usuarias información de manera imparcial y sin prejuicios.
Confidencialidad y privacidad
Cuidar el pudor y la privacidad de las personas usuarias al momento de realizar cualquier procedimiento. Evitar comentarios innecesarios dentro o fuera del hospital sobre los casos de las personas usuarias. Brindar atención personalizada. Brindar la atención en un lugar privado, evitando que otras personas observen a las personas usuarias o escuchen la consulta. Solicitar el permiso de las personas usuarias antes de realizar la exploración y la inspección física.
Acceso a redes de apoyo
Permitir que las personas usuarias sean acompañadas por sus familiares y amigos en las áreas de hospitalización. Brindar información oportuna a los familiares de la persona usuaria sobre la evolución de su estado de salud. Permitir el apoyo físico, moral y espiritual de las personas usuarias por parte de sus redes de apoyo, siempre y cuando no afecten o molesten a otras personas. Ser flexibles con la dieta que le procuran a la persona usuaria sus familiares, siempre y cuando no exista contraindicación médica. Disponer de albergues con las comodidades mínimas necesarias para que los familiares y amigos puedan hospedarse mientras acompañan a la usuaria.

* Los entrecomillados se refieren a comentarios textuales de los participantes en los cursos-taller.

debería cumplir con las siguientes características: ser comprensible, respetuosa, en un lenguaje no técnico y, en caso necesario, con traductores que aseguren que la usuaria haya entendido la información e indaguen si quedan posibles dudas.

Autonomía

La autonomía se definió como la libertad y el poder de las personas usuarias para participar en la toma de decisiones respecto a su salud y su atención, incluyendo los procedimientos preventivos, diagnósticos o terapéuticos. Los participantes reconocieron que la estructura de la distribución de poder en la sociedad mexicana determina las restricciones a la autonomía de las mujeres, y que las mujeres indígenas y las que viven en condiciones de pobreza ocupan la posición de mayor subordinación. Reconocieron que las condiciones de opresión de las mujeres indígenas se acrecientan dentro de las estructuras de poder del campo médico, particularmente en cuanto usuarias de los servicios hospitalarios. Expresaron que estas condiciones limitan el ejercicio pleno de las mujeres de su derecho a la autonomía en salud y que se debe ser muy consciente de estas estructuras de dominación para procurar facilitar circunstancias que favorezcan su autonomía.

Confidencialidad y privacidad

Los participantes identificaron también que la privacidad y la confidencialidad respecto a la información sobre su salud son derechos de las usuarias. Reconocieron que el personal de salud debe garantizar las condiciones de privacidad en los espacios donde ocurren los encuentros médicos, así como asegurar que la información de las usuarias y sus condiciones de salud no serán divulgadas.

Acceso a redes sociales de apoyo durante la hospitalización

Respecto al acceso a las redes sociales de apoyo, los participantes no sólo apuntaron la importancia de que el paciente reciba cuidados y apoyo práctico, sino también aspectos relevantes de la subjetividad e intersubjetividad de pacientes y familiares, tales como tratar de atender el desarraigo, la angustia, la incertidumbre y la soledad, e intentar aliviarlas.

Aunque todos los grupos hicieron propuestas de intervención y material de difusión específico para los establecimientos de salud a los que estaban adscritos, en uno de los hospitales de Chiapas se recogieron las propuestas emitidas por los propios trabajadores para elaborar un libro que guíe sus acciones para garantizar el trato digno.[22]

Trato digno

Algunos trabajadores señalaron que "si bien somos servidores públicos y tenemos la obligación de brindar un servicio con buen trato, también tenemos el derecho de que nos traten con respeto". El respeto se vive en condiciones dignas, pero es circular; el buen trato tiene el potencial de provocar un círculo virtuoso de relaciones respetuosas con los usuarios, prestadores de servicios y todos los compañeros de trabajo.

Discusión

Los trabajadores de la salud suelen exhibir actitudes de resistencia y rechazo hacia las actividades educativas convocadas por las autoridades. En esta experiencia se hicieron frecuentes señalamientos respecto a que tales actividades eran "una pérdida de tiempo", "fastidiosas" y "aburridas". No obstante, la innovación pedagógica implementada consiguió atraer su atención y despertar su interés.

El éxito de esta intervención radica en su enfoque crítico-constructivista, alejado de la pedagogía tradicional en la que los participantes no intervienen en la construcción del conocimiento. En contraste, la pedagogía empleada en los cursos-taller considera a los participantes tanto individual como grupalmente al situarlos dentro del objeto de conocimiento, la estratificación social –con sus asimetrías, sus formas de dominación, subordinación y discriminación, y sus privilegios– y las creencias, visiones y prácticas de discriminación y maltrato hacia las mujeres indígenas durante la atención obstétrica. Los resultados permiten señalar que, al analizar su propia ubicación en dicha estratificación, así como sus creencias y visiones, los participantes lograron identificar que la reflexión tiene que ver no sólo con su desempeño profesional, sino con ellos mismos, pues pudieron reconocerse como individuos atravesados por las estructuras e ideologías productoras de desigualdades imperantes en esta sociedad. Tal deconstrucción los hizo conscientes de sus posibilidades para contrarrestar los efectos perniciosos –en términos de discriminación y maltrato– hacia otras personas, especialmente las usuarias de los servicios de atención obstétrica.

El trabajo grupal favorece la reflexión constructivista, pues propicia el intercambio de ideas y también la introspección, es decir, la revisión de las propias biografías, experiencias, saberes y afectos.[25] El trabajo en grupo favorece el análisis de problemas comunes, los

consensos, la liberación de resistencias ante la innovación; en suma, propicia el cambio social democrático.[25]

Las dinámicas y las actividades grupales, que implican la propia experiencia y el uso del cuerpo, no sólo permitieron romper las resistencias, sino lograr un aprendizaje significativo. Por ejemplo, los ejercicios de intercambio de papeles permitieron aprender de manera relacional a partir de interacciones en situaciones reales o hipotéticas. De este modo, "el objeto de conocimiento es también un contenido de la conciencia del que conoce, ya que ésta es el instrumento de construcción de la realidad (…), no solamente hay una aprehensión de la realidad, sino también una aprehensión de sí mismo por parte del sujeto".[25] Los participantes abordaron el objeto de conocimiento –las creencias y visiones respecto a las mujeres indígenas y sus efectos en el trato que les brindan en los servicios de atención obstétrica–, le dieron sentido a partir de su propia experiencia, sus valores y sus afectos, y adquirieron conciencia de las circunstancias en que se encuentran insertos y de quiénes son ellos mismos en dichas circunstancias.[25] El análisis del objeto de conocimiento parte, así, de la razón y las emociones, lo que permite a los participantes incorporar la nueva información en sus esquemas de pensamiento, sentimiento y acción, e induce al cambio de las valoraciones y prácticas cotidianas, incluyendo el trato con las personas usuarias de los servicios de salud.

Los cambios de comportamiento a los que conduce el aprendizaje significativo tienden a ser permanentes, de modo que pueden medirse. Por ejemplo, los trabajadores de la salud reconceptualizaron las acciones que propusieron relativas al trato digno. Al dotar de contenido específico las dimensiones del trato digno con acciones concretas para garantizarlo, evidencian el aprendizaje. Este proceso de construcción a partir de la reflexión crítica implica la transformación de los esquemas mentales, las estructuras cognitivas y las conductas.

Los supuestos de la pedagogía implementada son que "la verdad" sobre el objeto de conocimiento no está dada, sino que se construye en la discusión individual y grupal; que el proceso de aprendizaje no parte de cero, sino que todas las personas, sin excepción, tienen experiencias, prejuicios y conocimientos relacionados con el problema abordado, y que el punto de vista de todos es igualmente valioso.

Conclusiones

Para la construcción de un sistema de salud universal y equitativo, es necesario incluir intervenciones que actúen sobre los determinantes estructurales de las prácticas de discriminación y maltrato en los servicios de salud, como las creencias y visiones racistas, clasistas y sexistas. La innovación pedagógica que aquí se ha discutido es útil para mejorar la calidad del trato interpersonal en los servicios de salud, pero también para contribuir democráticamente al cambio social necesario para contrarrestar las estructuras de desigualdad y construir una sociedad más justa y equitativa.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Menéndez E. Poder, estratificación y salud. México: Ediciones de la Casa Chata, 1981.
2. Montenegro RA, Stephens C. Indigenous health in Latin America and the Caribbean. Lancet. 2006;367(9525):1859-69. https://doi.org/10.1016/S0140-6736(06)68808-9
3. Gracey M, King M. Indigenous health part 1: determinants and disease patterns. Lancet. 2009;374(9683):65-75. https://doi.org/10.1016/S0140-6736(09)60914-4
4. King M, Smith A, Gracey M. Indigenous health part 2: the underlying causes of the health gap. Lancet. 2009;374(9683):76-85. https://doi.org/10.1016/S0140-6736(09)60827-8
5. Consejo Nacional de Evaluación de la Política de Desarrollo Social. Informe de Evaluación de la Politica de Desarrollo Social 2018 [Internet]. México: Coneval, 2018. Disponible en: https://www.coneval.org.mx/Evaluacion/IEPSM/IEPSM/Paginas/IEPDS-2018.aspx#:~:text=El%20Informe%20de%20Evaluaci%C3%B3n%20de,de%20sus%20planes%20y%20programas
6. Luna M, Muños JA, Freyermuth G. Mortalidad Materna en México: Numeralia 2016. México: Observatorio de Mortalidad Materna en México, 2018.
7. Torres JL, Villoro R, Ramírez T, Zurita B, Hernández P, Lozano R, *et al.* La salud de la población indígena en México. En: Knaul F, Nigenda G, eds. Caleidoscopio de la salud. De la investigación a las políticas y de las políticas a la acción. Ciudad de México: Funsalud, 2003:41-55.
8. Secretaría de Salud. Programa Nacional de Salud 2007-2012. Por un México sano: construyendo alianzas para una mejor salud. México: SS, 2007:37.
9. Meneses-Navarro S. Semiótica de la otredad. La diferencia como diagnósis. Etnografía de los encuentros médicos interétnicos en Los Altos de Chiapas (tesis). México: CIESAS- Sureste, 2005.
10. Meneses-Navarro S, González-Block MA, Quezada-Sánchez AD, Freyermuth-Enciso G. Evolución de la equidad en el acceso a servicios hospitalarios según composición indígena municipal en Chiapas, México: 2001 a 2009. En: Page J, coordinador. Enfermedades del rezago y emergentes desde las ciencias sociales y la salud pública. México: UNAM, 2014:17-35.
11. Meneses-Navarro S, Pelcastre-Villafuerte B, Vega-Macedo M. Maternal mortality and the coverage, availability of resources, and access to women's health services in three indigenous regions of Mexico: Guerrero Mountains, Tarahumara Sierra, and Nayar. En: Schwartz DM, ed. Maternal health, pregnancy-related morbidity and death among indigenous women of Mexico & Central America: An Anthropological, Epidemiological and Biomedical Approach. Alemania: Springer International Publishing, 2018:169-88.
12. Meneses-Navarro S, Meléndez-Navarro D, Meza-Palmeros A. Contraceptive counseling and family planning services in the Chiapas Highlands: challenges and opportunities for improving access for the indigenous population. En: Schwartz DA, ed. Maternal health, pregnancy-related morbidity and death among indigenous women of Mexico & Central America: an anthropological, epidemiological and biomedical approach. Alemania: Springer International Publishing, 2018:271-300.

13. Menéndez EL. Intercultural health: Proposals, actions and failures. Cienc Saude Coletiva. 2016;21(1):109-18. https://doi.org/10.1590/1413-81232015211.20252015
14. Ibáñez M, Heredia I, Meneses S, Pelcastre B, González-Block MA. Labor and delivery service use: indigenous women's preference and the health sector response in the Chiapas Highlands of Mexico. Int J Equity Health. 2015;14(1):1-10. https://doi.org/10.1186/s12939-015-0289-1
15. Comisión Nacional de los Derechos Humanos. Recomendación General 4. Derivada de prácticas administrativas que constituyen violaciones a los derechos humanos de los miembros de comunidades indígenas respecto a la obtención del consentimiento libre e informado para la adopción de métodos de planificación familiar. México: CNDH, 2002.
16. Comisión Nacional de los Derechos Humanos. Recomendación General 15. Sobre el derecho a la protección de la salud. México: CNDH, 2009.
17. Comisión Nacional de los Derechos Humanos. Recomendación General 31. Sobre violencia obstétrica en el Sistema Nacional de Salud. México: CNDH, 2017.
18. Collado-Peña SP. Tienes que buscarte otro hospital: acceso y rechazo hospitalario en la resolución obstétrica (tesis). México: UAM-X, 2010.
19. Castro R, Erviti J. Sociología de la práctica médica autoritaria. Violencia obstétrica anticoncepción inducida y derechos reproductivos. México: UNAM, 2015.
20. Donabedian A. Los espacios de la salud: Aspectos fundamentales de la organización de la atención médica. México: Fondo de Cultura Económica, 1988.
21. Pelcastre-Villafuerte BE, Meneses-Navarro S, Rivera-Dommarco J. Programa Institucional Salud de los Pueblos Indígenas: agenda para la investigación, la docencia y la vinculación. Salud Publica Mex. 2020;62(2):228-30. https://doi.org/10.21149/10992
22. Meneses-Navarro S, Pelcastre-Villafuerte B (coords). Trato digno en la atención obstétrica. Marco conceptual y propuesta de trabajadores de la salud para mejorar su calidad. Cuernavaca: Instituto Nacional de Salud Pública, 2019.
23. Freire P. Pedagogía del oprimido. México: Siglo XXI, 2005.
24. Carreto M. Constructivismo y educación. México: Editorial Progreso, 1997.
25. Guido L. ¿Para qué aprender? En: Guido L. Aprender a aprender. México: Red Tercer Milenio, 2012:10-20.
26. Culler J. Sobre la deconstrucción. Teoría y crítica después del estructuralismo. Madrid: Cátedra, 1984.
27. Murray CJL, Evans DB. Technical consultation on concepts and methods for measuring the responsiveness of health system. En: Murray CJL, Evans DE, ed. Health Systems Performance Assessment Debates, methods and empiricism. Ginebra: World Health Organization, 2003:115-24.
28. De Silva A. A Framework for measuring responsiveness. Ginebra: World Health Organization, 2000.
29. Darby C, Valentine N, Murray C, de Silva A. Strategy on measuring responsiveness. Discussion paper series. Ginebra: World Health Organization, 2003.

ARTÍCULO ORIGINAL

Condiciones de salud y uso de servicios en pueblos indígenas de México

Blanca Estela Pelcastre-Villafuerte, D en Psic Soc,[1] Sergio Meneses-Navarro, D en C,[1]
Mario Sánchez-Domínguez, D en C,[1] David Meléndez-Navarro, M en Epidemiol,[2]
Graciela Freyermuth-Enciso, D en Antrop Soc.[3]

Pelcastre-Villafuerte BE, Meneses-Navarro S, Sánchez-Domínguez M, Meléndez-Navarro D, Freyermuth-Enciso G.
Condiciones de salud y uso de servicios en pueblos indígenas de México.
Salud Publica Mex. 2020;62:810-819.
https://doi.org/10.21149/11861

Resumen

Objetivo. Identificar diferencias en indicadores socioeconómicos, de condiciones de salud y uso de servicios entre la población indígena (PI) y no indígena (PNI) del país**. Material y métodos**. Estudio trasversal descriptivo con información de la Encuesta Nacional de Salud y Nutrición 2018-19. **Resultados**. La mayoría de la PI se encuentra en el quintil socioeconómico más bajo y usa menos los servicios de salud. Las mujeres indígenas reportaron un mayor número de hijos, así como atención del parto con parteras. La PI acude por atención médica a las instituciones para población sin seguridad social como primera opción, pero manifiesta menor deseo de regresar a atenderse al mismo lugar. **Conclusiones**. La PI utiliza menos los servicios de salud. Se configura un panorama epidemiológico de doble carga e inequidad en indicadores de acceso que afecta a la PI. La salud reproductiva es el ámbito donde se observan las mayores desigualdades.

Palabras clave: uso de servicios de salud; servicios de salud; pueblos indígenas; disparidades en el estado de salud

Pelcastre-Villafuerte BE, Meneses-Navarro S, Sánchez-Domínguez M, Meléndez-Navarro D, Freyermuth-Enciso G.
Health conditions and use of services among indigenous peoples of Mexico.
Salud Publica Mex. 2020;62:810-819.
https://doi.org/10.21149/11861

Abstract

Objective. To identify differences in socioeconomic indicators, health conditions and use of services between the indigenous (IP) and non-indigenous population (NIP) of the country. **Materials and methods.** Descriptive cross-sectional study carried out with information obtained by the 2018-19 National Health and Nutrition Survey. **Results.** Most IP are in the lowest socioeconomic quintile and they use less health services. Indigenous women reported a higher number of children, as well as childbirth care with midwives. IP go for medical care to institutions for the population without social security as the first option but expressed less desire to return to the same place. **Conclusions**. IPs use less health services. An epidemiological panorama of double burden and inequity in access indicators that affect IP is configured. Reproductive health is the area where the greatest inequalities are observed.

Keywords: health services use; health services; indigenous peoples; health status disparities

(1) Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
(2) Comité Promotor por una Maternidad Segura. San Cristóbal de Las Casas, Chiapas, México.
(3) Centro de Investigaciones y Estudios Superiores en Antropología Social-Sureste. San Cristóbal de Las Casas, Chiapas, México.

Fecha de recibido: 15 de julio de 2020 • **Fecha de aceptado:** 2 de octubre de 2020 • **Publicado en línea:** 24 de noviembre de 2020
Autor de correspondencia: Dr. Sergio Meneses-Navarro. Conacyt, Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Av. Universidad 655, col. Santa María Ahuacatitlán. 62100 Cuernavaca, Morelos, México.
Correo electrónico: smenesesnavarro@gmail.com

Licencia: CC BY-NC-SA 4.0

Pelcastre-Villafuerte BE, Meneses-Navarro S, Sánchez-Domínguez M, Meléndez-Navarro D, Freyermuth-Enciso G. Condiciones de salud y uso de servicios en pueblos indígenas de México. Salud Publica Mex. 2020;62(6):810-819. https://doi.org/10.21149/11861

Alcanzar el mayor nivel posible de salud es un derecho humano. Su logro es desigual entre las personas y grupos sociales en virtud de las condiciones socioeconómicas en que nacen y viven. Históricamente, los pueblos indígenas de México y América Latina se han encontrado en condiciones socioeconómicas que determinan un menor ejercicio de sus derechos.

En América Latina, los indicadores en salud de las poblaciones indígenas (PI) muestran la persistencia de brechas y rezagos.[1] En México, 50% de las PI reside en localidades rurales y, de este porcentaje, 79% son pobres y 39% son pobres en extremo.[2] Algunos autores sugieren que estos rezagos se deben a factores culturales.[3-5] Sin embargo, las cosmovisiones, idiomas o tradiciones indígenas no explican las desigualdades en salud. Las desigualdades son producto de formas de organización social que han subordinado a las PI. La estructura social estratificada se sustenta en sistemas de creencias e ideas racistas, y se manifiesta en prácticas de discriminación que se reproducen en todos los ámbitos de la vida, incluyendo el sistema de salud.[6-8] El análisis de las condiciones de salud de estas poblaciones debe incluir el de estas estructuras de desigualdad y la manera de contrarrestarlas. Pero el estudio de sus condiciones de salud y las intervenciones para su atención han privilegiado un enfoque culturalista.[1,9] En 1990, la Conferencia Sanitaria Panamericana (CSP) impulsó la participación de los pueblos indígenas en la planeación de los servicios de salud y la inclusión de la medicina tradicional;[10] en 2017, promovió una política sanitaria con un enfoque intercultural para eliminar las barreras de acceso a los servicios para las poblaciones indígenas.[11]

En la última década, las bases de información administrativa de México han incorporado el criterio de etnicidad, pero su registro tiene un alcance limitado. La inclusión de esta variable en las encuestas nacionales de salud (Ensanut) permite tener una visión más comprensiva y confiable sobre los determinantes sociales, las condiciones de salud y el acceso a los servicios, toda vez que integran registros nominales de personas con esta información vinculada. A partir de la Ensanut 2018-19, para este estudio se recuperó información socioeconómica e indicadores que permitieron describir de manera general las condiciones de salud de las PI en México, así como su uso de servicios de salud. Con esta información se pretende documentar los rezagos y las brechas en salud respecto a la población no indígena (PNI), e identificar las ventanas de oportunidad para encaminar la política pública hacia la equidad en salud.

Material y métodos

Este es un estudio trasversal descriptivo formulado a partir del análisis de la Ensanut 2018-19, encuesta probabilística con representatividad nacional.[12] Para la aplicación de la encuesta se obtuvo el consentimiento informado de los participantes y los procedimientos para recolección de la información fueron aprobados por los comités de ética e investigación del Instituto Nacional de Salud Pública (INSP).[12]

El objetivo de este análisis es comparar indicadores socioeconómicos, de salud y de uso de servicios de salud entre PI y PNI de México. Se analizó la información al emplear los grupos etarios definidos en el diseño de la Ensanut 2018-19: población infantil (0-9 años), adolescentes (10-19 años) y adultos (20 o más años); estos grupos se diferenciaron en población indígena (hablante de lengua indígena) y no indígena. Las características analizadas fueron nivel socioeconómico, características sociodemográficas, factores de riesgo como consumo de alcohol y tabaco, prevalencia reportada de enfermedades crónicas (hipertensión y diabetes), medicina preventiva (inmunizaciones), antecedentes obstétricos (embarazo, atención del parto y muertes perinatales) en el grupo de mujeres en edad reproductiva y que habían iniciado vida sexual en el caso de adolescentes, frecuencia de enfermedad en las últimas dos semanas y uso de servicios de salud (8 184 personas quienes solicitaron atención a un profesional de la salud).

El nivel socioeconómico es una medida resumen presentada en quintiles (de menor a mayor), la cual fue generada a partir del índice de componentes principales. En este índice se consideran las condiciones de las viviendas (tipo de pared, techo, piso, número de habitaciones y disponibilidad de agua) y las posesiones del hogar (auto, tv, tv de paga, radio, refrigerador, estufa, lavadora, computadora, horno de microondas y teléfono).

Se analizó la información de 9 562 PI y 141 398 PNI con muestras ponderadas de 7 002 052 y 113 963 830, respectivamente, con las cuales se obtuvieron frecuencias absolutas, relativas e intervalos de confianza al 95% (IC95%) para cuantificar el nivel de la incertidumbre de los estimadores. Asumiendo que los datos provienen de muestras aleatorias representativas de la población, se realizaron pruebas de diferencia ji cuadradas y *t de student* en las proporciones y medias aritméticas obtenidas entre ambas poblaciones (PI y PNI). Se consideraron los ponderadores muestrales para cada grupo de población y se verificó que se cumpliera con la normalidad de la distribución de cada variable. En los casos en que las

variables no tuvieron una distribución normal se realizó una transformación a la función de logaritmo natural para su normalización y realización de pruebas de diferencia. Para el análisis estadístico se utilizó el programa Stata versión 14.*

* StataCorp. Stata Stadistical Software 14. College Station, TX: StataCorp LP, 2015.

Resultados

Características sociodemográficas

La población estudiada está conformada por 158 044 personas residentes de 44 612 hogares encuestados en los 32 estados de México. La muestra se compone de 48% hombres y 52% mujeres, la proporción de población que declaró ser hablante de lengua indígena (PI) es de 6%, sin diferencias por sexo. Las entidades que concentran una

Cuadro I
Características sociodemográficas por tipo de población (indígena y no indígena). México, Ensanut 2018-19

Variable	*Categorías*	*Indígena (n= 9 562) (N= 7 002 052)*				*No indígena (n=141 398) (N= 113 963 830)*			
		n (muestra)	*n (expandida)*	*%*	*IC95%**	*n (muestra)*	*n (expandida)*	*%*	*IC95%**
Hogar	Urbano	1 416	1 085 670	48.5	(43.0-53.9)	29 950	25 843 827	80.3	(79.7-80.8)
	Rural	1 642	1 154 415	51.5	(46.1-57.0)	10 062	6 351 491	19.7	(19.2-20.3)
Sexo	Hombre	4 612	3 343 258	47.7	(46.8-48.7)	68 334	54 817 382	48.1	(47.8-48.4)
	Mujer	4 950	3 658 794	52.3	(51.3-53.2)	73 064	59 146 448	51.9	(51.6-52.2)
Escolaridad	Sin instrucción	1 545	1 162 542	16.6	(15.4-17.9)	9 300	7 012 126	6.2	(6.0-6.4)
	Prescolar	320	255 246	3.6	(3.1-4.3)	6 511	5 103 712	4.5	(4.3-4.6)
	Primaria	4 220	3 116 529	44.5	(42.7-46.3)	42 098	33 113 478	29.1	(28.7-29.4)
	Secundaria	2 250	1 573 311	22.5	(21.2-23.8)	39 326	31 386 748	27.5	(27.2-27.9)
	Bachiller	856	618 964	8.8	(7.9-9.8)	24 866	20 565 104	18.0	(17.7-18.4)
	Licenciatura	358	266 521	3.8	(3.2-4.6)	17 808	15 444 500	13.6	(13.2-13.9)
	Posgrado	13	8 939	0.1	(0.1-0.3)	1 489	1 338 162	1.2	(1.1-1.3)
Edad en años	0-9	862	658 016	9.4	(8.2-10.8)	18 743	14 654 798	12.9	(12.6-13.1)
	10-19	1 439	1 106 827	15.8	(14.5-17.2)	27 471	21 778 636	19.1	(18.8-19.4)
	20-24	659	478 295	6.8	(6.2-7.5)	12 008	9 840 010	8.6	(8.4-8.9)
	25-44	3 058	2 248 280	32.1	(30.9-33.4)	42 801	34 696 156	30.4	(30.2-30.7)
	45-59	1 689	1 222 477	17.5	(16.3-18.7)	22 160	18 257 852	16.0	(15.7-16.3)
	60 o más	1 855	1 288 157	18.4	(16.8-20.1)	18 215	14 736 378	12.9	(12.6-13.3)
Nivel socioeconómico (quintiles, el nivel 1 corresponde al más bajo)	1	5 530	4 222 514	60.3	(56.4-64.1)	23 720	17 776 947	15.6	(15.0-16.3)
	2	2 115	1 472 396	21.0	(18.5-23.8)	27 635	21 315 226	18.7	(18.1-19.3)
	3	1 088	754 979	10.8	(9.3-12.5)	29 281	22 804 230	20.0	(19.4-20.7)
	4	590	373 269	5.3	(4.4-6.4)	29 719	23 593 290	20.7	(20.1-21.4)
	5	239	178 894	2.6	(2.0-3.3)	31 043	28 474 137	25.0	(24.3-25.7)
Afiliación a servicios médicos‡	IMSS	91	63 267	20.7	(15.9-26.4)	3 377	3 263 238	44.5	(42.7-46.3)
	ISSSTE	25	16 482	5.4	(3.4-8.5)	746	669 129	9.1	(8.1-10.2)
	SPS	253	183 842	60.1	(52.9-66.9)	2 863	2 383 492	32.5	(31.0-34.1)
	Ninguna	30	37 204	12.2	(7.7-18.7)	755	909 024	12.4	(11.1-13.8)

* IC95%: se compara la población indígena y no indígena
‡ IMSS: Instituto Mexicano del Seguro Social; ISSSTE: Instituto de Seguridad y de Servicios Sociales para los Trabajadores del Estado; SPS: Seguro Popular de Salud
Ensanut: Encuesta Nacional de Salud y Nutrición; IC95%: intervalo de confianza al 95%
Fuente: Elaboración propia con base en datos de la Ensanut 2018-19[12]

mayor proporción de PI son Oaxaca, Yucatán y Chiapas con 16, 14 y 11%, respectivamente.

La mayoría de las PI se encuentra en el quintil socioeconómico más bajo (60 vs. 16% de las PNI, $p<0.01$). Poco más de la mitad (52%) de las PI tiene residencia rural, mientras que 80% de las PNI vive en el contexto urbano. Más PI carecen de instrucción escolar que las PNI (17 vs. 6%, $p<0.001$) y la diferencia en el acceso a estudios superiores es 20 puntos porcentuales mayor entre las PNI respecto de las PI (33 vs. 13%, $p<0.001$) (cuadro I). El 70% de las PI vs. 79% de las PNI pueden leer o escribir un mensaje, mientras que para el subgrupo de jefes de hogar las proporciones fueron de 58 y 80%, respectivamente ($p<0.001$).

Condiciones de salud en adultos

El cuestionario de salud para población adulta se aplicó a 43 070 personas, 3 058 (7%) fueron PI y 40 012 (93%) PNI. Las PI reportaron, en menor proporción, consumo de tabaco y alcohol, así como diagnóstico previo de obesidad, en comparación con las PNI. Al explorar la atención que recibieron las personas para su seguimiento de control de diabetes mellitus, se encontró que a las PI se les realizó en menor proporción análisis clínicos de orina (29 vs. 41%) y hemoglobina glucosilada (11 vs. 21%) en comparación con las PNI ($p<0.01$). No hubo diferencias en la prescripción de estudios de glucosa sanguínea, medición de peso, revisión de pies y ojos, asesoría nutrimental o estudios de laboratorio. Sí hubo diferencias en el reporte de medición de presión arterial, siendo mayor en las PNI (90 vs. 94%, $p=0.03$).

La población de mujeres en edad reproductiva (20-49 años) estuvo conformada por 14 936 mujeres; las mujeres indígenas reportaron en mayor proporción haber estado embarazadas (87 vs. 77%, $p<0.001$) y en promedio un mayor número de embarazos (3.4 vs. 2.7, $p<0.001$). La atención prenatal se lleva a cabo principalmente por personal médico, aunque con una diferencia de 14 puntos porcentuales menos entre las mujeres indígenas ($p<0.001$). En la atención del parto también predomina el personal médico, aunque la diferencia entre las mujeres indígenas es de 17 puntos porcentuales menos respecto a las no indígenas ($p<0.001$). En cambio, la atención del parto con parteras es 16 puntos porcentuales mayor entre las mujeres indígenas que las no indígenas ($p<0.001$). El lugar de atención del parto es principalmente las instituciones de salud para población sin seguridad social (68% para PI y 48% para PNI, $p<0.001$), aunque la atención del parto en casa es 16 puntos porcentuales mayor entre las PI ($p<0.001$). El parto vaginal es más frecuente en las mujeres indígenas con una diferencia de 15 puntos porcentuales ($p<0.001$), y la cesárea programada es 10 puntos porcentuales mayor en las mujeres no indígenas ($p<0.001$) (cuadro II).

Condiciones de salud en adolescentes

La población de adolescentes (10-19 años) encuestada fue de 17 925 personas, de las cuales 50% fueron mujeres, y el porcentaje de PI en esta población fue de 4%. Se reportó un alto consumo de alcohol entre adolescentes, sin diferencias significativas entre indígenas y no indígenas. Las ideaciones suicidas fueron más frecuentes entre las PNI ($p=0.003$). La cobertura de inmunizaciones para tétanos (47 vs. 59%, $p<0.001$) y VPH (29 vs. 37% $p<0.05$) es menor entre las PI.

El reporte de antecedente de embarazo fue mayor en las adolescentes indígenas (68 vs. 44%, $p<0.05$) y, aunque la atención del parto fue principalmente realizada por personal médico en ambas poblaciones, la diferencia al comparar entre grupos fue de 19 puntos porcentuales menor entre las indígenas ($p<0.001$).

Asimismo, en las revisiones de control de embarazo de las mujeres de ambos grupos se encontró que a las PI se les realizó en menor proporción medición de presión arterial y se les indicó con menor frecuencia examen general de orina (87 vs. 96%, $p=002$), análisis de sangre (90 vs. 95%, $p=0.00$), prueba de VIH (41 vs. 72%, $p=0.001$) y prescripción de ácido fólico (89 vs. 97%, $p=0.040$). No se encontraron diferencias en los reportes de medición de peso y talla, ni en las prescripciones de detección de sífilis o indicación de vitaminas y minerales. Las adolescentes indígenas recibieron menos anticoncepción posparto que las no indígenas (52 vs. 70%, $p<0.005$) (cuadro III).

Condiciones de salud en niños

La población infantil está compuesta por un total de 21 495 personas, de las cuales se pudo clasificar como hablantes o no de lengua indígena a 15 763; de esta población, 4% reportó ser hablante de lengua indígena. La población infantil indígena cuenta, en menor proporción, con cartilla de inmunizaciones en comparación con la población infantil no indígena (49 vs. 59%, $p=0.005$). Asimismo, los infantes indígenas tuvieron una menor cobertura de inmunizaciones, con una diferencia de 32 y 30 puntos porcentuales para la vacunación de BCG y de hepatitis B, en comparación con los no indígenas ($p<0.001$). No se encontró diferencia en la administración de vitamina A ni en el reporte de enfermedades diarreicas o respiratorias (cuadro IV).

Cuadro II
Factores de riesgo y condiciones de salud en adultos mayores de 20 años, por tipo de población (indígena y no indígena). México, Ensanut 2018-19

Factores de riesgo	*Categorías*	*Indígena (n=3 058)*		*No indígena (n=40 012)*		*p*
Variable		%	*IC95%**	%	*IC95%**	
Obesidad	Sí	11.2	(9.7-13.0)	23.7	(23.0-24.4)	0.0000
Diabetes	Sí	11.3	(9.7-13.1)	10.3	(9.8-10.7)	0.3659
Hipertensión	Sí	17.1	(14.9-19.6)	18.5	(17.9-19.1)	0.2751
Tabaco	Sí	8.9	(7.5-10.5)	18.5	(17.9-19.1)	0.0000
Alcohol	Sí	28.9	(26.4-31.5)	37.1	(36.4-37.8)	0.0000
Atención a personas con DM2 (análisis clínicos)	Orina	29.3	(22.6-36.9)	40.5	(38.3-42.8)	0.0062
	Sangre	35.3	(28.1-43.2)	41.0	(38.8-43.2)	0.1653
	Hb glucosilada	11.3	(7.4-16.9)	20.5	(18.7-22.3)	0.0038
Medicina preventiva Vacunación Adulto mayor	Pneumococo	27.4	(22.1-33.4)	24.2	(22.7-25.8)	0.0224
	Influenza	38.7	(32.6-45.1)	40.3	(38.5-42.1)	0.0134
Antecedentes obstétricos, mujeres en edad reproductiva		*Indígena (n=948)*		*No indígena (n=13 275)*		*p*
		%	*IC95%**	%	*IC95%**	
Ha estado embarazada	Sí	86.6	(83.5-89.2)	77.2	(76.0-78.4)	0.0000
Personal que le proporciona atención prenatal	Médico	82.5	(76.4-87.3)	96.4	(95.5-97.1)	0.0000
	Otro personal de salud	10.2	(6.7-15.4)	2.8	(2.2-3.6)	
	Partera	7.3	(4.1-12.7)	0.8	(0.5-1.2)	
Personal que le atendió último parto	Médico	79	(72.7-84.2)	96.2	(95.2-97.0)	0.0000
	Partera	7.8	(12.7-24.4)	2.2	(1.5-3.0)	
Lugar donde se atendió su último parto	Instituciones de seguridad social	10.5	(7.2-15.1)	27.4	(25.6-29.3)	0.0000
	Instituciones que brindan atención a la población sin seguridad social‡	67.6	(60.8-73.7)	48	(45.9-50.2)	
	Privado	3.3	(1.8-6.1)	21.6	(19.8-23.6)	
	Domicilio	18.6	(13.5-25.0)	2.9	(2.2-3.7)	
Vía de nacimiento de su último hijo	Vaginal	67.8	(63.4-71.9)	52.7	(51.3-54.1)	0.0000
	Cesárea urgencia	19.3	(16.0-23.1)	24	(22.9-25.3)	
	Cesárea programada	12.9	(9.7-16.9)	23.3	(22.1-24.5)	
Recibió anticoncepción posparto		49.1	(44.6-53.5)	62.5	(61.0-63.9)	0.0000
Número promedio de embarazos		$\overline{\chi}$ (3.38)	(3.2-3.5)	$\overline{\chi}$ (2.66)	(2.6-2.7)	0.000

Adultos: incluye la información de la población de adultos (n=43 070) y de 14 223 mujeres en la sección de antecedentes obstétricos
* IC95%: se compara la población indígena y no indígena
‡ Secretaría de Salud federal, servicios estatales de salud, servicios del Seguro Popular e IMSS-*Prospera*
p<0.05
$\overline{\chi}$: media aritmética
Ensanut: Encuesta Nacional de Salud y Nutrición; IC95%: intervalo de confianza al 95%; DM2: diabetes mellitus tipo 2; IMSS: Instituto Mexicano del Seguro Social
Fuente: Elaboración propia con base en datos de la Ensanut 2018-19[12]

Cuadro III
FACTORES DE RIESGO Y CONDICIONES DE SALUD EN ADOLESCENTES DE 10 A 19 AÑOS POR TIPO DE POBLACIÓN (INDÍGENA Y NO INDÍGENA). MÉXICO, ENSANUT 2018-19

Variable	*Categorías*	*Indígena (n=775)*		*No indígena (n=17 150)*		*p*
		%	*IC95%**	%	*IC95%**	
Sexo	Hombre	51.3	(47.4-55.1)	50.6	(49.5-51.7)	0.7302
	Mujer	48.7	(44.9-52.6)	49.4	(48.3-50.5)	
Factores de riesgo	Tabaquismo	2.6	(1.6-4.2)	5.3	(4.7-5.8)	0.0050
	Alcohol	79.0	(68.2-86.8)	76.6	(74.7-78.5)	0.6447
	Accidentes	4.4	(2.8-6.8)	5.4	(4.9-5.9)	0.3549
	Violencia	2.8	(1.4-5.3)	4.0	(3.6-4.5)	0.2955
	Suicidio (ideación)	2.2	(1.4-3.6)	5.2	(4.8-5.7)	0.0032
	Uso condón última relación,VSA‡	40.7	(29.9-52.4)	65.9	(63.3-68.4)	0.0000
Inmunizaciones	Tétanos	46.6	(40.1-53.2)	58.9	(57.4-60.3)	0.0008
	Sarampión/Rubeola	38.7	(33.4-44.3)	41.7	(40.4-43.1)	0.3683
	Papiloma humano	28.6	(23.3-34.7)	37.4	(36.2-38.7)	0.0026
Antecedentes obstétricos de mujeres adolescentes que iniciaron vida sexual		*Indígena (n=61)*		*No indígena (n=1 410)*		*p*
		%	*IC95%**	%	*IC95%**	
Ha estado embarazada	Sí	67.6	(51.2-80.5)	44.2	(40.5-47.9)	0.0212
Embarazo actual	Sí	16.3	(4.9-42.3)	22.3	(18.0-27.3)	0.7001
Personal que le atendió último parto	Médico	76.4	(58.0-88.3)	95.8	(92.9-97.6)	0.0000
	Otro personal de salud	3.2	(0.4-20.1)	2.0	(1.0-4.0)	
	Partera	20.3	(9.5-38.3)	1.1	(0.4-2.9)	
Lugar donde se atendió su último parto	Instituciones de seguridad social	1.4	(0.2-9.6)	17.9	(13.2-23.8)	0.0000
	Instituciones que brindan atención a la población sin seguridad social§	78.3	(61.4-89.1)	65.2	(58.4-71.4)	
	Particular	-	-	14.9	(11.1-19.7)	
	Domicilio	20.3	(9.9-37.2)	2.1	(0.9-4.7)	
Vía de nacimiento de su último hijo	Vaginal	69.3	(42.9-87.1)	60.3	(53.0-67.1)	0.6945
	Cesárea urgencia	17.3	(6.7-37.9)	27.1	(21.6-33.4)	
	Cesárea programada	13.4	(2.2-51.9)	12.7	(9.2-17.3)	
Recibió anticoncepción posparto		51.9	(31.3-71.8)	70.1	(63.2-76.1)	0.0014

Adolescentes: incluye la información de la población adolescente de entre 10 y 19 años de edad (n= 17 925)
* IC95%: se compara la población indígena y no indígena
$p<0.05$
‡VSA: adolescentes que tienen vida sexual activa (n=3 409)
§ Secretaría de Salud federal, servicios estatales de salud, servicios del Seguro Popular e IMSS-*Prospera*
Ensanut: Encuesta Nacional de Salud y Nutrición; IC95%: intervalo de confianza al 95%; IMSS: Instituto Mexicano del Seguro Social
Fuente: Elaboración propia con base en datos de la Ensanut 2018-19[12]

Cuadro IV
Vacunación y condiciones de salud en niños de 0 a 9 años de edad, por tipo de población (indígena y no indígena). México, Ensanut 2018-19

Variable	Categorías	Indígena			No indígena			
		n	%	*IC95%**	*n*	%	*IC95%**	*p*
Edad (años)	0-3	82	12.9	(9.9-16.7)	2 189	14.3	(13.6-15.0)	0.6038
	4-6	256	40.7	(35.7-45.8)	6 302	41.6	(40.5-42.8)	
	7-9	301	46.4	(41.4-51.5)	6 633	44.1	(43.0-45.2)	
Medicina preventiva	Cuenta con CV	238	48.8	(41.8-55.8)	9 135	58.9	(57.6-60.2)	0.0050
	BCG	282	37.1	(30.0-44.7)	10 910	69	(67.7-70.3)	0.0000
	Hepatitis B	264	34.7	(27.9-42.1)	10 411	65.1	(63.7-66.5)	0.0000
	Vitamina A	395	64.2	(58.7-69.4)	8 311	61.0	(59.8-62.2)	0.2649
Enfermedad y accidentes Últimas dos semanas	Diarreica	11	8.8	(4.4-16.8)	293	6.8	(5.8-7.9)	0.7348
	Respiratoria	47	28.9	(21.3-37.8)	1 461	32	(30.0-34.1)	0.7620
	Accidentes	19	2.9	(1.6-5.0)	555	3.7	(3.3-4.2)	0.2619

* IC95%: se compara la población indígena y no indígena
$p<0.05$
Niños: incluye la información de la población infantil de entre 0-9 años de edad (n= 21 495)
Ensanut: Encuesta Nacional de Salud y Nutrición; IC95%: intervalo de confianza al 95%; CV: cartilla de vacunación; BCG: *Bacillus Calmette-Guerin*
Fuente: Elaboración propia con base en datos de la Ensanut 2018-19[12]

Uso de servicios de salud

La mayor parte de la población usuaria son mujeres (62%) sin presentarse diferencias significativas por tipo de población. La proporción de personas usuarias entre PNI es mayor en las edades tempranas de la vida; mientras que en PI las mayores proporciones de personas usuarias se concentran en edades adultas. No se encontró diferencia en el uso por tipo de población.

Las PI que acudieron a consulta médica recibieron menos explicaciones claras sobre su enfermedad (80 vs. 87%, $p<0.05$), manifestaron menor deseo de regresar a atenderse al mismo lugar (81 vs. 86%, $p<0.05$) y experimentaron un mayor tiempo de espera para recibir atención (30 vs. 25 minutos, $p<0.05$). Las PI acuden por atención médica principalmente a las instituciones para personas sin seguridad social y como segunda opción a los servicios médicos particulares (cuadro V). El 42% de los usuarios reportó haber realizado un pago al momento de recibir atención médica, sin diferencia entre poblaciones. Respecto al surtimiento de las recetas médicas, más de 91% de las personas refirió haber recibido todos los medicamentos indicados en la receta, sin encontrar diferencias por tipo de población.

Discusión

Estos resultados brindan un panorama general de las condiciones de salud y de uso de servicios entre las PI y las PNI, e identifican los principales retos para la equidad. Primero: las condiciones socioeconómicas ponen en desventaja a las PI. Segundo: las condiciones de salud de las PI se caracterizan por un perfil epidemiológico de doble carga de enfermedades. Tercero: sistemáticamente hay un menor uso de servicios de salud entre las PI. Esto configura una forma de discriminación sistémica.

Las circunstancias materiales en que una persona nace, crece, trabaja, se reproduce y envejece determinan su salud y la de las poblaciones.[13,14] El mayor porcentaje de PI en condiciones de pobreza y sin instrucción, confirma que esta población enfrenta mayores obstáculos para el acceso a la educación escolar. El analfabetismo fue tres veces mayor entre las PI y sólo un mínimo porcentaje tuvo acceso a la educación superior.[15-17] Esto determina una mayor posibilidad de que las PI se empleen en el sector de la economía sin seguridad social y continúen dependiendo de paquetes limitados de servicios de salud, pues las mayores coberturas continúan vinculadas al empleo asalariado.

Los problemas relacionados con la reproducción –mayor prevalencia de embarazos en las adolescentes y su menor cobertura de anticoncepción posevento obstétrico, la mayor paridad y menor atención del parto por personal calificado– fueron más frecuentes entre las PI y no se encontraron diferencias significativas en el reporte de enfermedades crónico-degenerativas. Esto podría vislumbrar la configuración de un panorama epidemiológico de doble carga de enfermedades[18] en el ámbito indígena, en donde, al tiempo que persisten problemas asociados con la reproducción, emergen las

Cuadro V
UTILIZACIÓN DE SERVICIOS DE SALUD POR TIPO DE POBLACIÓN (INDÍGENA Y NO INDÍGENA). MÉXICO, ENSANUT 2018-19

Variable		*Indígena (n=400)*			*No indígena (n=7 784)*			*p*
		%		*IC95%**	%		*IC95%**	
Sexo	Hombre	42.7		(36.9-48.8)	37.8		(36.3-39.3)	0.1091
	Mujer	57.3		(51.2-63.1)	62.2		(60.7-63.7)	
Edad (años)	0-9	4.2		(2.6-6.5)	11.0		(10.1-11.9)	0.0000
	10-19	5.9		(3.7-9.2)	11.4		(10.4-12.4)	
	20-24	1.7		(0.7-4.0)	5.6		(4.8-6.4)	
	25-44	30.4		(24.8-36.7)	25.2		(23.8-26.7)	
	45-59	21.3		(16.7-26.7)	21.0		(19.8-22.4)	
	60 o más	36.5		(30.6-43.0)	25.8		(24.3-27.4)	
Utilización de servicios de salud								
Solicitó servicios de salud en las últimas dos semanas		88.7		(82.9-92.8)	91.2		(90.3-92.1)	0.2695
Recibió atención médica		99.1		(96.3-99.8)	99		(98.6-99.3)	0.8969
Pagó por la atención que recibió		40.0		(33.4-47.0)	41.9		(40.1-43.7)	0.7321
Variable	*Categorías*	*n*	%	*IC95%**	*n*	%	*IC95%**	*p*
Lugar de atención	Hospital	69	18.7	(14.0-24.4)	2 090	28.9	(27.4-30.6)	0.0000
	Centro de salud	172	43.5	(36.2-51.1)	2 001	25.3	(23.8-26.8)	
	Consultorio farmacia	28	10.4	(6.6-16.0)	1 041	16.6	(15.2-18.1)	
	Consultorio privado	85	24.8	(19.6-30.8)	1 756	26.1	(24.6-27.7)	
Institución que le atendió	De seguridad social	71	18.4	(13.7-24.3)	2 474	34.8	(33.2-36.5)	0.0000
	Instituciones que brindan atención a la población sin seguridad social‡	172	43.6	(36.8-50.7)	1 687	20.6	(19.3-22.0)	
	Particular	118	36.8	(30.6-43.6)	2 768	42.2	(40.5-44.0)	
	Otro	2	1.1	(0.2-6.1)	135	2.3	(1.8-2.9)	
Características de la atención								
Le surtieron toda su receta		93.3		(89.6-95.7)	90.7		(89.6-91.7)	0.1557
La persona que le atendió le explicó claramente su enfermedad		80.4		(75.1-84.8)	86.7		(85.5-87.8)	0.0045
Regresaría a atenderse al mismo lugar si tuviera opción de elegir		80.8		(75.2-85.5)	86.1		(84.9-87.2)	0.0477
Tiempo de traslado al lugar de atención en minutos ($\bar{\chi}$)		20		(13.6-26.3)	20		(19.1-20.8)	1.0000
Tiempo de espera en el lugar de atención en minutos ($\bar{\chi}$)		30		(28.6-32.5)	25		(23.2-26.7)	0.0002

Usuarios: incluye la información de la población que enfermó y solicitó atención en las últimas dos semanas (n= 8 184)
* IC95%: se compara la población indígena y no indígena
‡ Secretaría de Salud federal, servicios estatales de salud, servicios del Seguro Popular e IMSS-*Prospera*
Ensanut: Encuesta Nacional de Salud y Nutrición; IC95%: intervalo de confianza al 95%; IMSS: Instituto Mexicano del Seguro Social
$\bar{\chi}$: media aritmética
$p<0.05$
Fuente: Elaboración propia con base en datos de la Ensanut 2018-19[12]

enfermedades crónico-degenerativas las cuales a principios del siglo XXI no figuraban entre las PI.[19]

Como otros estudios, este análisis evidencia diferencias constantes en indicadores de uso entre las PI.[20,21] Por ejemplo, la menor cobertura de inmunizaciones, la atención prenatal y del parto por personal médico y la práctica de análisis de orina y sanguíneos como seguimiento a las personas con diabetes –como indicador proxy de calidad de la atención. También se observó que la PI tuvo menor proporción de cartillas de vacunación; si bien la cartilla por sí sola no asegura la aplicación de las vacunas, es un derecho que debe garantizarse.

Algunos resultados, aunque no fueron significativos, apoyan la idea de que las PI reciben un trato diferente en los servicios: se les tomó menos la presión arterial, se les invitó menos a grupos de ayuda mutua o a que acudieran a revisión de la vista y al dentista. Otros estudios han documentado menor disponibilidad de recursos de salud en el ámbito indígena y rural.[22]

Los resultados de esta encuesta señalan un importante porcentaje de PI en zonas urbanas, por lo que estas evidencias no descartan la posible existencia de formas de discriminación sistémicas hacia ellas, que se reflejan en la menor satisfacción por los servicios; por ejemplo, recibir explicaciones poco claras sobre su enfermedad y menor deseo de regresar a atenderse al mismo lugar. Los estudios de los procesos de salud-enfermedad-atención entre las PI se han centrado en ámbitos rurales, pero futuros estudios deberán enfocar su atención al ámbito urbano, tanto desde perspectivas culturalistas como del análisis de la discriminación y el racismo.

La salud materna es un indicador de desarrollo que da cuenta de inequidades sociales y de género.[23] En este estudio los indicadores de salud reproductiva presentan las mayores diferencias entre las PI y las PNI: las mujeres indígenas tienen mayor fecundidad, menor atención médica prenatal y de menor calidad. Las adolescentes indígenas han estado embarazadas en mayor proporción y, paradójicamente, reciben menos anticoncepción posterior al evento obstétrico.

Por otro lado, las parteras tradicionales siguen participando en la atención del parto y gozan de aceptación por parte de las mujeres indígenas. La Organización Mundial de la Salud (OMS) promueve distintas opciones para la atención prenatal, entre ellas las parteras u otro personal capacitado.[24] Sin embargo, con los datos de la Ensanut no fue posible identificar si la atención fue otorgada por una partera profesional.

Las cesáreas programadas casi se duplican entre las mujeres no indígenas, lo que configura un problema de salud pública en esta población.[25] Esta situación no ha cambiado mucho en los últimos años[26] y es en este ámbito, en donde las políticas públicas deben garantizar los derechos reproductivos, ampliar el acceso a métodos anticonceptivos, a la atención del embarazo y parto, así como la prevención del embarazo en la adolescencia.

En materia de seguridad social, las PI siguen estando más desprotegidas que las PNI; ejemplo de ello es el hecho de que los partos mayoritariamente son atendidos en instituciones para población abierta. El menor acceso de las PI a la seguridad social es un reflejo de las condiciones estructurales de desigualdad que determinan menores oportunidades educativas y laborales en la economía formal con seguridad social.[6] Por otro lado, las PI viajan más tiempo para llegar al lugar donde reciben atención en salud y reportan mayores tiempos de espera. La falta de dinero para cubrir los costos que supone la atención (traslados o compra de medicamentos) es un factor adicional que se constituye en barreras de acceso para esta población.[27-29]

Este análisis sugiere los efectos de las estructuras de desigualdad en las condiciones de salud y uso de servicios entre las PI. Algunos datos parecen sugerir un trato diferencial para la PI en los servicios de salud y un menor acceso que no se explican por las diferencias culturales.

La Ensanut ha mostrado ser un instrumento que permite conocer de manera más comprensiva los determinantes y las condiciones de salud de las PI, así como el uso de servicios para identificar las brechas que persisten con la PNI. La principal limitación de este estudio es la fragmentación de la información en salud sobre PI y la reducción de la representatividad de esta población en algunos grupos etarios como la población infantil, condición que reduce el poder de la muestra para identificar diferencias entre poblaciones. Otra limitación inherente al diseño transversal del estudio es el sesgo de memoria, relevante sobre todo para las variables de utilización.

Finalmente, se considera que persiste la necesidad de incluir a la población afromexicana en los sistemas de información y las encuestas que se realizan en México.[30] Lo cual permitiría contar con información integrada sobre las condiciones de salud de estas poblaciones, a fin de poder dar seguimiento a las brechas y proponer decisiones sustentadas en evidencia para su reducción.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Anderson I, Robson B, Connolly M, Al-Yaman F, Bjertness E, King A, *et al.* Indigenous and tribal peoples' health (The Lancet–Lowitja Institute Global Collaboration): a population study. Lancet. 2016;388(10040):131-57. https://doi.org/10.1016/S0140-6736(16)00345-7

2. Consejo Nacional de Evaluación de la Política de Desarrollo Social. La pobreza en la población indígena de México, 2008-2018. México: Coneval, 2019 [citado mayo 6, 2020]. Disponible en: https://www.coneval.org.mx/Medicion/MP/Documents/Pobreza_Poblacion_indigena_2008-2018.pdf
3. Mokuau N. Culturally based solutions to preserve the health of Native Hawaiians. J Ethn Cult Divers Soc Work. 2011;20(2):98-113. https://doi.org/10.1080/15313204.2011.570119
4. Nureña CR. Incorporación del enfoque intercultural en el sistema de salud peruano: la atención del parto vertical. Rev Panam Salud Publica. 2009;26(4):368-76 [citado mayo 6, 2020]. Disponible en: https://scielosp.org/pdf/rpsp/v26n4/v26n4a13.pdf
5. Mignone J, Bartlett J, O'Neil J, Orchard T. Best practices in intercultural health: five case studies in Latin America. J Ethnobiol Ethnomed. 2007;3(31):1-11. https://doi.org/10.1186/1746-4269-3-31
6. Pelcastre-Villafuerte BE, Meneses-Navarro S, Rivera-Dommarco J. Programa Institucional Salud de los Pueblos Indígenas: agenda para la investigación, la docencia y la vinculación. Salud Publica Mex. 2020;62(2):228-30. https://doi.org/10.21149/10992
7. Cerón A, Ruano AL, Sánchez S, Chew AS, Díaz D, Hernández A, Flores W. Abuse and discrimination towards indigenous people in public health care facilities: experiences from rural Guatemala. Int J Equity Health. 2016;15(77):1-7. https://doi.org/10.1186/s12939-016-0367-z
8. Castro A, Savage V, Kaufman H. Assessing equitable care for indigenous and afrodescendant women in Latin America. Rev Panam Salud Publica. 2015;38(2):96-109 [citado mayo 6, 2020]. Disponible en: https://iris.paho.org/handle/10665.2/10044
9. Russell NK, Nazar K, del Pino S, Alonso-Gonzalez M, Díaz-Bermúdez XP, Ravasi G. HIV, syphilis, and viral hepatitis among Latin American indigenous peoples and Afro-descendants: a systematic review. Rev Panam Salud Publica. 2019;43:e17. https://doi.org/10.26633/RPSP.2019.17
10. Organización Panamericana de la Salud, Organización Mundial de la Salud. Salud de los pueblos indigenas. Washington: OPS/OMS, 1993 [citado mayo 6, 2020]. Disponible en: https://iris.paho.org/bitstream/handle/10665.2/1582/CD37.R5sp.pdf?sequence=2&isAllowed=y
11. Organización Panamericana de la Salud, Organización Mundial de la Salud. Política sobre etnicidad y salud. 29ª Conferencia Sanitaria Panamericana. Washington: OPS/OMS, 2017 [citado mayo 6, 2020]. Disponible en: https://iris.paho.org/bitstream/handle/10665.2/34425/CSP29.R3-s.pdf?sequence=2&isAllowed=y
12. Romero-Martínez M, Shamah-Levy T, Vielma-Orozco E, Heredia-Hernández O, Mojica-Cuevas J, Cuevas-Nasu L, Rivera-Dommarco J. Encuesta Nacional de Salud y Nutrición 2018-19:: metodología y perspectivas. Salud Publica Mex. 2019;61(6):917-23. https://doi.org/10.21149/11095
13. Marmot M, Friel S, Bell R, Houweling T, Taylor S, Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Lancet. 2008;372(9650):1661-9 https://doi.org/10.1016/S0140-6736(08)61690-6
14. Dunn JR. Housing and health inequalities: review and prospects for research. Hous Stud. 2000;15(3):341-66. https://doi.org/10.1080/02673030050009221
15. Rodríguez-Garcés CR, Padilla-Fuentes G, Suazo-Ruíz C. Etnia mapuche y vulnerabilidad: una mirada desde los indicadores de carencialidad socioeducativa. Encuentros. 2020;18(1):84-92. https://doi.org/10.15665/encuent.v18i01.2232
16. Padilla-Medina ME. Educación, evaluación y pueblos indígenas [internet]. México: Instituto Nacional para la Evaluación de la Educación, 2017 [citado mayo 6, 2020]. Disponible en: https://www.inee.edu.mx/educacion-evaluacion-y-pueblos-indigenas/
17. Schmelkes S. Educación y pueblos indígenas: problemas de medición. Rev Int Estad Geogr. 2013;4(1):5-13 [citado mayo 6, 2020]. Disponible en: http://poblacion-indigena.iniciativa2025alc.org/wp-content/uploads/2017/04/112RDE_08_Art1.pdf
18. Bygbjerg IC. Double burden of noncommunicable and infectious diseases in developing countries. Science. 2012;337(6101):1499-501. https://doi.org/10.1126/science.1223466
19. Torres JL, Villoro R, Ramírez T, Zurita B, Hernández P, Lozano R, Franco F. La salud de la población indígena en México. Caleidoscopio Salud. 2003;41-54 [citado mayo 6, 2020]. Disponible en: https://www.researchgate.net/profile/Beatriz_Zurita_Garza/publication/267856093_La_salud_de_la_poblacion_indigena_en_Mexico/links/546cffc60cf2a7492c55affa/La-salud-de-la-poblacion-indigena-en-Mexico.pdf
20. Leyva-Flores R, Infante-Xibille C, Gutiérrez JP, Quintino-Pérez F. Inequidad persistente en salud y acceso a los servicios para los pueblos indígenas de México, 2006-2012. Salud Publica Mex. 2013;55(supl 2):S123-8. https://doi.org/10.21149/spm.v55s2.5107
21. Flores-Hernández S, Mendoza-Alvarado LR, Vieyra-Romero WI, Moreno-Zegbe E, Bautista-Morales AC, Reyes-Morales H. La condición indígena en los servicios de salud: comparación de la calidad en la atención 2012-2018 para la población en pobreza. Salud Publica Mex. 2019;61(6):716-25. https://doi.org/10.21149/10562
22. Meneses-Navarro S, Pelcastre-Villafuerte B, Vega-Macedo M. Maternal mortality and the coverage, availability of resources, and access to women's health services in three indigenous regions of Mexico: Guerrero mountains, Tarahumara sierra, and Nayar. En: Schwartz D (editor). Maternal death and pregnancy-related morbidity among indigenous women of Mexico and Central America. United States: Springer, 2018: 169-88 [citado mayo 6, 2020]. Disponible en: https://link.springer.com/chapter/10.1007/978-3-319-71538-4_9
23. Langer A, Meleis A, Knaul FM, Atun R, Aran M, Arreola-Ornelas H, *et al.* Women and health: the key for sustainable development. Lancet. 2015;386(9999):1165-1210. https://doi.org/10.1016/S0140-6736(15)60497-4
24. Organización Mundial de la Salud. Recomendaciones de la OMS sobre atención prenatal para una experiencia positiva del embarazo. Ginebra: OMS, 2018 [citado mayo 6, 2020]. Disponible en: https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/es/
25. Bernal-García C, Escobedo-Campos NC. Cesárea: situación actual y factores asociados en México. Rev Salud Quintana Roo. 2018;11(40):28-33.
26. Instituto Nacional de las Mujeres. Fecundidad y preferencias reproductivas en las mujeres indígenas mexicanas. México: INMUJERES, 2006 [citado mayo 6, 2020]. Disponible en: http://cedoc.inmujeres.gob.mx/documentos_download/101103.pdf
27. Shepherd SM, Willis-Esqueda C, Paradies Y, Sivasubramaniam D, Sherwood J, Brockie T. Racial and cultural minority experiences and perceptions of health care provision in a mid-western region. Int J Equity Health. 2018;17(33):1-10. https://doi.org/10.1186/s12939-018-0744-x
28. Greenwood N, Habibi R, Smith R, Manthorpe J. Barriers to access and minority ethnic carers' satisfaction with social care services in the community: a systematic review of qualitative and quantitative literature. Health Soc Care Community. 2015;23(1):64-78. https://doi.org/10.1111/hsc.12116
29. Montenegro RA, Stephens C. Indigenous health in Latin America and the Caribbean. Lancet. 2006;367(9525):1859-69. https://doi.org/10.1016/S0140-6736(06)68808-9
30. Gregorius A. Los negros de México que han sido "borrados de la historia". México: British Broadcasting Corporation, 2016 [citado mayo 6, 2020]. Disponible en: https://www.bbc.com/mundo/noticias/2016/04/160410_cultura_mexico_comunidad_negra_discriminacion_wbm



Ethnicity & Health

ISSN: 1355-7858 (Print) 1465-3419 (Online) Journal homepage: http://www.tandfonline.com/loi/ceth20

Aging in rural, indigenous communities: an intercultural and participatory healthcare approach in Mexico

Blanca Estela Pelcastre-Villafuerte, Sergio Meneses-Navarro, María Guadalupe Ruelas-González, Hortensia Reyes-Morales, Alejandra Amaya-Castellanos & Arianna Taboada

To cite this article: Blanca Estela Pelcastre-Villafuerte, Sergio Meneses-Navarro, María Guadalupe Ruelas-González, Hortensia Reyes-Morales, Alejandra Amaya-Castellanos & Arianna Taboada (2016): Aging in rural, indigenous communities: an intercultural and participatory healthcare approach in Mexico, Ethnicity & Health, DOI: 10.1080/13557858.2016.1246417

To link to this article: http://dx.doi.org/10.1080/13557858.2016.1246417

Published online: 28 Oct 2016.

Submit your article to this journal

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
http://www.tandfonline.com/action/journalInformation?journalCode=ceth20

Download by: [Ins Nacional de Salud] **Date:** 28 October 2016, At: 08:07

ETHNICITY & HEALTH, 2016
http://dx.doi.org/10.1080/13557858.2016.1246417

Taylor & Francis
Taylor & Francis Group

Aging in rural, indigenous communities: an intercultural and participatory healthcare approach in Mexico

Blanca Estela Pelcastre-Villafuerte [a], Sergio Meneses-Navarro[b], María Guadalupe Ruelas-González[a], Hortensia Reyes-Morales[c], Alejandra Amaya-Castellanos[d] and Arianna Taboada[e]

[a]Centre for Health Systems Research, National Institute of Public Health, Cuernavaca, Mexico; [b]Centre for Research and Higher Studies in Social Anthropology, San Cristóbal de las Casas, Mexico; [c]Mexican Infant Hospital "Federico Gómez", Col. Doctores, Mexico; [d]Center for Nutrition and Health Research, National Institute of Public Health, Cuernavaca, Mexico; [e]Independent Consultant

ABSTRACT

From an ethno-gerontological perspective, new models are needed to fulfill the health needs of the indigenous older adult population in Mexico. In this paper we developed a comprehensive healthcare model, interculturally appropriate, designed to meet the needs of Mexican indigenous older adults. The model was constructed using a qualitative design with semi-structured interviews of older adults, health providers, and available health resources in three Mexican indigenous regions. An ethnographical review was carried out to contextually characterize these communities. At the same time, a comprehensive bibliographic revision was made to identify socio-demographic markers. Results pointed out that Mexican indigenous older adults are not covered by any type of social health insurance program. Their health problems tend in large part to be chronic in nature due to the lack of early diagnosis and treatment. There is a need for trained human resources in the field of gerontology encompassing the sociocultural context of the indigenous groups. The geographical location of these communities limits the permanent presence of healthcare givers and thus limits access to continuous care. Traditional healthcare givers, able to speak the native language, are a great asset allowing the invaluable possibility of direct verbal communication. Based upon the data gathered from indigenous older adults and service providers, in tandem with evidence from the literature, we identified key elements for successful intervention and designed an intervention model. We concluded that indigenous older adults are a more vulnerable group, given that aside from being elderly in a country where the health needs of these populations exceed the capacity of existing healthcare services, their ethnicity serves as an added barrier preventing their access to the limited available healthcare resources. To achieve uniformity in providing health care, today's health systems need to address intercultural and participative aspects of healthcare models.

ARTICLE HISTORY
Received 30 June 2014
Accepted 27 July 2016

KEYWORDS
Healthcare model; intercultural; older adults; indigenous

CONTACT Guadalupe Ruelas-González guadalupe.ruelas@insp.mx Instituto Nacional de Salud Pública, Centro de Investigación en Sistemas de Salud, Av. Universidad 655, Sta. Ma. Ahuacatitlán, CP 62100, Cuernavaca, Morelos, México

© 2016 Informa UK Limited, trading as Taylor & Francis Group

Introduction

In Mexico, indigenous communities are exposed to adverse social conditions with high levels of marginalization. In 2010, 73% of the indigenous population lived below the poverty line, 48.6% had less education than the national schooling average, and 50.6% had no access to basic utilities (e.g. water and electricity) in the home (CONEVAL 2011). The combination of historical discrimination and marginalization due to ethnicity, combined with limited access to formal public healthcare resources, has led to a serious inequity in health outcomes for this population. Key indicators provide inarguable evidence of this inequity: the mean life expectancy of indigenous people is 6 years less than that of their non-indigenous counterparts (United Nations 2009); the 2010 indigenous infant mortality rate was 228 per 10,000 live births, as compared to 140 per 10,000 in the non-indigenous Mexican population (SINAVE/DGE/SALUD 2012); and the national maternal mortality rate in 2011 was 50.7 per 100,000 live births while in states such as Guerrero, a state with a large indigenous population, the maternal mortality rate was 104 per 100,000 live births (SSA 2012).

As for healthcare coverage, 24.3% of the indigenous population does not have access to health services, as defined by the lack of affiliation with state-sponsored health insurance, such as the *Seguro Popular* (the national public health insurance program provided to families without social security),[1] or other public health insurance programs. Furthermore, only 12.9% of individuals who speak indigenous languages have access to healthcare coverage by a subsidiary of IMSS (Instituto Mexicano del Seguro Social), which provides health care to formally employed individuals and their families, in comparison with 33.7% among non-indigenous population (CESOP 2011). Recent studies conducted in the state of Chiapas describe the expanding gap of inequity between the indigenous and non-indigenous populations in their access to inpatient care being attributable to health policies being implemented without adherence to an intercultural health model (Meneses et al. 2014). Meneses and colleagues found that healthcare programs often ignored ethnicity as an important differentiating element when designing new strategies and actions, leading to discordance between supply and demand; the indigenous population was not seeking out public health services based on a perceived lack of cultural sensitivity and thus did not benefit from evidence-based prevention and intervention efforts. This has been identified in the Mexican health systems as a significant cultural barrier (DGPLADES 2006) influenced in part by the lack of common language and culturally bound beliefs about health and illness.

The aging process adds an additional layer of complexity to the health services context. Demographic data for the year 2010 revealed that 9.06% of the total population of Mexico was composed of older adults, whereas, of the country's total indigenous population, 13.8% were older adults (INEGI 2011), a demographic marker of the differential aging process. Although the higher rate of indigenous older adults may seem counter-intuitive, explanatory factors such as the migration of young indigenous out of their communities to larger cities and work opportunities and the persistent rate of infant mortality may play a role in shaping this demographic reality (Escárcega and Varese 2004). This population's vulnerability is increased by the lack of state-sponsored social and health benefits such as medical care, social and pension benefits as a result of working in non-formal occupations.

From this landscape of inequality based on ethnicity and age, we highlight the need to develop new healthcare models for indigenous older adults, taking their sociocultural characteristics and particular needs into careful consideration. Past research has recommended the development of a healthcare model designed specifically for the aging indigenous adults from an ethno-gerontological perspective. Such a model should stem from knowledge derived from specific contexts and designed to identify needs outlining specific actions. It is important to note that a more generalized conceptual model on aging may not be adequate in describing the aging process of this population, given that the Mexican indigenous population which we focus on in this article experiences heterogeneous aging phenomena. This is to say, the characteristics and patterns of aging across indigenous groups vary greatly depending on physiological and sociocultural factors, including gender, ability/disability, and employment (Reyes 2001, 2012).

The development of healthcare strategies for an aging population with specific traits and with equally specific socio-demographic and cultural characteristics must be developed from an intercultural perspective, that is, considering the relationship between different cultures in an effort to promote mutual understanding and cross-cultural communication (DGPLADES 2006). Strategies for developing intercultural health interventions have been well documented in several Latin American countries (Mignone et al. 2007). In Chile, for example, a family health model was developed using an intercultural approach in the community of Quellon in the Chiloé province. The model was based heavily on active community participation, and the primary strategy used was the training of community members as intercultural health facilitators who could help navigate the system. Similar models have been documented in Ecuador, where community participation and local health agents have been central to the process (Arteaga, San Sebastián, and Amores 2012). However, geography (the distance to health centers) and extreme climate conditions present important barriers to successful implementation (Vargas, Pérez, and Ayancán 2005).

In Colombia strategies for primary care in indigenous communities have been implemented using intercultural health agents who are trained in a biomedical model as auxilary nurses, but also have been identified by traditional health providers in the indigenous community as traditional authorities. All care provided by these agents, as well as equipment maintenance, medical supplies, and medication needed for the provision of care is located in houses built according to traditional construction and designated for this specific use by the community (Organización Gonawindúa Tayrona 2009). There are three other prominent models for intercultural health care in Colombia for indigenous communities on the Casanare indigenous, in the north of Cauca, and for the Wayuu population on the Colombian–Venezuelan border (Ministerio de la Protección Social 2008). While these models have been focused on primary care, but there are also examples of models developed around a specific health issue. In Chiapas, Mexico, there are two model programs providing services related to domestic violence in indigenous communities with a focus on intercultural and gender-based perspectives (ACASAC 2008).

These models are based on international standards for improving the health status of indigenous communities, and as such, consider culture and world-view as central to the design and activities of the model. Indigenous community members are not considered passive recipients of services, but rather as active agents in the development of the healthcare model. Such models therefore should include specific mechanisms to assure inclusion

and community participation (Canadian Coalition for Global Health Research 2008; Cunningham 2002). The exchange of knowledge between traditional and allopathic medicine is also a distinguishing element of these models. This type of facilitated dialogue has resulted in perceived reduced barriers to care and increased satisfaction by users, as well as a positive impact on continued involvement and community participation (Mignone et al. 2007); however, the combination of allopathic and traditional medicine in practice does not always result in genuine collaboration, as exemplified by a study in Mexico documented by Duarte et al. (2004).

Another challenge is related to the inclusion of traditional health promotors in the models. Evidence suggests that these individuals often have had to take a subordinate position to medical providers, again exemplifying that collaboration between traditional healers and allopathic providers is very challenging, and that overall the aspects of community participation leave much room for improvement. These elements of previous models, in combination with the literature concluding that further research is needed about strategies that potentially improve the quality of health care for indigenous populations (Beach et al. 2006), support a model for intercultural health in Mexico.

This paper shares results from a qualitative research study developed using the theoretical frameworks for intercultural health. The study was conducted to specifically explore the context for intercultural health interventions for older indigenous adults in three Mexican states: Chihuahua, Guerrero, and Quintana Roo. The study aimed to identify key factors for comprehensive, intercultural health services and subsequently propose a model of care, designed with input from diverse stakeholders including state healthcare institutions, traditional medicine providers in indigenous communities, and indigenous older adults from the three sites. While the paper does not address a novel topic, it does aim to tackle the challenges suggested by previous research about intercultural interventions by presenting a model that highlights ongoing participation without subordination. The specific inputs to the integrated model were:

(1) Major health needs of men and women indigenous older adults living in rural areas, as identified by key informants.
(2) Availability of public (state-provided) primary care and traditional healthcare providers[2] to elderly indigenous identified in the locations where the study was conducted.
(3) Alignment between the perceived needs and available resources and services.
(4) Specific contextual characteristics related to geography, including issue of access and transit/mobility, dispersion, and isolation.

Method

Design

We designed a qualitative study using semi-structured interviews and focus group discussions as the primary data collection methods. These strategies were complemented with ethnographic techniques leading to an in-depth description and characterization of the communities' structural context as related to healthcare delivery, as well as content analysis of key documents to identify of socio-demographic markers and existing models for indigenous populations.

Study communities

The three study sites were selected based on identified Mexican indigenous regions (CDI 2006a), the density of indigenous older adult populations (CDI 2006b), the number of indigenous municipalities, and those municipalities with the highest indigenous presence (CDI 2006a). The state of Chihuahua was selected to represent the northern region of the country where the Tarahumara population resides; the state of Guerrero was selected as the central region where the Nahua population resides; and Quintana Roo, as the southern region with the Maya population. We worked respectively with these major ethnic groups in each region. These three regions are recognized as being marginalized or highly marginalized according to the Mexican government agency on population (CONAPO 2005).

The specific municipalities where we worked were selected according to the following criteria: the level of marginality (selected from each state's 10 most marginalized municipalities) (CONAPO 2005); population living in rural localities with less than 5000 inhabitants; the density of indigenous population residing in a municipality, and geographic proximity among communities to facilitate data collection. Municipalities were selected as follows: in the state of Chihuahua, the municipalities of the Guachochi and Balleza; in the Guerrero Mountain region, the municipalities of Acatepec and Atlixtac; in the state of Quintana Roo the municipalities of Felipe Carrillo Puerto and Jose Maria Morelos. The profile of each municipality is further described in Table 1.

Health facilities are scarce or completely absent in these rural regions. Mexico's healthcare public system is organized according to levels of care (i.e. primary, secondary, and tertiary), both in the social security institutions serving individuals who work in the formal sector and their families mainly in urban areas, and in services offered by the Ministry of Health (MoH) to persons without social security living in urban and rural areas, financed through the country's public health insurance *Seguro Popular* (Frenk, Gómez-Dantés, and Knaul 2009). The IMSS-Prospera Program provides health care to people living in rural areas of extreme poverty, where access to MoH facilities is limited.

In the communities where the study was conducted, small health centers, staffed by limited health personnel (one or two general physicians and an auxiliary nurse or health technician), provide health care to populations from several communities frequently far from the facilities; sometimes people have to travel several hours to access the health center. Work conditions are also difficult for the health teams, who are isolated and with scarce infrastructure. Moreover, there are limited resources (medications, lab test availability, communication system, etc.) to respond the population health needs,

Table 1. Community profile.

Community	Municipality	State	Population	Geography/climate
Chun Yah	Felipe Carrillo Puerto	Quintana Roo	591	15 meters altitude, warm subtropical climate
Sabán	José María Morelos	Quintana Roo	2058	30 meters altitude, warm subtropical climate
Tecorichi	Balleza	Chihuahua	83	3200 meters altitude, mountainous alpine with chronic drought
Pichique	Guachochi	Chihuahua	150	2240 meters altitude, mountainous alpine with chronic drought
Xalpitzahuac	Alixtac	Guerrero	862	2340 meters altitude, temperate subtropical climate
San Marcos	Zitlala	Guerrero	302	2320 meters altitude, temperate subtropical climate

including for those patients with complex diseases who require timely referral for specialized care (SSA 2013).

Recruitment and sample

In 2009 a stakeholder engagement visit was made to the selected research sites, and the project was presented to the local authorities for their review and approval. The stakeholders in all three regions subsequently provided assistance in the supply of documents for review, maps, transportation, and recommending indigenous language interpreters. Indigenous citizens and indigenous organizations also participated at this stage, such as the Tarahumara State Coordinator in Chihuahua, the Public Health Jurisdiction in Quintana Roo, the Director of Culture and the representative of Indigenous Affairs in Guerrero, as well as delegates from the state offices of the National Commission for the Development of Indigenous Populations of all States.

Subsequently, information was gathered from the following communities: Chun Yah and Saban in Quintana Roo; Tecorichi and Pichique in Chihuahua; Xalpitzahuac and San Marcos in Guerrero. Three different types of key informants were identified and recruited in each region: (a) indigenous men and women 60 years of age and older; (b) allopathic health service providers affiliated with an institution of government health center; and (c) local healthcare resources providing traditional (indigenous) services.

In the Mayan region, older adults were contacted using a snowball technique. In the northern region of Chihuahua, initial contact was established with the highest traditional authority as determined by traditional customs. In Guerrero participants were invited to participate through loudspeaker broadcasts, a typical and culturally acceptable method of communication for this locale, where a central dispatch makes announcements that are played on speakers throughout the town. Contact with institution-based healthcare providers was established by reaching out to local public health services directly and traditional healthcare providers were contacted through local community-based networks. Table 2 demonstrates the general interview distribution.

The majority of older adults and traditional providers spoke only indigenous languages, and bilingual interpreter from each location was hired to provide linguistic interpretation and often served as a cultural bridge between researchers and participants. All interpreters were known by their respective communities and selected for not having family bonds or close relationship with any of the study participants. Nevertheless, they were asked to sign a statement of confidentiality.

Table 2. Total interviews by state.

State	QUINTANA ROO		CHIHUAHUA[a]		GUERRERO	
Community Informant	Chun Yah	Saban	Pichique	Tecorichi	Xalpitzahuac	San Marcos
Male Indigenous Older Adults	7	4	1	1	2 + 1 in FG[b]	4 in FG
Female Indigenous Older Adults	6	3	0	1	7 in FG	7 in FG
Allopathic providers	3	4	0	0	2	1
Traditional providers	3	6	1	0	0	0
TOTAL	19	17	2	2	12	14

[a]The geographical conditions (six-hour drive through complicated paths), the absence of the highest traditional authority (which would allow access to the community), the great dispersion of the population and local festivities blocked further contact with informants.
[b]FG = Focus group.

An additional strategy to strengthen and reinforce our intercultural approach was to interview seven key informants who were experienced researchers responsible for collaborating with social programs serving indigenous communities. These experts were identified through social and academic networks and were invited to help identify contributing elements for the healthcare model we developed.

Fieldwork and information-gathering techniques

We conducted extensive participant observation in each site using a standardized observation guide to identify and document the main contextual characteristics. This observation document included sections both for local healthcare resources (formal and informal) and public health services (health centers and related resources) that were available in the locality.

As a second methodological strategy we identified and analyzed the various official documents, vital and health statistics, diagnostic reports, databases, surveys, previous research projects, existing models of care, and official healthcare programs. This contributed to the characterization of the health needs of the study population and helped identify necessary elements for a model of care for this population. This information allowed us to pull the details of previous models in Mexico. For example, the Casas de Salud de las Mujeres Indígenas project evaluation, designed and conducted by members of the research team, served as a foundation for further developing the model; the existing literature provided foresight of the limitations that could be encountered. Both positive outcomes and recommendations from the sources were taken into account.

Our third methodological strategy was to develop and apply a semi-structured interview guide for indigenous older adults, aimed at identifying the main health needs as well as the characterization of resources and access to care that they experienced in their communities. Due to the large response from interested older adults in Guerrero we organized a focus group at that site using the same semi-structured questions from the interview guide.

Data analyses

We used the steps from Grounded Theory to analyze the data, emphasizing the process of categorizing and coding the information (Strauss and Corbin 1990, 2002). Study data, observational field notes, and findings from the content analyses were reviewed using memo-writing and discussion amongst the team to identify analytical categories related to the salient topics. All data were then compiled and coded using Atlas ti v.5.2®, with continued memo-writing. The categories were re-organized, and eventually sorted, as the key perspectives needed to develop the intercultural model reached theoretical saturation. To develop the proposed model, the following key perspectives were considered: those of the local health providers (institutional and folk), the participating indigenous adults (men and women), the general context (observation), the analyses of models from other countries, and evidence from the literature. In addition, findings about the most important health needs of this population were considered, as well as factors that facilitated and/or limited access to care.

Ethical considerations

The project was approved by the Ethics and Research Commissions of the National Institute of Public Health. Informed consent forms were provided to service providers and participating older adults. These included information regarding the study objectives, type of participation requested, confidentiality and privacy, as well as contact information. Consent forms were thoroughly reviewed with the participants with assistance from interpreters, and an oral consent was considered acceptable, given the oral tradition and high rates of illiteracy of the study communities.

Results

Table 3 shows socio-demographic markers from the municipalities obtained from official data. Atlixtac in the state of Guerrero and Balleza in Chihuahua had the lowest human development index of the six municipalities included in the study. Guachochi in Chihuahua had the lowest health index of the six municipalities. We present the qualitative results from all municipalities by three themes, (1) healthcare needs, (2) healthcare barriers, and (3) help-seeking attitudes and behaviors. We then discuss findings in relation to study site and ethnic group, in the following section.

Perceived healthcare needs

All participants, whether indigenous older adults, doctors, or traditional medicine healers, identified a set of common healthcare needs; however, the root cause of such ailments was described quite differently.

Table 3. Socio-demographic indicators of the studied municipalities.

State	CHIHUAHUA		GUERRERO		QUINTANA ROO	
Data[a]	Guachochi	Balleza	Atlixtac	Zitlala[b]	F. Carrillo Puerto	J.M. Morelos
Total population	48 602	18 585	23 371	19 718	65 373	32 746
% >15 years old illiterate population	31.11	32.45	48.12	41.94	18.98	16.98
% >15 years old population without basic education	54.87	58.55	66.54	60.28	34.25	36.83
% Occupants in houses without drainage	41.47	36.55	48.14	20.91	38.30	33.60
% Occupants in houses without electrical energy	57.61	38.70	17.07	3.22	6.52	6.80
% Occupants in houses without piped water	62.42	64.58	54.78	70.08	4.26	1.75
% Households with some level of overcrowding	59.76	50.68	75.88	73.27	70.78	70.84
% Occupants in houses with dirt floors	61.93	54.05	82.00	70.61	31.30	21.50
% Population in localities with less than 5000 inhabitants	73.01	100.0	100.0	71.62	67.07	68.17
% Employed people earning up to 2 minimum wages	43.79	46.11	90.20	89.50	68.09	74.03
Index of marginalization	1.92	1.634	2.59	1.87	0.37	0.311
Level of marginalization	Very high	Very high	Very high	Very high	High	High

Source: Estimates based on CONAPO the Second Census of Population and Housing 2005 and the National Survey of Occupation and Employment 2005 (fourth quarter).

[a]Indicator data for 2005.

[b]The study design proposed Acatepec as a municipality of Guerrero to conduct the research, however during the reconnaissance visit identified that the inhabitants were Tlapaneco speakers, so we proceeded to the identification of another nearby municipality that conform to the methodological criteria, choosing the municipality of Zitlala.

Female indigenous participants from the Maya region reported symptoms and illnesses that differed from those described in the epidemiological profile as typical for older adults in the country. Participants attributed their ailments (listed in Table 4) to 'the bad winds[3]', and 'the passing of time', referring to periods of heat and hurricanes.

> Two years ago, [since then] when hurricane Dean passed by, I've been sick, I stay in bed, I can't walk, [since] the time the hurricane passed through … (Female, 66 years old)

Male indigenous participants from the same region tended to consider themselves unhealthy due to illness for which they perceived there are no possible treatments. They reported feeling chronically weak and attributed their bad health outcomes to this state of weakness. Those reporting good health typically attributed symptoms like cough and fever to changes in the weather, as their female counterparts did.

Likewise, in the Tarahumara region, the symptoms reported were believed to be associated with the local environment, since the Sierra of Chihuahua is a wooded region with very cold temperatures, with constant winds and limited access to drinking water.

In the Nahua region, older adults reported that despite their ailments, they continued to carry out their domestic and work activities. Older adults also identified assistance from their children for their ailments as a major healthcare need, and expressed that many of their problems were untreatable by doctors.

> -Have you had this pain looked at? This issues that you have here, has a doctor already examined it?
>
> -No, it's just that the [doctors] over there say that nothing is going to make it better … (Male, 62 years old)

In the Nahua region, the gap between perceived healthcare needs and challenges between older indigenous adults and allopathic providers is quite evident in this region. The main health issues given vary greatly between the two groups, although both recognize important factors in providing greater access and higher quality services. The lay health worker (a woman from the community trained in basic health promotion and primary care) staffing the health center stated that older adults did not visit the health clinic frequently, except for vaccinations, coughs, and fever. According to the provider who visited the community once per month, the main diseases seen were: diabetes, hypertension, respiratory diseases, and stomach ailments such as gastroenteritis, skin problems, and mycosis.

The medical personnel interviewed in the Maya region indicated that falls due to the fragile state of the elderly and malnutrition were the most important health problems presented by the elderly patients. They also reported a wide variety of ailments that patients came to the health center with (see Table 4).

Help-seeking practices

Among Maya women, there was an expressed conflict between going to the doctor or seeing the herbalist, based on what the providers thought of each other. Doctors were known for scolding women for going to the herbalist, while the herbalist prohibits the medicines prescribed by the doctor, believing that the women should only take the herbs. Maya men acknowledge that the *menes* (herbalists who also pray and provide

Table 4. Identified healthcare needs and barriers to care.

	Older adults	Allopathic providers	Traditional providers
Healthcare needs	*Maya* Loss of vision, headaches, back and leg aches, gastrointestinal diseases, and gall bladder ailments *Tarahumara* Cough, fever, colds, headache and stomach ache. *Nahua* Headaches, shivers, cramps, high blood pressure, colds, coughs, fever, and arthritis. Falls were common, resulting in pain in the bones, particularly the feet	*Maya* Respiratory problems, diarrhea, parasitic infections, diabetes, hypertension, blindness as a complication of diabetes, leptospirosis caused by bacterial infections, asthma, joint pains such as lower back pain, rheumatoid arthritis, fatigue, intestinal motility disorders, gastritis, problems related to the deterioration of mental functions, malnutrition, obesity, falls. *Tarahumara* None reported *Nahua* Coughs, fever, diabetes, hypertension, respiratory diseases, and stomach ailments such as gastroenteritis, skin problems and mycosis	*Maya* Muscle pains, headaches, stomach aches, eye pains, headache due to bad winds, fever, snake bites, diabetes, kidney stones and 'cleanings' (spiritual ritual) *Tarahumara* Coughs and headaches *Nahua* None reported
Barriers to care	*Maya* Lack of bilingual & bicultural physicians at the health centers, shortage of medications, prolonged waiting room time, exposure to the hot sun while waiting, mistreatment by the health center's personnel, no night and weekend medical attention, cost of transportation to services. *Tarahumara* There is no health center in the area; a doctor comes every 15 days to deliver routine services but does not speak the Raramuri language. *Nahua* Limited permanent staff, no access to medication, cost of consultation, including transportation to nearby facility. Language is also a barrier; no providers speak Nahuatl.	*Maya* Language barriers, limited nursing personnel, inadequate supply of basic drugs, scarcity of more specialized medications (e.g. hypertension and glycemia). *Tarahumara* None reported *Nahua* Patient follow up difficult; most only came for vaccines. More staff training and additional qualified personnel are necessary, as is collaboration with traditional providers.	*Maya* Absence of communication with allopathic doctors; lack of respect for herbal remedies and cultural traditions. *Tarahumara* Belief that traditional providers should be using the health center to deliver services, since the space is under-utilized by allopathic doctors. *Nahua* None reported

spiritual healing) have greater power, compared to the allopathic doctors. In their words, 'they have direct power from heaven … ' and they cure different diseases:

> Well, sometimes I think of going [to the traditional healer], because once I had a headache and I started losing my vision (… .) I already [felt] more like seeing smoke [referring to the effect on his vision]. I think that [it's a] bad spirit that hit me on the head … (Male, 75 years old)

Home remedies

Participants mentioned the frequent use of teas and *mejorales* (an analgesic, anti-inflammatory and antipyretic agent whose formula corresponds to acetaminophen) to treat respiratory illnesses. Among the natural remedies mentioned was shark oil to treat asthma and to expel phlegm. However, older adults also reported using allopathic medicines for high blood pressure or pains, more often than using natural remedies. When participants perceived ailments to be more serious, they went directly to the health center.

In the Nahua region, home remedies were the most frequently mentioned care, participants openly expressed not trusting or adhering to allopathic medications when available because they did not feel they had an impact on their ailments. However, cost was also a factor. When ill, older adults in the Nahua region reported seeking help at the health center, with the traditional healer and with a private doctor, in that order, because of the accessibility, in terms of cost.

Traditional medicine

In the Tarahumara region, participants expressed choosing traditional medicine to alleviate their health problems. Older adults were knowledgeable about medicinal herbs and plants and collected them regularly to prepare remedies for their own ailments (e.g. *tesgüino*, a fermented corn drink was often mentioned as an effective remedy for diarrhea). Additionally, they reported visiting the traditional healer in cases of persistent health problems or when they cannot travel to the health center. In these cases where they did seek services at the health center, they typically continued the use of herbs along with medications prescribed by the allopathic doctor.

The traditional healer interviewed shared several reasons why he believed that older indigenous adults preferred his services over the allopathic health care: being familiar with the regional herbs that he collects and uses to treat, he does not have a set time for consultation and will see patient at any time, and the low cost (the cost for consultation is $50 pesos, around 2.58 USD). An excerpt from the interview with the researcher (R) and traditional provider (TP) illustrates this point.

R: What is your typical schedule for providing care or do you provide care at any time?
TP: In the mornings and any time
R: Do you charge for your services?
TP: yes I charge them, its $50 pesos for anything.
R: What services would you say would be better for the older adults, the elders, the cherames, what do you propose of what services do you think the older adults should have?
TP: For me it's important for there to be a health center where older adults, cherames, can go to get services.
R: Who should be providing these services?
TP: The owiruames?
R: In what language should services be given?

TP: Raramuri, the raramuri language (…)
R: Do you think it's possible for the medical doctors to works with the traditional healers, with the owiruames, is it possible for you to work together?
TP: I'd like it if we worked together. (Male, traditional provider, 60 years old)

The traditional provider interviewed had never worked with any institutional healthcare providers, but was responsive and open to collaboration. He acknowledged that people request his services when they do not have the means of transportation to go elsewhere, and that his curative abilities would help get indigenous older adults (cherames) into the clinic. However, he was also quite clear in stating that the traditional healers (owiruames) should be providing these services.

Perceived barriers to care

In terms of seeking care some participants identified the healthcare center and the allopathic medicine providers there as an option. Nevertheless the challenges to adequate service delivery and access to care, lack of communication related language and cultural barriers, along with distance and transportation was most salient.

Cultural factors

Study participants in the Maya region identified the biggest barrier to accessing care as the lack of bilingual physicians at the health centers. Participants reported that nurses were often expected to interpret, even if they were not a member of indigenous community and had no knowledge of the native language.

Medical personnel also acknowledged that the language barrier is the most significant obstacle in reaching diagnosis and to the older adult's adherence to prescribed treatments:

> The problem we now have with them [older adults] is precisely the language barrier, which often makes it difficult for patients to follow our recommendations and treatment, since they don't understand Spanish and we do not speak Mayan (…). They cannot fully express their need because it's not the same for a person to be telling you about his/her symptoms and ailment, than having an intermediary interpreting this information. (Doctor in social service practice, 25 years old)

In the Nahua region, a healthcare mobile unit visits the community once a month, and a medical doctor checks all older adults. Before the visit, they may consult the health assistant, who is a woman from the community who has been trained in primary healthcare. The language barrier with all other providers is a significant obstacle, since the visiting health providers did not speak the local language.

Socioeconomic and geographic factors

Patients also encountered numerous barriers related to transportation and wait time when trying to access allopathic services. In the Tarahumara region there is no regular access to allopathic providers or services. Since there is no health clinic in the community, participants reported their options as seeking the care of an herbalist, or walking, often several hours, to a health center in another community. However, in addition to geographic barriers there was a sense of fear of that impeded participants from seeking care at the health center:

> (…) [we] are fearful of going to the health center, in spite of the fact that the doctors do give good, good medicine (…). [We] are fearful because that's the way [we] are, [we] are used to it. In spite of the fact that there are doctors, good doctors, [we] know there is a doctor; this is what [we] are used to. (Male, traditional provider, 67 years old)

Health system factors

Other common problems included: shortage of medications, lack of supplies and infrastructure, prolonged waiting room time, exposure to the hot sun while waiting, mistreatment by the health center's personnel, and no night or weekend medical attention:

> … we don't have a room for labor & delivery. We provide prenatal care, but we can't attend the birth because we don't have the supplies, we don't have where to deliver. (Doctor, Chun Yah Health Center, Quintana Roo)

> [The health center] needs some doctors from Monday to Friday. I needs them to be available [for consultations] even on Saturday and Sunday, so that the health center is not left without a doctor. Sickness does not wait during week-ends. The nurse says -it's forbidden to get sick on Saturday or Sunday. (Male, 87 years old)

For these reasons, many participants reported seeking health care outside the community, or going to the herbalist, traditional healer, or a priest, because they speak their language and share their customs and culture. Moreover, besides curing physical ailments traditional providers are also willing to treat ailments based on the participants' cultural perspective (e.g. illnesses due to weather). Traditional healers also reported working at their place of residence with medicines made with herbs that are abundant in the surroundings and able to offer their services at any time and day of the week. However, these alternatives involve monetary expenditure for participants:

> In [nearby town] there is medication, there are doctors, there are veterinarians … but it's not the same because you spend more on the travel. It's like 30 pesos to come, its 30 pesos, and then if you want to each something well you have to bring like 100 pesos or more, so it's not easy. There are a lot of people who come on foot, they come from farther away, from the ranches, so if there was a pharmacy … or more doctors here then people would get more care … (Female 72 years old)

Moreover, there is scarcity of resources: the health center has no medications available, and there are no drug stores in the community. The provider who frequently visited the community to provide services stated that generally there were enough resources to care for the indigenous older adults, but more personnel and training courses were needed. In particular, an additional physician who would be present when the provider interviewed was absent. From the provider's point of view, collaboration with traditional health providers was another possible strategy. At this time, there was no collaboration between allopathic and traditional providers, with the exception of complicated labor and delivery cases brought by traditional birth attendants to the health centers.

Economic factors

Seeking care implies a significant expense due to transportation costs, although participants also reported the cost of the consultation itself as the main obstacle to care. To afford the cost of the visit, they often must sell their produce – corn or beans – that would otherwise feed their family.

When persons cannot receive care at the health center, sometimes they are referred to the municipal capital. The cost to travel is covered by the family; several participants reported having to sell their animals to cover these costs.

Discussion

These data show that the perception of health needs of the indigenous older adults varies greatly by participant profile. However, commonly identified barriers to care include language barriers and the lack of permanent health providers. In the life context and worldview of the indigenous participants, climate and context play a central role in their health. Thus, in the southeast Maya region, common ailments were those related to vision and hearing problems, while in the northern Tarahumara region, respiratory diseases prevailed. Food and cultural traditions (the role of the family, social networks, etc.) also hold an important role in healing, exemplified by the use of home remedies and faith in traditional healers.

A noteworthy aspect is the general perception of indigenous older about their ailments, as many believe these are inexorably related to their age. Some of these illnesses like diabetes or hypertension tend to progress silently, and individuals may be asymptomatic for undetermined periods of time, delaying timely intervention by health providers (be it an allopathic or traditional healer), eventually leading to chronic and long-term effects. This situation suggests the need for closer and comprehensive surveillance of these vulnerable populations, establishing timely diagnostic and therapeutic actions, and thus preventing health problems from becoming complicated and costly (Kim 2007).

Related to the perception of disease as being 'natural', indigenous older adults participating in the study experienced a number of health problems occurring with such frequency that they express no longer worrying about them being solved or healed, and thus, do not seek medical attention. This perspective is in direct contrast to the biomedical perspective of the allopathic system in which diagnosis, treatment, and cure are considered the standard of care and define a functional healthcare system. These norms drive the Mexican public healthcare system, including how budget is allocated, and how health centers are operated, staffed, and stocked. However, given the evidence this study provides about the older adults experience with health centers and the providers themselves report of the less than adequate provisions for delivering care, there is a clear gap both in material goods needed to provide basic care, as well as a disconnect between the population's expressed needs and the systems' supply of services.

This disconnect is a key component of our finding related to the order of viable options participants mentioned for seeking care for their health problems: (1) traditional healers; (2) the health centers; and (3) private doctors. The first is the most commonly used option due to the lower cost; the evidence we present from our study suggests this preference is also based on cultural affinity. The health center is also preferable for being less costly. Nevertheless, there is scarcity of health units serving the indigenous population in all three regions included in the study, reflective of other marginalized areas in Mexico. Communities with health units acknowledged the limited availability of permanent human resources; doctor and nurse services are not provided on a full-time basis. In addition, the current healthcare model does not incorporate intercultural adaptations, and health personnel rarely speak the local language.

The shortage of health professionals specialized in caring for older adults in indigenous communities reflects a generalized Mexican human resource problem. Moreover, problems in the organization of the services result in lengthy wait time, which was generally considered by consumers as one of the major obstacles to clinic services. These problems have direct public health repercussions, as well as resulting in a community perception of poor quality of services.

Finally, the third option is seeking care with private physicians, an option selected when participants are facing emergency situations that demand immediate care and after having exhausted the first two options. However, private services are a major drain on older adults' finances.

These findings highlight a fragmented approach to both seeking and providing care, which results in sub-par services and the need for collaborative healthcare planning among different healthcare providers, including with the traditional healers. We consider that these traditional healers are a potential health resource that have not been fully integrated or even sufficiently recognized in the current health service organization. Although there have been collaborative models (traditional and allopathic medicine) piloted at select hospitals, these pilot studies reveal certain organizational limitations (Duarte et al. 2004). Furthermore these efforts need to be strengthened to extend their potential benefits and can draw from the international models that promote collaborative practices (Cunningham 2002; Mignone et al. 2007; PAHO 2008; SSA 2007; Troncoso and Nigenda 2002).

The results of our study highlight the urgency of developing a healthcare model based on the intercultural perspective, including the acknowledgment of traditional knowledge and practices pertaining to health, but also incorporating organizational and systems improvements according to the population needs. International research and myriad authors have reflected on the evidence that, despite immense geographic and cultural diversity, poor health conditions among indigenous populations are overwhelmingly similar, and thus recommendations have been developed and proposed across indigenous groups. For example, the need for flexible clinic hours designed to provide services after typical working hours, providing clear explanations about what may be causing illnesses, discussing the effects of medications, and the importance of adhering to treatment are frequently mentioned (Gracey and King 2009).

Moreover, as our study findings suggest, enhanced communication between the health professionals and the indigenous population is key to improved health status. Our findings are supported by evidence from the literature that language is a crucial element to be considered, given its role in the therapeutic relationship. Our data furthermore suggest language as an especially important link with spirituality, a basic component of indigenous health and worldview. As such, the disappearance of indigenous languages all over the world threatens a fundamental part of the indigenous identity, and revitalization of indigenous languages has been seen as a favorable health promotion strategy (King, Smith, and Gracey 2009, 78). Health services designed for indigenous communities should also incorporate an intercultural communication and health promotion strategy. This strategy must be adjusted to the characteristics of the target population, assuring that the promoted health messages are truly understood.

Based upon the data gathered from indigenous older adults and service providers, in tandem with evidence from the literature, we identified key elements for successful intervention and designed an intervention model. It considers participatory approaches as its

foundational basis upon which all coordinating activities occur, and brings together strategies that have proven useful in models implemented in other countries. Given the history of piloting of models in Mexico without any longevity, the key importance of this model is that it contains elements that encourage its sustainability in addition to responding to the needs perceived by the population and prioritizing an intercultural perspective.

Intervention model

We identified six strategic areas for this intercultural model: (1) Sociocultural epidemiology; (2) Local healthcare resources; (3) Community participation; (4) Strategies for communication on health issues; (5) Inter-institutional communication/interaction; and (6) Sustainability.

(1) *Sociocultural epidemiology*. This strategic area's role is to identify the most common health needs as they are perceived by the indigenous elderly population, including those needs that may be perceived as culturally bound or outside the scope of biomedical care. The term sociocultural epidemiology was coined in the 1950s and is widely used in Latin America to describe the consideration of sociocultural factors in epidemiologic studies. Specifically it seeks to reconcile theories from medical anthropology with epidemiology in instances where using a strictly biomedical (causal) understanding of health and disease falls short of solving pertinent public health issues (Hersch-Martínez 2013). It incorporates a consensual methodology based on participation, dialogue, and knowledge exchange (Cunningham 2002), and it is geared towards the community's participatory role in defining their health priorities, including the participation of indigenous authorities, teachers, grassroots organizations, local authorities, traditional healers, allopathic doctors, and other actors recognized as community leaders.

(2) *Local healthcare resources*. The strategy of developing collaborative links between health personnel assigned to the communities and local healthcare resources has marked a valuable difference in intercultural models applied in other Latin American countries (Organización Gonawindúa Tayrona 2009; PAHO 2003). These links do not necessarily have to be between traditional healers and allopathic doctors; in fact, several studies have found that this particular kind of collaboration has important limitations (Duarte 2003; Nureña 2009). Moreover, our findings indicate that traditional healers are not eager to collaborate with allopathic providers. As such, this model does not propose integration of traditional medicine to health centers providing allopathic services, and leaves it up to the patient to decide whether they will seek care with the allopathic provider, the traditional provider, or both. However, indigenous health promoters are an important human resource for health. Previous models have suggested that these promotors be literate and bilingual, and we further emphasize that such promoters be bi-cultural in terms of healthcare knowledge, defined as being trained (or in training) in either medicine or nursing, understand the health system and biomedical perspective, be a member of the indigenous community, value their community's indigenous worldview of health and disease, and possess cultural capital. This dual knowledge permits such promoters to easily operate in traditional and allopathic settings, and serve as a bridge between the local population and biomedical health services. An example of a typical job description for this role is as follows: providing home visits for early and timely screening of health problems, counseling services for the family oriented to the care of older

adults; prescribing treatment and rehabilitation at the primary care level, and diligent reporting of medical emergencies to the health service providers, maintaining records of all these actions. Part of the work duties should also include actions to raise intercultural awareness among other healthcare providers in the community. Moreover, in addition to providing direct care and referral services, health promoters should also receive training on legal rights and standards, so they also have the capacity to engage in advocacy and strategic planning. This macro-level training provides the opportunity for their role to also have an impact on the health system, in addition to those served by the system.

(3) *Community participation*. Community involvement in action planning, as well as in health surveillance, administration of resources, and their own provision of services, is fundamental to this model. Specific to this model is the commitment for future implementation and evaluation to be based on participatory research principles, and have mechanisms for joint decision-making. The model itself only functions with active and permanent participation in the decision-making process, as well as strategies for implementing the jointly agreed upon actions (Ibacahe and Leighton 2005; PAHO 2003). This participatory focus will help to establish trust in collaborative work in these communities (PAHO/WHO 1997), and the specific mechanisms of participation must be decided alongside community members. From the community-based conceptual framework, we propose the construction of community in both senses, as agent and as resource, and not only as a setting where interventions are implemented (McLeroy et al. 2003; Merzel and D'Afflitti 2003; Whitehead 2002).

(4) *Strategies for communication on health issues*. The preparation of interculturally adequate audio-visual materials is basic to this model. These materials must be designed in their own language and developed with the community's input, symbolically significant and attractive. The dissemination of these materials must be guaranteed through local media, such as radio, loudspeakers, and any other appropriate means.

(5) *Inter-institutional communication/interaction*. Continuous feedback and follow-up mechanisms greatly strengthen this type of strategies involving community participation (Pelcastre-Villafuerte et al. 2014). In this model, communication channels must be established, linking the intercultural promoters with the national health system (for technical assistance), and with local organizations working with indigenous groups (for operational consultation). Creation of such collaborative networks among the health system, the local and civic service organizations (if present), is fundamental in effectively and efficiently improving the health conditions of indigenous older adults in Mexico.

(6) *Sustainability*. The permanent and committed action of the various participants is an important element guaranteeing the sustainability and replication of the model. Thus, active work in all the areas described previously must lead to a strengthening of this commitment (see Figure 1).

One of the limitations of this study is that the available health information about Mexican indigenous populations is extremely limited. We recognize the need and value of more quantitative data and statistical analysis, as well as qualitative studies and current ethnographies of the many different, and incredibly diverse indigenous groups in the country. This lack of information affected our prior knowledge of and encounters with the three indigenous groups profiled in this study, including establishing contact with participants and timing related data collection. The study protocol did not always align with the local communities' infrastructure and organization, and thus we had to invest time and study resources into adapting our approach.



Figure 1. Proposed model of care.

In conclusion, the results of this study allowed us to develop a comprehensive, data-driven model for providing health care to indigenous older adults living in marginalized and remote communities. However, the development of alternative models of health care for indigenous populations, led by the guiding principles of intercultural health, is only an initial step towards ensuring the right to health for all of Mexico's regions and ethnicities. It must be further tested to demonstrate its feasibility and acceptability.

Notes

1. For further information about Seguro Popular, consult 2009 publication by (Frenk, Gómez-Dantés, and Knaul 2009, 542–548).
2. By traditional health care providers we are referring to healers with ancient knowledge and non-formal training; some of them have an innate talent to heal others (Torres and Sawyer 2005). Generally they use herbs or plants in their therapeutic practice and natural remedies. There are several specialties such as Yerberos (herbalists), Parteras (midwives), Sobadores (massages), Espiritualistas (psychic mediums) and represent an important health resource in many indigenous communities (Montiel, Crowe, and Torres 2009).
3. In Mexican traditional medicine 'wind' is the most common etiology for many bodily harms. Medical anthropologists, among other types of researchers, have documented that the effect of 'bad winds' varies greatly, depending on the ethnic group and region studied. In some cases 'bad wind' is the illness itself, or in other cases the cause of illness. In some contexts 'bad winds' are framed within the indigenous ethno-medical framework of hot versus cold; cold illnesses, such as respiratory infections, are associated with the wind, while illnesses attributed to heat are not associated with the wind at all. Another contextual factor is that wind is believed to be both a tool and act alone; wind can be manipulated by those with powers, such as healers, or it can simply be the cause without interference (Durand et al. 1989).

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by Fondo Sectorial de Investigación en Salud y Seguridad Social SSA/IMSS/ISSSTE-CONACYT [grant number 087123].

ORCID

Blanca Estela Pelcastre-Villafuerte http://orcid.org/0000-0003-4755-1881

References

ACASAC (Asesoría, Capacitación y Asistencia en Salud, A. C.). 2008. "Modelo de atención intercultural." Accessed July 9, 2015. http://www.womenshelter.ca/presentations/internetCafe/Ortiz.pdf.

Arteaga, E. L., M. San Sebastián, and A. Amores. 2012. "Construcción participativa de indicadores de la implementación del modelo de salud intercultural del cantón Loreto, Ecuador." *Saúde em Debate* 36 (94): 402–413.

Beach, M. C., T. L. Gary, E. G. Price, K. Robinson, A. Gozu, A. Palacio, C. Smarth, et al. 2006. "Improving Health Care Quality for Racial/Ethnic Minorities: A Systematic Review of the Best Evidence Regarding Provider and Organization Interventions." *BMC Public Health* 6: 104. doi:10.1186/1471-2458-6-104.

Canadian Coalition for Global Health Research. 2008. "Structural Issues Affecting the World's Indigenous Peoples." Accessed May 11, 2015. http://www.ccghr.ca/wp-content/uploads/2013/04/StructuralIssues_GIHR_2008_en.pdf.

CDI (Comisión Nacional para el Desarrollo de los Pueblos Indígenas). 2006a. *Regiones indígenas de México*. Enrique Serrano Carreto, Coord. México: CDI-PNUD. Accessed April 24, 2008. http://www.cdi.gob.mx/index.php?option=com_content&task=view&id=245&Itemid=54.

CDI (Comisión Nacional para el Desarrollo de los Pueblos Indígenas). 2006b. *Diagnóstico sociodemográfico de los adultos mayores indígenas de México*. Susana Villasana y Laureano Reyes. México: CDI-PNUD. Accessed April 24, 2008. http://www.cdi.gob.mx/adultos_mayores/diagnostico_adultos_mayores_indigenas.pdf.

CESOP (Centro de Estudios Sociales y de Opinión Pública de la LXI Legislatura de la Cámara de Diputados). 2011. "Descripción sociodemográfica de la población hablante de lengua, autoadscrita como indígena y el resto de la población, a partir de los datos del Censo de Población y Vivienda 2010." Accessed March 20, 2014. http://www.google.com.mx/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CB0QFjAA&url=http%3A%2F%2Fwww3.diputados.gob.mx%2Fcamara%2Fcontent%2Fdownload%2F271337%2F837099%2Ffile%2FCarpeta16_Situacion_indigenas.pdf&ei=kvieVZPVI4GqgwTh87GICg&usg=AFQjCNHnwBuEb8EJATjhSVD4HLU5pyvRXQ&bvm=bv.96952980,d.eXY.

CONAPO (Consejo Nacional de Población). 2005. "Índices de marginación a nivel de localidad." Accessed June 5, 2008. http://www.conapo.gob.mx/.

CONEVAL (Consejo Nacional de Evaluación de la Política de Desarrollo Social). 2011. Accessed August 6, 2008. http://www.coneval.gob.mx/cmsconeval/rw/pages/salaprensa/comunicados/2011/index.en.do.

Cunningham, M. 2002. *Etnia, cultura y salud: La experiencia de la salud intercultural como una herramienta para la equidad en las Regiones Autónomas de Nicaragua*. Washington, DC: OPS/OMS.

DGPLADES (Dirección General de Planeación y Desarrollo en Salud). 2006. "Barreras culturales." Accessed June 3, 2008. http://dgplades.salud.gob.mx/2006/htdocs/Enfoque%20intercultural.pdf. http://dgplades.salud.gob.mx/2006/htdocs/dmtdi/barreras_culturales.pdf.

Duarte, M. B. 2003. "Medicina occidental y otras alternativas: ¿es posible su complementariedad? Reflexiones conceptuales." *Cadernos de Saúde Pública, Rio de Janeiro* 19 (2): 635–643.

Duarte, M. B., V. Brachet, R. Campos, and G. Nigenda. 2004. "Políticas nacionales de salud y decisiones locales en México: el caso del Hospital Mixto de Cuetzalan, Puebla." *Salud Pública de México* 46 (5): 388–398.

Durand, J. A., E. Aguirre, R. Herrero, I. Rodríguez, and X. Lozoya. 1989. "El "Mail Aire" en el Universo de la Medicina Tradicional Mexicana." *Nematihuani* 4: 41–52.

Escárcega, S., and S. Varese, eds. 2004. *La ruta mixteca. El impacto entnopolítico de la migración transnacional en los pueblos indígenas de México*. México, DF: Universidad Nacional Autónoma de México.

Frenk, J., O. Gómez-Dantés, and F. M. Knaul. 2009. "The Democratization of Health in Mexico: Financial Innovations for Universal Coverage." *Bulletin of the World Health Organization* 87: 542–548.

Gracey, M., and M. King. 2009. "Indigenous Health Part 1: Determinants and Disease Patterns." *The Lancet* 374: 65–75.

Hersch-Martínez, P. 2013. "Epidemiología sociocultural: una perspectiva necesaria." *Sal Pub Mex* 55 (5): 512–518.

Ibacahe, J., and A. Leighton. 2005. *Salud colectiva: un modelo de atención de salud contextualizado*. Chile: Departamento Provincial de Salud de Chile.

INEGI (Instituto Nacional de Estadística y Geografía). 2011. "Principales resultados del Censo de Población y Vivienda 2010." Accessed April 24, 2014. http://www3.inegi.org.mx/sistemas/biblioteca/ficha.aspx?upc=702825002093.

Kim, S. 2007. "Burden of Hospitalizations Primarily due to Uncontrolled Diabetes." *Diabetes Care* 30 (5): 1281–1282.

King, M., A. Smith, and M. Gracey. 2009. "Indigenous Health Part 2: The Underlying Causes of the Health Gap." *The Lancet* 374: 76–85.

McLeroy, K. R., B. L. Norton, M. C. Kegler, J. N. Burdine, and C. V. Sumaya. 2003. "Community-based Interventions." *American Journal of Public Health* 93 (4): 529–533.

Meneses, S., M. A. González Block, D. Quezada, and G. Freyermuth. 2014. "Evolución de la equidad en el acceso a servicios hospitalarios según composición indígena municipal en Chiapas, México: 2001 a 2009. En Jaime Page (coord.)." Enfermedades del rezago y emergentes desde las ciencias sociales y la salud pública. México, DF: Universidad Nacional Autónoma de México/Instituto de Investigaciones Antropológicas, 17–35.

Merzel, C., and J. D'Afflitti. 2003. "Reconsidering Community-based Health Promotion: Promise, Performance, and Potential." *American Journal of Public Health* 93 (4): 557–574.

Mignone, J., J. Bartlett, J. O'Neil, and T. Orchard. 2007. "Best Practices in Intercultural Health: Five Case Studies in Latin America." *Journal of Ethnobiology and Ethnomedicine* 3: 31. doi:10.1186/1746-4269-3-31.

Ministerio de la Protección Social. "Acciones adelantadas con grupos étnicos. República de Colombia, 2008." Accessed May 19, 2015. http://www.sela.org/DB/ricsela/EDOCS/SRed/2008/09/T023600003017-0-Acciones_adelantadas_con_grupos_%E9tnicos.pdf.

Montiel, M. T., T. K. Crowe, and E. Torres. 2009. "A Review of curanderismo and Healing Practices among Mexicans and Mexican Americans." *Occupational Therapy International* 16 (1): 82–88.

Nureña, C. R. 2009. "Incorporación del enfoque intercultural en el sistema de salud peruano: la atención del parto vertical." *Revista Panamericana de Salud Pública* 26 (4): 368–376.

Organización Gonawindúa Tayrona. 2009. *Ley de Se Seyn Zare Shenbuta. Salud indígena en la Sierra Nevada de Santa Marta*. Bogotá, Colombia: Sirga.

PAHO/WHO (Panamerican Health Organization/World Health Organization). 1997. *Hacia el abordaje integral de la salud. Pautas para la investigación con pueblos indígenas*. Washington, DC: PAHO, 4–38.

PAHO (Panamerican Health Organization). 2003. *Encuentro Internacional de Salud y Pueblos Indígenas: Logros y Desafíos en la Región de las Américas*. Washington, DC: PAHO, 4–7.

PAHO (Panamerican Health Organization). 2008. *Una visión de salud intercultural para los pueblos indígenas de las Américas*. Washington, DC: PAHO, 60.

Pelcastre-Villafuerte, B., M. Ruiz, S. Meneses, C. Amaya, M. Márquez, A. Taboada, and K. Careaga. 2014. "Community-based Health Care for Indigenous Women in Mexico: A Qualitative Evaluation." *International Journal for Equity in Health* 13: 2. doi:10.1186/1475-9276-13-2.

Reyes, L. 2001. "Población indígena mayor. El envejecimiento de la población zoque de Chiapas." *Demos* 14: 29–30.

Reyes, L. 2012. "Etnogerontología social: la Vejez en Contextos Indígenas." *Revista del Centro de Investigación. Universidad La Salle* 10 (38): 69–83.

SINAVE/DGE/SALUD. 2012. *Perfil Epidemiológico de los Grupos Vulnerables en México*. México, DF: SSA.

SSA (Secretaría de Salud). 2007. Subsecretaría de Innovación y Calidad. Programa de Acción Específico 2007–2012. "Medicina Tradicional y Sistemas Complementarios de Atención a la Salud." México, D.F.: Secretaría de Salud. Accessed June 26, 2014. http://www.dgplades.salud.gob.mx/interior/biblioteca.html.

SSA (Secretaría de Salud). 2012. *Rendición de Cuentas en Salud 2011*. México, DF: Secretaría de Salud.

SSA. 2013. "Observatorio de los Servicios de Atención Primaria 2012." Dirección General de Evaluación del Desempeño. Secretaría de Salud. México. Accessed June 26, 2014. www.dged.salud.gob.mx/contenidos/dess/descargas/ … /OSAP_2012.pdf.

Strauss, A., and J. Corbin. 1990. *Basic of Qualitative Research: Grounded Theory Procedures and Technics*. Thousand Oaks, CA: Sage, 272.

Strauss, A., and J. Corbin. 2002. *Codificación selectiva. En Bases de la investigación cualitativa. Técnicas y procedimientos para desarrollar la teoría fundamentada*. Medellín: Universidad de Antioquia, 157–177.

Torres, E., and T. Sawyer. 2005. *Curandero: A life in Mexican folk healing*. Albuquerque, NM: University of New Mexico Press.

Troncoso, E., and G. Nigenda. 2002. *Las políticas de salud para poblaciones indígenas en México*. Executive Summary. México, DF: CASE/FUNSALUD, 5.

United Nations. 2009. "State of the World´s Indigenous Peoples." Accessed June 26, 2014. http://www.un.org/esa/socdev/unpfii/documents/SOWIP_web.pdf.

Vargas, L., F. Pérez, and A. Ayancán. 2005. "Aplicación del modelo de salud familiar en la comuna de Quellon." Accessed July 9, 2015. http://medicina.uach.cl/saludpublica/diplomado/contenido/trabajos/1/Osorno%202005/Aplicaci%F3n_del_Modelo_de_Salud_Familiar_en_la_Comuna_de_Quell%F3n.pdf.

Whitehead, T. L. 2002. "Community Based Interventions, Definitions and Types." The Cultural Ecology of Health and Change (CEHC) Working Papers Series Working Paper *#2*. Accessed July 11, 2016. http://www.cusag.umd.edu/documents/workingpapers/cbi.pdf.

Social Science & Medicine 82 (2013) 51–57

Contents lists available at SciVerse ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Prevalence and severity of intimate partner violence in women living in eight indigenous regions of Mexico

Rosario Valdez-Santiago*, Martha Híjar, Rosalba Rojas Martínez, Leticia Ávila Burgos, María de la Luz Arenas Monreal

National Institute of Public Health, Mexico

ARTICLE INFO

Article history:
Available online 29 January 2013

Keywords:
Intimate partner violence
Indigenous population
Women
Mexico

ABSTRACT

The aim of this study was to identify the prevalence and severity of intimate partner violence (IPV) in eight indigenous regions of Mexico, as well as the socioeconomic and demographic variables that are associated with this phenomenon. A cross-sectional study was conducted in indigenous regions that have a greater availability of government medical services than other indigenous regions. Interviews were conducted with female patients ($n = 3287$) seeking medical care in either of the two public health institutions in these regions. The severity of intimate partner violence (SIPV) during the previous 12 months was measured using a 33-item scale. Multinomial logistic regression analyses were performed to explore the factors associated with SIPV. Intimate partner violence prevalence was 25.5% (95%CI 24.93–25.26). Female partner variables such as personal history of child abuse (OR_A 3.48; 95%CI 2.48–4.89) and work outside the home (OR_A 1.74; 95%CI 1.22–2.49) and male partner variables such as unemployment (OR_A 2.31; 95%CI 1.34–3.97) and a high frequency of alcohol use (OR_A 13.35; 95%CI 7.02–25.39) were the main predictors for IPV. We found a three-fold higher risk of IPV for women living in the Los Altos de Chiapas region (OR_A 3.01; 95%CI 1.88–4.79) compared with women in the Mayan region (reference category). Such results should aid decision makers in the development of extended public policies and interventions to address violence against women in the indigenous populations of Mexico.

© 2013 Elsevier Ltd. All rights reserved.

Introduction

There are approximately 42 million indigenous individuals living in the Americas, distributed among 400 different ethnic groups; they constitute almost 10% of the Latin American population. The majority is distributed among Mexico, Guatemala, Peru, Bolivia, and Ecuador (PAHO, 1998, p. 95). It is estimated that in Mexico alone the indigenous population comprises 12.5 million individuals who speak 62 different languages; these characteristics make the Mexican indigenous population the largest and most heterogeneous indigenous population on the American continent.

Indigenous women of the region confront a triple disadvantage, given their ethnic origin, gender, and segregation. The social position of indigenous women is mainly characterized by their subordination to men and by their productive, reproductive, and community responsibilities; these conditions contribute to their higher vulnerability to gender violence and social discrimination, as widely documented in Latin America (Sierra, 2008) and worldwide (FIMI, 2006). Nevertheless, IPV in the Americas has been minimally examined; even countries such as the United States and Canada that have devoted extensive research to this problem have produced only limited evidence documenting IPV directed toward indigenous women (Fairchild, Fairchild, & Stoner, 1998).

In the United States, Malcoe, Duran, and Montgomery (2004) reviewed eight publications documenting the prevalence of IPV among native American women. They identified a lifetime prevalence of IPV of 38%–79%. Certain limitations were identified: a) the sample size was small (only two of the studies had a sample of 300 or more observations); b) there were no studies exploring violence typology of IPV among the various ethnic groups in the United States; and c) there were limited analyses of the socioeconomic factors associated with IPV among indigenous women.

The ethnicity and language of participants and communities are rarely documented in these studies. The study conducted by García-Moreno, Jansen, Ellsberg, and Watts (2006) compared IPV in ten countries from all continents, but in Latin America, only Peru included a large indigenous population. Language was included as a variable but was not analyzed for participants residing in Cuzco and Lima.

* Corresponding author. Av. Universidad 655, Office 236, Col. Santa María Ahuacatitlán, 62100 Cuernavaca, Morelos, Mexico. Tel.: +52 777 3293000x5326.
E-mail address: rosario.valdez@insp.mx (R. Valdez-Santiago).

0277-9536/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.socscimed.2013.01.016

Our study is the first that is specifically designed to capture the prevalence, severity, and other aspects of IPV among indigenous populations in Mexico and Latin America. The study was carried out in clinics associated with the public health service institutions of Mexico in eight indigenous regions; it aims to identify the socioeconomic and demographic variables associated with the prevalence and severity of IPV during the preceding year.

Method

A cross-sectional study of violence against women was conducted in two public health institutions of Mexico between September 2006 and March 2007.

Sample selection

A stratified probabilistic sampling was carried out in three stages. In the first stage, the units were the current 25 indigenous regions in Mexico. The selection was proportional to the indigenous population size. Following this criterion, eight indigenous regions were selected: Altos de Chiapas (Chiapas), Istmo (Oaxaca), Huasteca (San Luis Potosi), Mazahua-otomí (Querétaro), Maya (Yucatán), Chinanteca (Oaxaca), Costa y Sierra Sur (Oaxaca) and Zongolica (Veracruz) (see Fig. 1).

In the second stage, clinics and hospitals located throughout the study regions were selected with a probability proportional to the number of medical units per type of institution. The strata were the two health institutions providing medical care to the Mexican indigenous population: The Health Ministry (HM) and the Mexican Institute of Social Security Opportunity (IMO). Then, using a systematic sampling method, respondents were selected from female patients receiving preventive or curative services who fulfilled the following selection criteria: aged 15–59 years and having had an intimate partner at some point. Exclusion criteria included women with any type of vision, hearing, or cognitive disability that interfered with their ability to complete the questionnaire.

After providing written informed consent, selected women were interviewed individually in a private room in the clinic. Only the interviewer and the respondent were present during the interview. Translators were present for respondents who did not speak Spanish; wherever possible, translators from another community who would not know the respondent were selected. Women participated voluntarily without any type of incentive. Interviews were conducted by professional female interviewers who were trained to handle the emotional experiences that might arise as a result of answering the questions.

The sample included 3949 women; all were users of public health services. The non-response rate was approximately 5%. This project was reviewed and approved by the Research, Ethics, and Bio-Safety Commission of the National Institute of Public Health and by the National Commission of Indigenous Communities of Mexico.

Data collection

A pilot study was conducted with 200 women from a non-participating indigenous community. The pilot helped to clarify the wording of some items and to adjust certain study procedures. For example, difficulties that arose from home interviewing, such as suspicions about the activities of unfamiliar female interviewers, led to the decision to conduct the interviews in medical units. Questionnaires were administered verbally. The field crew consisted of 15 interviewers, 2 supervisors, and 1 field coordinator. Ethical and safety recommendations established by the World Health Organization (WHO), including training of and support to field workers, obtaining informed consent from participants, emphasizing voluntary participation and securing confidentiality and anonymity, were strictly followed throughout the study and data analysis (WHO, 2001).

Assessments

Intimate partner violence (IPV)

To measure intimate partner violence, we used a modified version of the "Scale to measure male partner violence (SV)," which was validated with Mexican women during the first and second National Survey on Violence against Women, conducted in 2003 and 2006 (Avila-Burgos et al., 2009; ENVIM, 2009; Valdez-Santiago



Fig. 1. The eight indigenous regions of Mexico.

et al., 2006). The original scale consisted of 27 items. Six items were added, including four exploring neglect, which was defined as preventing access to care, such as forbidding women to seek needed medical attention or forcing women to do housework when sick. Such acts have been found to be common in the indigenous regions of Mexico. The scale was tested, modified, and validated during the pilot study.

For this study, intimate partner violence was defined as an isolated life-threatening event or a repetitive pattern of violent and coercive behavior, including physical, sexual and psychological attacks, as well as economic coercion inflicted on women by their intimate partner. The scale measures the following dimensions: a) *physical violence*: pushing, blows, or wounds by a firearm or a sharp object; b) *emotional violence*: intimidation, verbal humiliation, or threats of violence; c) *neglect*: partner intimidation to perform household duties during sickness or a delay or postponement in seeking medical attention; d) *sexual violence*: any form of forced sexual activity through physical or emotional coercion; and e) *financial violence*: partner abuse through restriction of monetary resources.

The violence scale also required the respondent to report the frequency with which each violent episode occurred during the preceding twelve months using the response format: 0 = never; 1 = once; 2 = often; and 3 = many times. To reduce the number of highly correlated variables, a factor analysis was used. Six factors were identified for different types of violence: Factor 1, emotional violence; Factor 2, physical violence; Factor 3, neglect; Factor 4, financial violence; Factor 5, severe violence; and Factor 6, sexual violence. These factors and their respective items are available from the authors upon request. Three items were removed from the scale because of ambiguous factor loadings, namely, above 0.30 for more than one factor (Hair, Anderson, Tatham, & Black, 2000). The items comprising each of these factors were consistent with the general indices of the National Surveys on Violence Toward Women conducted in 2003 and 2006 (Avila-Burgos et al., 2009; ENVIM, 2009). The reliability of the complete scale was an alpha value of 0.90.

With the linear combination of these factors, a new continuous variable was created: severity of partner violence index (SPVI). The criteria used to define the cut-off points were those used by the previously mentioned surveys:

Scores of 0 up to 1 point below the mean = *no violence*. Values from the mean up to 1 standard deviation = non-severe violence. Values greater than 1 standard deviation indicate cases of *severe violence* (for a more detailed description of the methodology, see Valdez-Santiago et al., 2006).

The severity index was reviewed and validated theoretically and statistically, establishing that any single life-threatening experience was classified as a case of severe violence, such as pointing a gun or threatening the partner with a sharp object, inflicting burns, firing a gun, attempting to choke or suffocate the partner, or forcing sexual intercourse.

Independent variables of interest

a) Socio-demographic characteristics of indigenous women, their partners, and their households. This dimension was measured with 20 questions addressing age, education, and the number of children born alive. These variables were measured with a continuous scale. Work activity during the week preceding the interview, the frequency of alcohol use, and the indigenous language spoken were measured categorically. All variables were reported for both partners. Male partner information was provided by the interviewed women.
b) Types of partnership. Indigenous communities follow certain traditional practices with respect to marital unions. This variable was recorded using the following categories: a) the woman was married with her parents' approval; b) the woman was married without her parents' approval; c) the woman eloped with her partner; d) the woman was abducted by her partner without her consent; and e) the woman was given to her partner in exchange for a dowry or payment in cash or in kind, as arranged by the woman's father and the young man's family and without consulting the woman. Other variables included age at first union, duration of the union, and the respondent's lifetime number of partners.
c) Interpersonal history of violence. This category was explored with two questions: the first asked about blows and humiliation inflicted by parents or caretakers during childhood, and the second asked about sexual abuse before age 15.
d) Index of possessions. This was measured with 10 items concerning the possession or presence of different home appliances, dwelling ownership, the possession of an automobile or truck, and overcrowding of the dwelling (1). Affirmative answers were summed, and the new variable was categorized in tertiles, corresponding to low, middle, and high strata (Avila-Burgos et al., 2009).
e) Type of municipality. This category was classified as an indigenous municipality or as a municipality with an indigenous presence. This classification was created and validated by the National Population Council (CONAPO, 2012). An indigenous municipality is identified when 40% or more of its population 5 years of age and older speaks an indigenous language; a municipality with an indigenous presence is identified when less than 40% of the population speaks an indigenous language.
f) The level of poverty of a community is a measure of the intensity of deprivation on dimensions related to basic needs that are established as constitutional rights. A Deprivation Index was developed and validated by the National Population Council (CONAPO, 2012). This index encompasses the following four dimensions (as well as nine indicators): *education*, which indicates illiteracy and individuals with an incomplete grammar school education; *dwelling*, which addresses whether the home possesses running water, a sewage system and/or a toilet and whether the home has dirt floors, electricity, and is overcrowded; *income*, which indicates an employed population earning minimum wage; and *population distribution*, which indicates communities with a population under 5 thousand inhabitants. Deprivation is classified as very high, high, middle, low, and very low (3).

Statistical analyses

The categorical variables (frequency of alcohol use, occupation, history of child abuse, etc.) were analyzed individually to obtain their proportions; bivariate chi-squared tests were used to examine the association of these variables with the severity index. For continuous variables, means and medians were used to examine the differences among the severity groups, namely, no violence (0), non-severe violence (1), and severe violence (2). The Ordinal Logistic Regression Model (Model 1) was used initially but later rejected because it did not comply with the model's central supposition test (Test of Parallel Lines); the Multinomial Logistic Regression Model (Model 2) was used instead. Model 2 assumes that the dependent variable has more than two non-ordered categories. Women who were exposed to severe partner violence and those who experienced non-severe violence were compared to those who did not report violence.

Variables showing a value of $p < .20$ (Hosmer & Lemeshow, 2000) in the bivariate analysis were tested in the multivariate model as confounders and effect modifiers and were kept when $p < .05$. The model's global adjustment was verified with Pearson's goodness-of-fit test and adjusted as needed when $p > .20$ (Hosmer

& Lemeshow, 2000). In both bivariate and multivariate analyses, the confidence intervals were calculated with a robust standard error (Williams, 2000). Continuous variables were evaluated to determine whether they were linearly related to the logit of the dependent variable in the final model (Box–Tidwell Test) (Bagley, White, & Golomb, 2001; Hosmer & Lemeshow, 2000). This test was rejected; therefore, these variables became categories that were incorporated in the model.

Differences among the variable categories were evaluated to determine significant differences. Thus, when the statistics showed no differences (Lincom Test $p > .10$) (Hosmer & Lemeshow, 2000), the categories collapsed. The Stata version 10.1 statistical package was used (Stata, 2009).

Results

The overall IPV prevalence in indigenous women was 25.1% (95%CI 24.93–25.26), of which 15% (95%CI 14.86–15.13) and 10.10% (95%CI 9.98–10.21) corresponded to non-severe and severe violence, respectively. The Los Altos de Chiapas region showed the greatest significant prevalence of IPV (41.37%), whereas the Coastal and South mountain regions had the lowest prevalence (15.81%). IPV by type of violence was distributed as follows: emotional 21%, physical 10%, financial 10%, sexual 10%, and neglect 6%.

Socio-demographic correlates of IPV

The average age of the study respondents was 35 ± 15.78 years; education was low among most of the respondents, with an average of 4.5 school years. Women subjected to IPV had significantly less education (3.5 ± 5.74 years), particularly those reporting severe IPV (2.76 ± 4.79). Most participants were housewives, although among those who were victims, 41% worked outside the home, and almost half of these suffered from SIPV (46%). Women reporting severe IPV married at a young age, did not have consensual unions, were married against their will or had a history of more than one union; they also had a higher frequency of alcohol consumption and a larger number of offspring, and they lived in urban areas and belonged to poorer households (Table 1).

Fifty-nine percent of women reporting severe IPV reported a personal history of severe child abuse. The proportion of women reporting sexual abuse before age 15 was significantly higher among the IPV victims (10%), particularly among those who reported severe IPV (19%).

Male partners of women reporting severe IPV had significantly less education (4.06 ± 7.62 years), and a larger number of them were unemployed (14%) in comparison with women reporting non-severe IPV (10%). The reported proportion of male partners consuming alcohol daily was also significantly larger for women who experienced severe IPV (20%) (Table 2).

Table 3 presents the unadjusted model with the variables found to be most associated with severity of partner abuse. Table 4 presents the multivariate model's IPV results. In the final model, 97% ($n = 3287$) of women remained in a union with their partners. Of those variables characterizing the women in the study, child abuse was the most important predictor for IPV; women subjected to violence during their childhood had a 3.48 (OR_A 3.48; 95%CI 2.48–4.89) times greater likelihood of experiencing severe IPV and a 2.3 times greater likelihood of experiencing non-severe IPV (OR_A 2.31; 95%CI 1.76–3.01) when compared with women not exposed to child abuse.

Each one-year increment in the women's education functioned as a protector for severe violence (OR_A .91; 95%CI .86–.96). Women working outside the home had a higher risk of suffering IPV; they had a 74% higher probability of experiencing SIPV (OR_A 1.74; 95%CI 1.22–2.49) and a 64% higher probability of experiencing non-severe IPV. Housewives were the reference group for this comparison.

Table 1
Intimate partner violence and demographic characteristics of female participants.

Characteristics	No violence ($n = 191\,435$)	Non-severe violence[a] ($n = 38\,661$)	Severe violence[a] ($n = 26\,032$)	*p*
	%	%	%	
General data				
Age (continuous)	34.62 (mean)	35.23 (mean)	36.05 (mean)	
Education in years (mean ± SD)	4.67 ± 3.52	3.56 ± 5.74	2.76 ± 4.79	
Women's work activity				
Housewife	71	59	54	<.0001
Work outside the home[b]	29	41	46	
Age at start of partnership				
19 years or younger	67	78	75	<.0001
20 years or older	33	22	25	
Number of partners				
One partner	96	93	91	<.0001
More than one	4	7	9	
Union in agreement with male partner's family				
Yes	91	81	81	<.0001
No	9	19	19	
Partnership's modality				
Engaged and/or eloped consensually	97	95	91	<.0001
Engaged and/or eloped against the woman's will	2	4	8	
Bought	1	1	1	
Live births				
Without children	3	1	3	.06
With children	97	99	97	
Child abuse				
No	73	52	41	<.0001
Yes	27	48	59	
Sexual abuse before age 15				
No	95	90	81	<.0001
Yes	5	10	19	
Frequency of alcohol use				
Never	86	79	81	<.0001
Occasionally	13	20	17	
Once or more per month	1	1	2	
Language				
Monolingual (only indigenous language spoken)	8	7	12	.83
Bilingual	53	50	52	
Spanish only	39	43	36	
Income index				
Very low	23	23	29	.58
Low	20	18	17	
Middle	36	36	38	
High	21	23	16	
Type of locality				
Urban	16	22	21	.08
Rural	84	78	79	
Type of municipality				
Indigenous municipality	62	54	53	.12
With indigenous presence	38	46	47	

[a] All types of violence were included (emotional, physical, financial, sexual, and neglect).
[b] All work activities explored by the survey were included: employee, laborer, day laborer, unskilled laborer, self-employed worker, and house maid.

Women having their first intimate partnership at age 19 or younger had a 65% higher probability of being subjected to non-severe IPV (OR_A 1.66; 95%CI 1.21–2.29) and a 17% probability of experiencing SIPV. Women ages 20 and older were the reference group.

Of the male partner variables, the most important predictor for IPV was the male partner's reported higher frequency of alcohol

Table 2
Demographic characteristics of women's partners (% unless reported otherwise).

Characteristics	No violence (n = 191 435)	Non-severe violence[a] (n = 38 661)	Severe violence[a] (n = 26 032)	p
	%	%	%	
Age (continuous)	38.50 (mean)	39.17 (mean)	40.14 (mean)	
Education in years (mean ± SD)	5.33 ± 6.03	4.92 ± 7.37	4.06 ± 7.62	
Partner's occupation (during the week prior to survey)				
Unemployed	5	10	14	<.0001
Employed	95	90	86	
Contributes to household expenses				
Yes	96	89	76	<.0001
No	4	11	24	
Frequency of alcohol consumption				
Never drinks	45	23	20	<.0001
Occasionally, less than once per month	30	31	14	
One to three times per month	13	19	14	
One to two times per week	9	20	31	
Every day or almost every day	3	7	20	
Language				
Indigenous language only	3	4	4	.75
Bilingual	58	53	60	
Spanish only	39	43	36	

[a] All types of violence were included (emotional, physical, financial, sexual, and neglect).

use. A gradient was observed; as the frequency of alcohol use increased, so did the risk for IPV. Women whose partners used alcohol daily had a 13.35 times greater risk of experiencing severe IPV than women whose partners never used alcohol (OR_A 13.35; 95%CI = 7.02–25.39). Women with unemployed partners had a higher risk for severe IPV (OR_A 2.31; 95%CI = 1.34–3.97) and non-severe IPV (OR_A 1.61; 95%CI = .97–2.68); the comparison group was women with employed partners.

Additionally, two variables exploring regional IPV prevalence were included. Women living in municipalities classified as having an indigenous presence (<40%) had a higher risk of experiencing severe (OR_A 2.45; 95%CI 1.29–4.67) and non-severe IPV (OR_A 1.68; 95%CI 1.00–2.84) when compared with those participants residing in communities classified as indigenous municipalities.

When comparing IPV by study regions, *Los Altos de Chiapas* stands out, as women from that area showed a higher risk for severe and non-severe IPV. Remarkably, in this region, the risk of severe IPV was three times higher (OR_A 3.01; 95%CI 1.88–4.79); women from the Huasteca and Zongolica regions also had a higher probability of being subjected to severe and non-severe IPV. In all cases, the comparison group was the Mayan region.

Discussion

The main findings of the study were that the Altos de Chiapas region showed almost a two-fold higher prevalence of IPV when compared with other study regions and to national data. Interestingly, the prevalence and severity of IPV was lower in regions that were exclusively indigenous when compared with those communities where the indigenous population was a minority. This suggests that the preservation of cultural traditions of the communities of origin may be important and that being a minority presents tensions and contradictions that may be one source of violence.

Another finding was that working women experienced higher levels of partner violence. This has been noted previously among working women of both indigenous and mixed ethnicities (Archer, 2006; Avila-Burgos et al., 2009; Bustillos-Domínguez, Sanín-Aguirre, Valdez-Santiago, & Harlow, 2006; Casique, 2006). The women studied were typically unskilled, working as farm laborers,

Table 3
Factors associated with intimate partner violence in indigenous women, Mexico.

Variables	Non-severe violence[a]			Severe violence[a]		
	ORc	CI 95%[b]	p	ORc	CI 95%	p
Women's characteristics						
Age in years (continuous)	1.00	.99–1.01	.35	1.01	.99–1.02	.06
Education in years (continuous)	.98	.95–1.02	.53	.91	.87–.95	≤.0001
Age at first union						
20 years or older	1			1		
19 years or younger	.67	.48–.95	.02	.57	.42–.77	≤.0001
Live children						
No children	1			1		
1–2 children	.82	.63–1.06	.14	.55	.39–.79	≤.0001
3–4 children	1.15	.82–1.51	.47	.82	.56–1.21	.33
5 or more children	1.09	.855–1.41	.46	1.75	1.30–2.37	≤.0001
Working activity						
Works only at home	1			1		
Works outside the home	1.73	1.34–2.24	<.0001	2.09	1.55–2.82	≤.0001
Child abuse (humiliation and blows)						
No	1			1		
Yes	2.46	1.91–3.17	<.0001	3.90	2.88–5.28	≤.0001
Partners' characteristics						
Work activity						
Employed-laborer	1			1		
Day laborer-unskilled laborer	.87	.68–1.12	.29	.95	.71–1.29	.78
Self-employed	.79	.59–1.05	.15	.58	.39–.85	≤.0001
Unemployed	1.82	1.23–2.69	<.0001	3.04	2.05–4.96	≤.0001
Male partner NOT contributing to household support	2.82	1.86–4.28	<.0001	6.84	4.56–10.27	≤.0001
Frequency of alcohol use						
Never	1			1		
Occasionally	1.05	.80–1.38	.06	.40	.26–.61	≤.0001
One to three times per month	1.60	1.16–2.24	<.0001	1.13	.74–1.71	.56
Once or twice per week	2.42	1.72–3.39	<.0001	4.27	2.98–6.10	≤.0001
Daily or almost daily	2.71	1.54–4.77	<.0001	8.73	5.36–114.21	≤.0001
Household characteristics						
Household asset index						
High	1.00	.75–1.34	.97	1.37	.99–1.87	.05
Medium	.85	.62–1.16	.32	.80	.55–1.16	.25
Low	1.00	.77–1.29	.99	1.06	.74–1.44	.68
Very low	1.14	.84–1.55	.39	.74	.48–1.15	.19
Locality's characteristics						
Indigenous municipality	1			1		
Municipality with indigenous presence	1.37	1.06–1.77	.01	1.42	1.05–1.92	.02
Level of community marginality						
Very low	1			1		
High	.89	.69–1.15	.39	.61	.45–.82	≤.00
Low	1.05	.76–1.46	.74	.51	.30–86	.01
Medium	1.29	.83–1.85	.29	1.66	1.06–2.60	.02
Very high	.89	.54–1.44	.60	2.27	1.52–3.40	≤.00
Regions						
Maya	1			1		
Altos de Chiapas	1.39	1.04–1.86	.02	3.36	2.54–4.44	≤.00
Istmo de Tehuantepec	.71	.52–.98	.04	.30	.17–.51	≤.00
Chinanteca	.90	.66–1.21	.49	.63	.42–.95	.02
Costa y Sierra Sur de Oaxaca	.57	.40–.82	.00	.46	.29–.74	≤.00
Mazahua-Otomí	1.22	.91–1.62	.17	1.12	.79–1.59	.51
Huasteca	1.11	.83–1.49	.45	.99	.69–1.43	.99
Zongolica	1.19	.89–1.60	.22	1.11	.78–1.59	.53

ORc = OR crude.
[a] Women who were victims of severe or non-severe violence inflicted by their partners are compared with women who experienced no violence.
[b] The analyses were carried out by adjusting stratum and design, and 95% confidence intervals were calculated, with a robust standard error adjusted by "clusters" (institution).

Table 4
Multivariate model of independent factors associated with partner abuse in indigenous women.

Characteristics	Partner violence Non-severe vs no violence			Partner violence Severe vs no violence		
	OR_A[a]	CI 95%[b]	*p*	OR_A[a]	CI 95%[b]	*p*
Women's characteristics						
Education in years	.99	.95–1.03	.63	.91	.86–.96	<.0001
Age at first union						
20 years or older	1					
19 years or younger	1.65	1.20–2.26	.002	1.17	.79–1.74	.43
Work activity						
Housewife	1			1		
Works outside the home	1.64	1.24–2.17	<.0001	1.74	1.22–2.49	<.0001
Child abuse (humiliation and blows)						
No	1			1		
Yes	2.31	1.76–3.01	<.0001	3.48	2.48–4.89	<.0001
Male partner's characteristics						
Work activity						
Employed	1			1		
Unemployed	1.61	.97–2.68	.07	2.31	1.34–3.97	<.0001
Frequency of alcohol use						
Never	1			1		
Occasionally	2.74	1.47–2.92	<.0001	1.08	.65–1.81	.76
1–3 times per month	2.96	1.99–4.39	<.0001	2.49	1.48–4.21	<.0001
1–3 times per week	4.22	2.81–6.33	<.0001	7.32	4.59–11.64	<.0001
Daily or almost daily	4.43	2.39–8.19	<.0001	13.35	7.02–25.39	<.0001
Locality characteristics						
Type of municipality						
Indigenous	1					
Indigenous presence	1.68	1.00–2.84	.05	2.45	1.29–4.67	<.0001
Regions						
Maya	1			1		
Altos de Chiapas	1.51	.98–2.30	.06	3.01	1.88–4.79	<.0001
Istmo de Tehuantepec	1.21	.78–1.89	.40	.57	.29–1.11	.10
Chinanteca	1.13	.72–1.77	.59	.77	.42–1.44	.42
Costa y Sierra Sur de Oaxaca	1.17	.74–1.91	.50	1.21	.65–2.26	.54
Mazahua-Otomí	1.04	.61–1.76	.85	.58	.29–1.15	.12
Huasteca	1.80	1.16–2.78	<.0001	1.99	1.15–3.44	<.0001
Zongolica	2.07	1.34–3.21	<.0001	1.87	1.08–3.23	.02

[a] OR adjusted.
[b] 95% Confidence intervals were calculated.

house maids, or street vendors. Many of the women had low levels of education. Education was protective of severe forms of IPV. Jewkes (2002), noted that education had a protective effect in South Africa only when it extended beyond the high school level; at this level, women were better able to utilize information and social resources. It is possible that given the low educational levels of women from the indigenous regions, the protective effect of higher education may only exist in severe cases of IPV.

The association of IPV with violence inflicted by parents or caregivers during a woman's childhood has been widely documented in indigenous and non-indigenous populations in Mexico and elsewhere (Avila-Burgos et al., 2009; Chartier, Walker, & Naimark, 2009). Perhaps both female victims and male perpetrators are more accepting of violence as a way to resolve conflicts when they are exposed to violence at a young age.

The relationship between a male partner's higher alcohol use and the severity of violence against women in diverse cultural contexts is widely documented (Finney, 2004; Jewkes, 2002); this association is marked by an observed exacerbation of conflicts along with increased use of physical force when the male partner is under the influence of alcohol. Alcohol use inhibits normal constraints on aggression and the ability to reason. This relationship could also be due to other factors such as poverty, which is itself found to be associated with high alcohol use (García-Moreno et al., 2006; Jewkes, 2002; Parish, Wang, Laumann, Luo, & Pan, 2004).

Even though the male partners' different employment categories were explored, unemployment was the only category found to be statistically significant. This could be due to employment homogeneity, given that the predominant occupations are farm work, unskilled labor (36.1%), and work as a self-employed street vendor (22.5%). Male partners' unemployment was associated with severe IPV. Various authors (Jewkes, 2002; Koeing, Ahmed, Hossain, & Korshed Alam Mozumder, 2003; Valentini, Meloinem, & Souza, 2006) have demonstrated that men with low income levels are exposed to higher levels of conflict, particularly concerning the stereotypical male identity. When men are not capable of fulfilling expectations as household providers, they are unable to enforce household norms and regulations and resort to aggression as a strategy to maintain control.

Socioeconomic status variables, measured using a financial resources index and the partner's education, were not found to be significantly associated with IPV. The results documented by other Mexican studies on non-indigenous populations are similar to these findings (Medina-Mora, Berenzon, & Natera, 1999). These data reveal that indices created to measure socioeconomic status in mixed ethnicity populations are limited when measuring financially precarious households, particularly in Mexico. However, these results may suggest that violence is associated not with economic factors but rather with social and gender norms in some populations.

Even though this study overcame a number of limitations reported by prior studies, it is important to mention that our study has some biases. For example, the women were all patients of medical services available in the indigenous communities, which are known to be under-utilized; thus, these women represent a select group. It is probable that women who do not have access to medical services in isolated indigenous regions are subject to IPV, and their inclusion might alter the significant correlates.

An additional limitation was the cross-sectional design of the study, which is susceptible to temporal ambiguity, for which causal relationships cannot be established. Consequently, the associations reported here are correlates rather than causes.

Endnotes

1. Overcrowding: when 2.5 individuals or more share a bedroom.
2. Minimum salary in Mexico is 4.18 dollars per day, Comisión Nacional de Salario Mínimo (CONASAMI), 2011. http://www.conasami.gob.mx/pdf/salario_minimo/sal_min_gral_prom.pdf. Consulted November 29, 2011.
3. This index was generated by the National Population Council (Consejo Nacional de Población (CONAPO)) through the National Survey on Housing, 2010. Available at: http://www.conapo.gob.mx/es/CONAPO/Indice_de_Marginacion_por_Localidad_2010.

Acknowledgments

We extend our gratitude to all the women who participated in this study. Likewise, we acknowledge the financial support provided by the CONACYT (Consejo Nacional deCiencia y Tecnología) and CDI (Comisión Nacional para el desarrollo de los pueblos indígenas), which made it possible to carry out this study.

References

Archer, J. (2006). Cross-cultural differences in physical aggression between partner: a social-role analysis. *Personality and Social Psychology Review, 10*(2), 133–153.
Avila-Burgos, L., Valdez-Santiago, R., Híjar, M., Rio-Zolezzi, A., Rojas-Martínez, R., & Medina-Solís, C. E. (2009). Factors associated with severity of intimate partner violence in Mexico: results of the first national survey of violence against women. *Canadian Journal of Public Health, 100*(6), 436–441.

Bagley, S. C., White, H., & Golomb, B. A. (2001). Logistic regression in the medical literature: standards for use and reporting, with particular attention to one medical domain. *Journal of Clinical Epidemiology, 54*, 979–985.
Bustillos-Domínguez, M. D., Sanín-Aguirre, L. H., Valdez-Santiago, R., & Harlow, S. (2006). Violencia doméstica y su impacto en mujeres de la industria maquiladora en Chihuahua. *Género Salud en Cifras, 4*(1), 8–15.
Casique, I. (2006). Índice de empoderamiento femenino y su relación con la violencia de género. In *Violencia de género en las parejas mexicanas. Resultados de la Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares 2003* (pp. 81–107). México: INMUJERES/CRIM-UNAM/INEGI.
Chartier, M. J., Walker, J. R., & Naimark, B. (2009). Health risk behaviors and mental health problems as mediators of the relationship between childhood abuse and adult health. *American Journal of Public Health, 5*(99), 847–854.
Consejo Nacional de Población. (2012). *Índice de marginación por localidad 2010. Colección: indices sociodemográficos*. México: CONAPO.
Fairchild, D. G., Fairchild, M. W., & Stoner, S. (1998). Prevalence of adult domestic violence among women seeking routine care in a native American health care facility. *American Journal of Public Health, 88*, 1515–1517.
Finney, A. (2004). Alcohol and intimate partner violence: key findings from the research. *Home Office Findings, 216*, 1–6.
García-Moreno, C., Jansen, H., Ellsberg, M., & Watts, C. (2006). Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *Lancet, 368*, 1260–1269.
Hair, J., Anderson, R., Tatham, R., & Black, W. (2000). *Análisis multivariante* (5th ed.). España: Prentice Hall.
Hosmer, D., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: John Wiley and Sons.
Instituto Nacional de Salud Pública & Secretaría de Salud. (2009). *Encuesta Nacional de Violencia contra la mujer*. México.
International Indigenous Women's Forum (FIMI). (2006). *Mairin Iwanka Raya. Indigenous women stand against violence*. A companion report to the United Nations Secretary-General's study on violence against women. New York: FIMI.
Jewkes, R. (2002). Intimate partner violence: causes and prevention. *Lancet, 359*(9315), 1423–1429.
Koeing, M. A., Ahmed, S., Hossain, M. B., & Korshed Alam Mozumder, A. B. (2003). Women's status and domestic violence in rural Bangladesh: individual- and community-level effects. *Demography, 40*, 269–288.
Malcoe, H. L., Duran, B., & Montgomery, J. (2004). Socioeconomic disparities in intimate partner violence against Native American women: a cross-sectional study. *BMC Medicine, 2*(20), 1–14. http://www.biomedcentral.com/1741-7015/2/20.
Medina-Mora, M. E., Berenzon, S., & Natera, G. (1999). El papel del alcoholismo en la violencia. *Gaceta Médica de México, 135*(3), 282–287.
PAHO. (1998). *Salud en las Américas, Vol. I*. Washington D.C.: PAHO.
Parish, W., Wang, T., Laumann, E., Luo, Y., & Pan, S. (2004). Intimate partner violence in China: national prevalence, risk factors and associated health problems. *International Family Planning Perspectives, 30*(4), 174–181.
Sierra, M. T. (2008). Mujeres indígenas, justicia y derechos: los retos de una justicia intercultural. Iconos. *Revista de Ciencias Sociales, 31*, 15–26.
Stata Corp. STATA. (2009). *Statistical software 10.1*. College Station, Texas USA: Stata Corp.
Valdez-Santiago, R., Hijar, M., Salgado, N., Rivera, L., Avila-Brugos, L., & Olaíz, G. (2006). Escala de violência e índice de severidad: una propuesta metodolófica para la medición de la violência de pareja em mujeres mexicanas. *Salud Pública de México*, (48), S221–S232.
Valentini, A. L., Meloinem, E., & Souza, L. (2006). Prevalence of violence against women users of health care services. *Revista de Saúde Pública, 40*(4), 2–7.
WHO. (2001). *Putting women first: Ethical and safety recommendations for research on domestic violence against women*.
Williams, R. L. (2000). A note on robust variance estimation for cluster-correlated data. *Biometrics*, (56), 645–646.

Capítulo 9.
Migración y salud

Desde sus inicios, el CISS ha promovido el desarrollo de investigación estratégica orientada a fortalecer los sistemas de salud desde una perspectiva de equidad. Una de las líneas más consolidadas del CISS es la relacionada con migración y salud que, a lo largo de las últimas décadas, se ha posicionado como un referente regional en la generación de evidencia científica sobre las condiciones de salud y el acceso a servicios tanto de las poblaciones migrantes en México como de las poblaciones mexicanas en Estados Unidos. La relevancia de esta línea de investigación radica, entre otras cosas, en que México es un país de origen, tránsito, destino y retorno de migrantes y, además, tiene una ubicación geográfica estratégica en el tránsito hacia Estados Unidos, por lo que es el país con mayor número de migrantes. En un contexto marcado por flujos migratorios diversos y complejos, esta línea ha abordado el análisis de la situación de salud, el uso de servicios y la respuesta institucional, con el propósito de contribuir, desde los datos empíricos, al diseño e implementación de políticas públicas inclusivas.

Como parte de estos esfuerzos, en 2011 se creó la Unidad de Estudios sobre Migración y Salud (UMyS), con el objetivo de articular la producción académica y fortalecer la colaboración interinstitucional en este campo. En 2023, la UMyS lideró la edición de un número especial de la revista *Salud Pública de México*, en el que se presentaron los resultados de investigaciones científicas enfocadas en visibilizar, con evidencia sólida, las vulnerabilidades y los desafíos que enfrentan las poblaciones migrantes. Esta publicación, entre otras nacionales e internacionales, marcó un hito al consolidar un espacio de diálogo entre diversos actores académicos comprometidos con el estudio y la atención de la problemática migratoria desde la salud pública.

La producción científica del CISS en este ámbito ha trascendido el plano nacional para contribuir en el análisis y diseño de políticas en diferentes países de la región de América Latina. Para esta edición conmemorativa, seleccionamos los artículos priorizando aquellos con mayor repercusión tanto en el ámbito académico como en los espacios de toma de decisiones. Se destacan especialmente los trabajos que han contribuido a desmontar narrativas infundadas sobre enfermedades, problemáticas sociales, uso de servicios, entre otros relacionadas con personas migrantes, así como aquellos que han brindado evidencia clave para el diseño de estrategias orientadas a garantizar el derecho a la salud sin discriminación. Esta trayectoria reafirma el compromiso institucional del CISS con la generación de conocimiento riguroso, pertinente y orientado a la transformación de los sistemas de salud en beneficio de todas las personas, independientemente de su nacionalidad o situación migratoria.

Los trabajos que se seleccionaron corresponden a una muestra de la aportación científica de investigadores del CISS en colaboración con investigadores del INSP y de otras instituciones nacionales y de otros países.

frontiers | Frontiers in Public Health

TYPE Original Research
PUBLISHED 25 January 2023
DOI 10.3389/fpubh.2022.1060861

Check for updates

OPEN ACCESS

EDITED BY
Osvaldo Espin-Garcia,
Western University, Canada

REVIEWED BY
Lea Sacca,
Florida Atlantic University,
United States
Vasiliki Eirini Chatzea,
Hellenic Mediterranean
University, Greece

*CORRESPONDENCE
Belkis Aracena-Genao
✉ belmearag@gmail.com

SPECIALTY SECTION
This article was submitted to
Public Health Policy,
a section of the journal
Frontiers in Public Health

RECEIVED 03 October 2022
ACCEPTED 28 December 2022
PUBLISHED 25 January 2023

CITATION
Leyva-Flores R, Aracena-Genao B,
Bustamante ND, Bojorquez I,
Cortés-Alcalá R, Gómez-López D and
Pérez-Sastré MA (2023) Ten-year
hospitalization trends in Mexico:
Examining the profile of national and
transient and migrants.
Front. Public Health 10:1060861.
doi: 10.3389/fpubh.2022.1060861

COPYRIGHT
© 2023 Leyva-Flores, Aracena-Genao,
Bustamante, Bojorquez, Cortés-Alcalá,
Gómez-López and Pérez-Sastré. This
is an open-access article distributed
under the terms of the Creative
Commons Attribution License (CC BY).
The use, distribution or reproduction
in other forums is permitted, provided
the original author(s) and the copyright
owner(s) are credited and that the
original publication in this journal is
cited, in accordance with accepted
academic practice. No use, distribution
or reproduction is permitted which
does not comply with these terms.

Ten-year hospitalization trends in Mexico: Examining the profile of national and transient and migrants

René Leyva-Flores[1], Belkis Aracena-Genao[2]*, Nirma D. Bustamante[3], Ietza Bojorquez[4], Ricardo Cortés-Alcalá[5], Diana Gómez-López[6] and Miguel Adonai Pérez-Sastré[7]

[1]Center for Research in Health Systems (CISS), National Institute of Public Health (INSP), Cuernavaca, Morelos, Mexico, [2]Center for Research in Nutrition and Health (CINyS), National Institute of Public Health (INSP), Cuernavaca, Morelos, Mexico, [3]Centers for Disease Control and Prevention, Atlanta, GA, United States, [4]Migration and Health, El Colegio de la Frontera Norte, Tijuana, Baja California, Mexico, [5]Ministry of Health (Secretaría de Salud), Mexico City, Mexico, [6]Independent Public Health Researcher, Mexico City, Mexico, [7]Faculty of Medicine, Universidad Nacional Autónoma de México (UNAM), Mexico City, Mexico

Aim: In Mexico, as in other societies, migrants are seen as over-users of health services. However, the extent, distribution, and trends of use over time are unknown. Evidence is needed to inform health policies and improve health services for foreign patients. The objective of this study was to examine factors associated with the distribution and trends of Mexican and foreign resident hospitalizations in Mexican public hospitals from 2010 to 2020.

Methods: A graphical and statistical analysis (descriptive and correlational) of discharge trends in public hospitals was carried out. Hospitalization trends were analyzed by country of habitual residence (Mexico, US, Central and South America, and Other Continents), age, sex, primary discharge category, and region of service delivery. Adjusted Poisson modeling was used to examine the factors associated with annual hospitalizations of Mexican and foreign residents.

Results: Between 2010 and 2020, there were 26,780,808 hospitalizations in Mexican public hospitals. Of these, 0.05% were of foreign residents. Hospitalizations for Mexican residents remained stable from 2010 to 2019, while those for foreign residents trended upward over the same period. In 2020, hospitalizations of Mexican residents fell by 36.6%, while foreign resident hospitalizations fell by 348.8%. The distribution of hospitalizations by sex was higher among females for all categories of habitual residence, except among US residents. Obstetric discharges were the most common reason for hospitalization among Mexican residents (42.45%), Central and South American residents (42.24%), and residents from Other Continents (13.73%). The average hospital stay was 2 days. Poisson regression confirmed these results, showing that hospitalizations was higher among women (except among foreign residents) and in the ≤17 age group. Poisson modeling also showed that trauma injury was the leading cause of discharge for foreign residents after obstetric causes.

Discussion: It is unlikely the upward trend in hospitalizations among foreign residents in Mexico from 2010 to 2019 affected the Mexican public health

Leyva-Flores R, Aracena-Genao B, Bustamante ND, Bojórquez I, Cortés-Alcalá R, Gómez-López D, Pérez-Sastré MA. Ten-year hospitalization trends in Mexico: examining the profile of national and transient and migrants. Front Public Health. 2023;10:1060861. https://doi.org/10.3389/fpubh.2022.1060861

10.3389/fpubh.2022.1060861

system, given the small proportion (0.05%) of hospitalizations and the brief length of hospital stay. The increased number of hospitalizations during the study period may be explained by local and national measures to facilitate foreign residents' access to hospital services, while the decrease in hospital utilization in 2020 is likely associated with COVID-19. Geographic location and the most frequent primary discharge categories of hospitalizations within each population could provide evidence for modifications to public health policy in Mexico.

KEYWORDS

hospitalizations, transients and migrants, health services accessibility, Mexico, Central America, South America, United States

Introduction

Mexico is a Latin American country with a long history of being a conduit for irregular migration to the United States (1–4). Recently, its international migration and mobility profile has been changing, slowly evolving into a transit country as well as one which receives persons voluntarily and involuntarily returning from the United States (5, 6). Transit migration through Mexico has traditionally involved individuals from Central America. However, recently, residents from other countries and continents have become more common, and a new mode of migration involving large, organized groups, has emerged (7). These dynamics have contributed to a complex migration profile, which includes temporary and permanent residents, irregular migrants in transit, asylum and refugee seekers, and refugees. The most recent data on the magnitude of mobility show that, in 2019, there were an estimated 1,060,707 foreign nationals with permanent residency in Mexico (0.84% of the national population) (8). Additionally, there were an estimated 182,940 irregular migrants in Mexico, in 2019, although this population experienced a historic drop of 54.42% in 2020 (9). Similarly, the number of asylum seekers dropped 41.68% between 2019 and 2020, from 70,609 to 41,179 (9).

The use of publicly funded health services by foreign residents, especially those with irregular migration status, has been a source of controversy (10, 11). Societal perspectives have ranged from embracing the right to health care for all, to denying publicly funded health services to specific groups, including foreign residents (12). Situated between these two perspectives are policies that support providing certain health services (outpatient care and life-saving urgent care) to specific populations (children and pregnant women), but restrict the provision of high-cost services that can pose financial risk to the health system (12). Stigmatization of foreign residents as disease vectors or as a public health problem can lead to barriers in health care access (10, 13). These views tend to shift based on the sociopolitical climate of the countries of origin, transit, and destination (12).

Within this context, in 2014, the Mexican government laid out a plan to provide temporary (90 days) health insurance coverage for certain services (14). Additionally, in 2019, the government implemented legal changes that recognized the right to health for all people in Mexican territory, regardless of migration status (15). However, the COVID-19 pandemic changed health service offerings and access, leading to a reconfiguration and adjustment of available capacity which had population-level impacts, especially among groups that already faced significant difficulties in accessing hospital services pre-pandemic, such as foreign residents.

Although it is to be expected that Mexico's new migration and mobility profile has led to changes in health care utilization, the magnitude of these changes and the factors that could help explain them is unknown. Scientific evidence is needed to inform decision making and the design of public policy to optimize the use of available resources and, above all, meet the needs of a highly vulnerable population. For this reason, the present study examined factors associated with the distribution and trends of Mexican and foreign resident hospitalizations in Mexican public hospitals from 2010 to 2020 to guide health policies and to enhance foreign residents' health services.

Materials and methods

This analysis included public hospitals in Mexico, which serve mostly low-income, uninsured populations, including foreign residents. In 2020, these public hospitals covered almost 36% (16) of Mexico's 126 million residents (17). In this descriptive, correlational analysis, we examined 2010–2020 discharge data from Mexican state-run public hospital databases, which is publicly available and generated annually by the Mexican Ministry of Health (18). We analyzed hospital discharge data as a proxy for the evaluation of hospitalizations.

Due to the absence of the code that identifies foreigners, in the variable "place of habitual residence," it was not possible to include the year 2015 in the analysis. Annual databases

consolidate data from official hospital administrative records. They include information on the primary discharge category, coded according to the International Classification of Diseases (ICD-10), and sociodemographic characteristics of users (age, sex, and habitual residence). The databases are open access and are available on the website of the Mexican Ministry of Health (18).

Data processing and analysis

The final database, composed of 10 annual databases, initially contained 29,971,549 hospitalizations. Once data was cleaned due to discordant and missing values, including the removal of the 2015 data set, 26,780,808 hospitalizations remained. Proportions were estimated for qualitative variables: declared habitual residence [Mexico; the United States (US); Central and South America (CSA); and Other Continents (OC), referring to any country outside Central or South America, the United States, or Mexico], sex, and primary discharge category according to the ICD-10 coding system. To facilitate the presentation of results, Mexican states were grouped into five regions: Central, North-Central, North, Northwest, and South. The median was calculated for numerical and quantitative variables (days in hospital and age) because these variables showed a non-normal distribution; this was proven both graphically and with a Kolmogorov-Smirnov test ($p < 0.001$), 163 which is the recommended test for large samples (19).

We analyzed the distribution of the variables using graphical methods and modeled the relationship between annual hospitalizations and habitual residence, adjusting for sociodemographic characteristics and primary discharge category using Poisson regression (20, 21). We chose this model because the response variable (annual hospitalizations) is a count variable (discrete and non-negative) (22, 23) and can occur at any point in time; additionally, its use to analyze hospital discharges over time has been established in the literature (24). To quantify the impact of omitting 2015, the expected number of hospital discharges of foreign residents was estimated by interpolation. However, each discharge could not be assigned individual characteristics such as place of habitual residence, sex, age, and cause for hospitalization and the estimates could not be included in the analysis.

To perform the analysis using Poisson regression, the database was organized by year, migratory status (foreign or domestic), habitual residence (with four categories described above), sex, age, and primary discharge category, which generated the variable count that identified the number of hospitalizations according to the characteristics of these variables. Crude and adjusted models were analyzed, with year of hospitalization, sex, age, and primary discharge categories as explanatory variables, respectively. Trends were evaluated over the study period by entering the response variable year as continuous in the models. This analysis was repeated, stratifying by sex, age, and primary discharge category for the period 2010–2014 and 2016–2020 for Mexican and foreign residents, respectively. For the analysis of the period 2016–2020, the year 2016 was used as a reference. Temporal trends were calculated by annual number of hospitalizations for Mexican and foreign residents.

Ethical considerations

This analysis conforms to all international guidelines on the protection of human subjects. The data used are open access and do not contain personally identifiable information. The analysis protocol was reviewed and approved by the Ethics Committee of the El Colegio de la Frontera Norte (El Colef; 079_230821) as part of a larger project on migration and health in Mexico. This activity was determined by the U.S. Centers for Disease Control and Prevention not to be research as defined in 45 CFR 46.102(l) and IRB review was not required.

Results

Of the total hospitalizations between 2010 and 2020 ($n = 26{,}780{,}808$), 0.05% or 13,277 were of foreign residents (residents of the US, CSA, or OC). As shown in Table 1, 71.42% ($n = 9{,}483$) of all hospitalizations of foreign residents were among individuals whose habitual residence was OC, and only 3.95% ($n = 524$) were among US residents.

The age of Mexican residents hospitalized (Table 1) was similar to the age of CSA residents, with a median age of 26 and 24, respectively; and the median age of US residents approximated that of residents from OC, with a median age of 35 and 34, respectively. The distribution of hospitalizations by sex was higher among females for all categories of habitual residence, except among US residents, where 52.65% of were male. This distribution also varied by category of habitual residence and obstetric hospitalizations were the most common reason for hospitalization among Mexican residents (42.45%), CSA residents (42.24%), and residents from OC (13.73%). In foreign residents, trauma was the second most frequent cause of hospitalization. Also common in both populations were hospitalizations due to causes grouped under "Other," which included was comprised of 32 individual ICD-10 categories with minor frequencies that summed to ∼ 20% of the total number of discharges.

In terms of the geographic region, Table 1 shows that Mexican residents received services mostly (37.83%) in the Central region. CSA residents were hospitalized primarily (88.51%) in the Southern region; US residents and residents from OC were treated mostly (39.12 and 98.37%, respectively) in the North-Central region. There were no observed differences in the length of stay based on habitual residence, and the median

10.3389/fpubh.2022.1060861

TABLE 1 Sociodemographic and health service characteristics of Mexican and transients and migrants hospitalizations, Mexico, 2010–2020.

Variables	Mexican residents (n = 26,767,531)	Transients and migrants (n = 13,277)			
		Total foreign residents	U.S. (n = 524)	Central and South America (n = 3,270)	Other Continents (n = 9,483)
Age (median in years)	26.00	30.83	34.50	24.00	34.00
Length of stay (median in days)	2.00	2.00	2.00	2.00	2.00
Sex (%)					
Male	27.41	45.46	52.65	37.73	46.00
Female	72.59	54.54	47.35	62.27	54.00
Primary discharge category (%)					
Neoplasms and hematologic diseases	6.82	9.70	10.61	7.52	10.29
Circulatory	2.77	4.40	5.87	1.92	5.21
Respiratory	3.96	4.90	7.01	2.16	5.63
Digestive	9.77	9.20	7.20	5.38	10.49
Genitourinary	7.11	7.40	4.36	2.50	9.20
Obstetric	42.45	20.70	5.49	42.24	13.73
Perinatal	4.01	2.60	0.95	3.07	2.67
Trauma injury	7.18	13.10	29.55	22.73	9.27
Others	15.93	28.10	28.98	12.48	33.51
Geographic region of discharge (%)					
Central	37.83	9.85	22.51	6.75	0.32
North-Central	16.73	46.98	39.12	3.45	98.37
North	13.72	6.58	18.63	1.01	0.09
Northwest	7.42	3.00	8.62	0.28	0.10
South	24.30	33.59	11.12	88.51	1.12

Source: Hospital discharge database, Mexican Ministry of Health. Office of Health Information (DGIS, for its initials in Spanish), 2010–2020.

length of stay was 2 days. Figure 1 illustrates the hospitalizations by geographic region and habitual residence.

Figure 2 shows the temporal trends of hospitalizations among Mexicans and foreign residents. The annual distribution of hospitalizations of Mexican residents was homogenous, with an annual average of 2.67 million (10.00% per year) and a standard deviation of 0.30 million (1.12% of total hospitalizations). The distribution ranged from a maximum of 2.93 million in 2016 (10.96% of all hospitalizations) to a minimum of 1.91 million in 2020 (7.13% of all hospitalizations). In contrast, the distribution of hospitalizations of foreign residents across the majority of the evaluation period trended upward, with a marked rise in 2019 due to a registered increase of residents from OC. The annual average number of foreign residents hospitalized was 1,300.70 (standard deviation: 1,266.65). However, between 2019 and 2020, there was a pronounced decline among foreign residents (348.8%) as compared with Mexican residents (36.6%).

Table 2 presents the adjusted models using Poisson regression for hospitalizations of Mexican and foreign residents from 2010 to 2014 and 2016 to 2020. Compared to 2010, there was an upward trend in hospitalizations for Mexican residents from 2011 to 2014 and a notable decrease after 2016. On the other hand, hospitalizations of foreign residents trended upward from 2011–2020, compared to 2010, with an increased intensity from 2017–2019. Regarding sex, hospitalizations were higher in females for Mexican residents and higher in males for foreign residents. Both Mexican and foreign residents had a higher frequency of hospitalizations in the $\leq$17 age group, although there was no difference in foreign residents when

10.3389/fpubh.2022.1060861



FIGURE 1
Proportion of hospitalizations by geographic region and habitual residence.

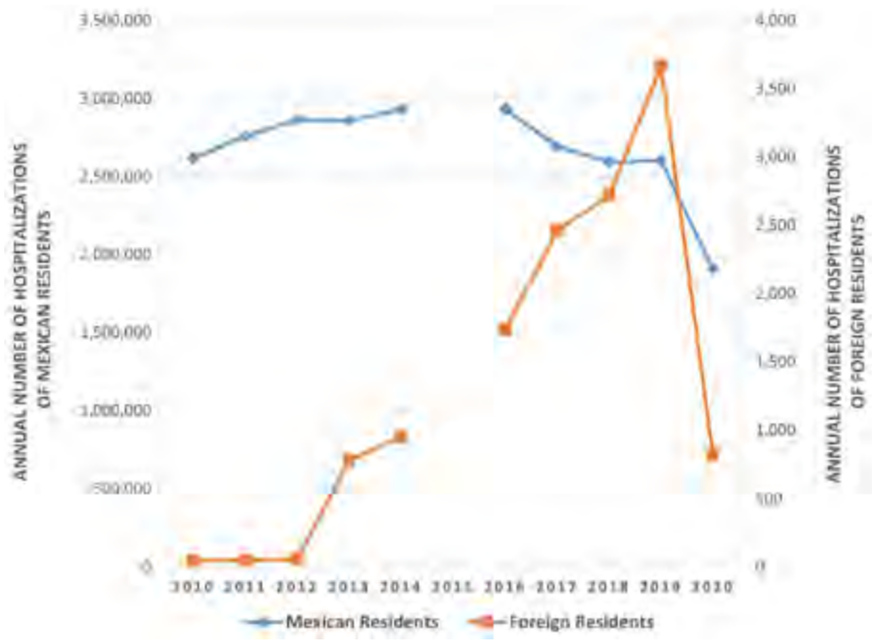


FIGURE 2
Trends in hospitalizations among Mexican and foreign residents, 2010–2020.

compared with those over 60 years of age. In both populations, hospitalizations for obstetric causes had the highest frequency, being up to 10 and four times more frequent than traumas in Mexican and foreign residents, respectively. In foreign residents, trauma was the second most frequent cause of hospitalization. Also common in both populations were hospitalizations due to causes grouped under "Other," which included 32 individual ICD-10 categories with minor frequencies that summed to ∼20% of the total number of hospitalizations.

Discussion

The long history of Mexican migration to the United States has been examined from various perspectives. Previous studies have considered the role of climate change in catalyzing migration, especially from rural areas (1); family and social networks in the United States and the desire for reunification as a motivating factor for migration (25); and worsening sociopolitical and economic conditions, which has long been used to explain international migration is not unique to Mexican society (4). These undercurrents are present in most Latin American countries and could help contextualize the current migration dynamics posing challenges to the Mexican health system (26).

According to the results of this analysis, which incorporates a decade of discharge records in Mexico, the volume and proportion of foreign resident hospitalizations among all hospitalizations was remarkably low (0.05%) over the analysis period. Despite the upward trend in hospitalizations of foreign residents since 2011 and most notably from 2017 to 2019, this increase was unlikely to have had an impact on the health system because the absolute number of hospitalizations remained low, and the median hospital stay was short (2 days). The most significant increase was observed in 2019, possibly due to the implementation of a new national policy (15), which extended health coverage to all persons in Mexican territory, including migrants. The prior policy, in place from 2015 to 2018 only provided 90 days of limited coverage for specific health problems (14), such as treatment for urgent health needs (e.g., childbirth or injuries due to external causes). These findings align with studies carried out in other countries (12, 27).

The COVID-19 pandemic revealed access differences related to social vulnerability (31). Our results showed a general reduction in hospitalizations during 2020. This decrease was slightly higher among foreign residents as compared with the Mexican population. The reduction in foreigner discharges could be attributable to the significant reduction in irregular migration through Mexico to the United States (9) and in the number of individuals seeking refugee status and asylum in Mexico (9). The decreased entry of migrants into Mexico could be related to international travel restrictions, despite the fact that Mexico did not adopt measures restricting mobility (28).

There were differences when comparing hospitalizations among all categories of habitual residence and those limited to foreign residents. Analysis of all hospitalizations showed a higher frequency among younger age groups. These results are similar to the findings by Klein and von dem Knesebeck (27). In relation to sex, a difference in trends was observed according to location of habitual residence; Mexican women and foreign men presented a higher frequency of hospitalizations. These findings are equivalent to those obtained in a 2021 study in Spain which found that the sex of hospital service users varied significantly by region of origin, and that Spanish women used 1.42% more health services than men, while African women's utilization was 18.2% lower (12). Similarly, Waure et al. found that women use health services more frequently than men (29). In contrast, Klein and von dem Knesebeck, found that migrant women use fewer cancer screening services (27). When the results of our analysis were limited to foreign residents, the probability of hospitalizations was higher for men, which aligns with the findings of Gimeno-Feliu in 2021 (12).

The distinct utilization pattern by geographic region could be used to develop a focused health policy in Mexico. CSA residents were overwhelmingly hospitalized in the southern states of Mexico, where the busiest points of entry for migrant populations to the country are located. Six out of ten persons discharged were women, and 43% were treated for obstetrical causes (pregnancy, childbirth, and puerperium). The relatively high frequency of hospitalizations for trauma injuries among CSA could reflect the situation of violence in Mexico (30) and the dangerous conditions of migration (31, 32), which has been documented in other studies (5).

This regional profile of health problems suggests the importance of measures to improve response capacity in the southern states of Mexico. Along the same lines, it is worth noting is that 47.0% of all foreign residents and 98.4% of residents from OC were treated in the hospitals in a single geographic region in Mexico (North Central; Table 1). Understanding this distribution requires other types of analysis that are not possible with the currently available discharge data.

This analysis helps explore the trends, relative burdens, profiles of hospitalizations, geographic distributions, and causes of hospital care for foreign residents in Mexico and for Mexican residents. However, several limitations should be noted. The analysis was based on administrative information generated by the Mexican Ministry of Health, which was the only available source of data on hospitalized foreign residents in Mexico. This constitutes an important limitation to carrying out a more detailed analysis due to the insufficient quantity and type of variables included in the records. In addition, in the case of the variable "place of habitual residence," the code that identified foreign residents in 2015 was missing. However, the behavior of the surrounding years (2014 and 2016) does not show significant differences in the number or composition of discharges, for Mexicans or foreign residents. Although it would be ideal to

10.3389/fpubh.2022.1060861

TABLE 2 Adjusted model of Poisson regression analysis of hospitalizations of Mexican and foreign residents, Mexico, 2010–2020.

	Adjusted models			
	Mexican residents		Foreign residents	
	IR[a]	CI 95%	IR	CI 95%
Year				
2010	Ref.		Ref.	
2011	1.05	1.05, 1.06	1.14	0.76, 1.71
2012	1.09	1.09, 1.10	1.11	0.75, 1.64
2013	1.09	1.09, 1.09	5.98	4.41, 8.11
2014	1.04	1.04, 1.04	5.72	4.23, 7.74
2016	1.05	1.05, 1.05	8.80	6.52, 11.87
2017	0.79	0.79, 0.79	12.16	9.02, 16.39
2018	0.98	0.98, 0.98	14.13	10.49, 19.04
2019	0.86	0.86, 0.86	19.07	14.17, 25.68
2020	0.56	0.56, 0.56	6.13	4.52, 8.30
Tendency	0.96	0.96, 0.96	1.18	1.17, 1.19
Sex				
Female	Ref.		Ref.	
Male	0.69	0.69, 0.69	1.19	1.14, 1.24
Age (years)				
<17	Ref.		Ref.	
18–24	0.74	0.74, 0.74	0.91	0.87, 0.96
25–39	0.88	0.88, 0.88	0.77	0.73, 0.81
40–59	0.59	0.59, 0.59	0.87	0.82, 0.91
60–100	0.64	0.64, 0.65	1.01	0.96, 1.07
Primary discharge category				
Trauma	Ref.		Ref.	
Neoplasia	0.95	0.95, 0.96	1.05	0.97, 1.12
Circulatory	0.39	0.38, 0.39	0.58	0.53, 0.64
Respiratory	0.55	0.55, 0.55	0.56	0.51, 0.61
Digestive	1.36	1.36, 1.36	0.93	0.86, 1.00
Genitourinary	0.99	0.99, 0.99	0.89	0.82, 0.96
Obstetric	10.22	10.21, 10.24	4.54	4.26, 4.84
Perinatal	0.71	0.71, 0.72	0.77	0.68, 0.86
Other	2.21	0.71, 0.72	2.07	1.95, 2.19

Adjusted models included all variables presented in the table and their results were obtained considering the variable year as categorical.
[a]Incident Ratio.

have an uninterrupted series of data, the lack of 2015 data did not affect the estimated tendency in the current study. Furthermore, no epidemiological or social event occurred in 2015 that could have modified the sociodemographic, migratory, or health characteristics of foreign residents in Mexico. For this reason, it was assumed that the findings regarding factors associated with hospitalizations can be applied to the omitted year. Foreign residents, especially those from the United States border regions, may have used private care in Mexico, and this data that is not captured by the Mexican public health system. Another element to consider was the low frequency of hospitalizations in the North and Northwest regions of the

country (only 1.28% of all hospitalizations), which could suggest substantial underreporting because many foreign residents in Mexico's northern border region seek care in in the United States (33). Lastly, the observed trends are solely based on data from 2010 to 2020. Registry and surveillance systems should be improved to better track the use of health services by foreign residents to inform and evaluate the implementation of national policies aimed at these groups in Mexico.

In reference to the need for policies that facilitate migrants' access to health services, several Latin American countries have implemented national programs to guarantee health services for migrants (34), which could be used to inform efforts in Mexico. There is little evidence in the literature on the effectiveness of these policies. However, Chile provides one of the limited exceptions where a national policy composed of various strategies at the regulatory and financial level has been implemented to eliminate legal and economic barriers to health services for migrants (35). One strategy involved the health system hiring migrants who spoke languages other than Spanish to reduce linguistic and sociocultural barriers (36). Another strategy involved social communication campaigns aimed at reducing or eliminating xenophobia and stigmatization through education about the contribution of migrants to the economic and social wellbeing of the country [4.00% of the 2019 Gross Domestic Product was attributed to this population group (37)]. The effects of these strategies in the elimination of access barriers were seen in the gradual increase in the migrants' use of outpatient and hospital services covered by the National Health Insurance (FONASA). This contributed to a significant reduction (72.00%) in the proportion of hospital discharges without FONASA coverage, which resulted in a decrease in impoverishing out of-pocket expenses for migrants (38).

In this context, mechanisms to facilitate migrants' access to health services in Mexico should be implemented. These efforts would support Mexico's 2019 policy authorizing health services for all persons regardless of migratory status.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found at: http://www.dgis.salud.gob.mx/contenidos/basesdedatos/da_egresoshosp_gobmx.html.

Author contributions

RL-F contributed to the design, writing, and final revision of the document. BA-G and MP-S contributed to the design, cleaning, organization, construction of the base, performed the analysis, writing, and final revision of the document. IB, NB, RC-A, and DG-L contributed to the development and editing of the document. All authors contributed to the article and approved the submitted version.

Funding

This study was funded by the Centers for Disease Control and Prevention of the United States of America (Grant: NU50CK000493) through the CDC-Mexico Cooperative Agreement for Surveillance, Epidemiology, and Laboratory Capacity with Fundación México-Estados Unidos para la Ciencia (FUMEC).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Author disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

References

1. Riosmena F, Nawrotzki R, Hunter L. Climate migration at the height and end of the great Mexican emigration era. *Popul Dev Rev.* (2018) 44:33. doi: 10.1111/padr.12158

2. Albo A, Ordaz-Díaz J-L. *La migración mexicana hacia los Estados Unidos: Una breve radiografía México: BBVA Research.* (2011). Available online at: https://www.bbvaresearch.com/wp-content/uploads/mult/WP_1105_Mexico_tcm346-246701.pdf (accessed December 14, 2022).

3. Herrera-Lima F-F. La migración a Estados Unidos: Una visión del primer decenio del siglo XXI. *Norteamérica.* (2012) 7:27.

4. Zenteno R. *¿es la migración mexicana a los Estados Unidos un tema de desigualdad económica?* México: El Colegio de México (2019).

5. Leyva-Flores R, Infante-Xibilié C, Gutiérrez-Reyes JP, Quintino-Perez F, Gómez-Saldivar MJ, Torres-Robles C. Migrants in transit through Mexico to the US: Experiences with violence and related factors, 2009-2015. *PLoS ONE.* (2019) 14:1–16. doi: 10.1371/journal.pone.0220775

6. Ruiz-Soto AG. *One Year After the U.S.-Mexico Agreement: Reshaping Mexico's Migration Policies*. Washington, DC: Migration Policy Institute (2020). p. 23.

7. Wurtz HM. A movement in motion: Collective mobility and embodied practice in the Central American migrant Caravan. *Mobilities.* (2021) 15:930–44. doi: 10.1080/17450101.2020.1806511

8. Expansión/Datosmacro.com. *Disminuye el número de inmigrantes en México. Expansión*. (2022). Available online at: https://datosmacro.expansion.com/demografia/migracion/inmigracion/mexico (accessed November 29, 2022).

9. Secretaría de Gobernación. *Aviso por el que se da a conocer el domicilio oficial de la Oficina de Representación en Saltillo, Coahuila de Zaragoza, de la Coordinación General de la Comisión Mexicana de ayuda a refugiados*. México: Diario Oficial de la Federación (2022).

10. Kwok K, Lai-Yuk-Ching S-K. Navigating stigma and discrimination: Experiences of migrant children with special needs and their families in accessing education and healthcare in Hong Kong. *Int J Environ Res Public Health.* (2022) 19:5929. doi: 10.3390/ijerph19105929

11. Mukumbang FC. Pervasive systemic drivers underpin COVID-19 vulnerabilities in migrants. *Int J Equity Health*. (2021) 20:2. doi: 10.1186/s12939-021-01487-2

12. Gimeno-Feliu LA, Pastor-Sanz M, Poblador-Plou B, alderón-Larrañaga A, Díaz E, Prados-Torres A. Overuse or underuse? Use of healthcare services among irregular migrants in a North-Eastern Spanish Region. *Int J Equity Health.* (2021) 20:41. doi: 10.1186/s12939-020-01373-3

13. Unger H-v, Scott P, Odukoya D. Constructing im/migrants and ethnic minority groups as 'carriers of disease': Power effects of categorization practices in tuberculosis health reporting in the UK and Germany. *Ethnicities*. (2019) 19:17. doi: 10.1177/1468796819833426

14. Secretaría de Salud. *Otorgan Seguro Popular a Migrantes Gobierno de México.* Mexico: Secretaría de Salud (2014).

15. Secretaría de Gobernación. Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la ley general de salud y de la ley de los institutos nacionales de salud. México (2019).

16. INEGI. *Porcentaje de la población afiliada a servicios de salud México*. INEGI (2021). Available online at: https://www.inegi.org.mx/temas/derechohabiencia/ (accessed October 19, 2022).

17. INEGI. *Censo de población y vivienda 2020 México*. INEGI (2021). Available online at: https://www.inegi.org.mx/programas/ccpv/2020/ (accessed February 02, 2022).

18. Secretaría de Salud. *Egresos hospitalarios*. México: Secretaría de Salud (2021).

19. Biu EO, Nwakuya MT, Wonu N. Detection of non-normality in data sets and comparison between different normality tests. *Asian J Probabil Statist.* (2019) 5:20. doi: 10.9734/AJPAS/2019/v5i430149

20. Pérez-Hoyos S, Ballester F, Tenias JM, González F, Bellido J, Arnedo A, et al. Uso de la regresión de Poisson para la detección de excesos en series temporales de enfermedades de declaración obligatoria con pocos casos semanales. *Gaceta Sanitaria.* (1999) 13:9039.

21. Kuhn L, Davidson LL, Durkin MS. Use of Poisson regression and time series analysis for detecting changes over time in rates of child injury following a prevention program. *Am J Epidemiol.* (1994) 140:943–55. doi: 10.1093/oxfordjournals.aje.a117183

22. Lindsey JK. "Modelling frequency and count data," in *Oxford Statistical Science Series*. New York, NY: Oxford University Press (1995). p. 68–74.

23. Cameron A-C, Trivedi P-K. *Regression Analysis of Count Data.* 2nd ed. Cambridge: Cambridge University Press (2012).

24. Bae S, Famoye F, Wulu JT, Bartolucci AA, Singh KP. A rich family of generalized Poisson regression models with applications. *Math Comput Simul.* (2005) 69:8. doi: 10.1016/j.matcom.2005.02.026

25. Sue C-A, Riosmena F, Joshua-Le P. The influence of social networks, social capital, and the ethnic community on the US Destination choices of Mexican migrant men. *J Ethnic Migrat Stud.* (2018) 45:20. doi: 10.1080/1369183X.2018.1447364

26. Leyva-Flores R, Infante-Xibilié C, Serván-Mori E, Quintino-Pérez F, Silverman-Retana O. *Acceso a servicios de salud para los migrantes centroamericanos en tránsito por México*. CIESAS. (2015). Available online at: https://canamid.org/publication?id=PB05 (accessed May 17, 2022).

27. Klein J, von dem Knesebeck O. Inequalities in health care utilization among migrants and non-migrants in Germany: A systematic review. *Int J Equity Health.* (2018) 17:160. doi: 10.1186/s12939-018-0876-z

28. Leyva-Flores R, Rojas K, Aracena B. ¿El cierre de fronteras y el control de la covid-19? El caso de Centroamérica y México International Development Policy. *Revue Internationale de Politique de Développement.* (2022) 14:22. doi: 10.4000/poldev.5125

29. De Waure C, Bruno S, Furia G, Di Sciullo L, Carovillano S, Specchia ML, et al. Health inequalities: An analysis of hospitalizations with respect to migrant status, gender and geographical area. *BMC Int Health Hum Rights.* (2015) 15:2. doi: 10.1186/s12914-014-0032-9

30. INEGI. *Crime Rate. Information on the Number of Individual Crime Victimization Events Reported. 2010-2019.* (2019). Available online at: https://en.inegi.org.mx/temas/incidencia/ (accessed February 16, 2022).

31. Martínez G, Cobo S-D, Narváez J-C. Trazando rutas de la migración de tránsito irregular o no documentada por México. *Perf latinoam.* (2015) 23:29. doi: 10.18504/pl2345-127-2015

32. Parrini-Roses R, Flores-Pérez E. El mapa son los otros: Narrativas del viaje de migrantes centroamericanos en la frontera sur de México. *Íconos Revista de Ciencias Sociales.* (2018) 61:20. doi: 10.17141/iconos.61.2018.3013

33. CNDH/Colegio de la Frontera Norte. *Migrantes haitianos y centroamericanos en Tijuana, Baja California, 2016-2017. Políticas gubernamentales y acciones de la sociedad civil*. Tijuana: CNDH/Colegio de la Frontera Norte (2018).

34. Larenas-Rosa D, Cabieses-Valdés B. Salud de migrantes internacionales en situación irregular: Una revisión narrativa de iniciativas. *Rev Peru Med Exp Salud Publica.* (2019) 36:11. doi: 10.17843/rpmesp.2019.363.4469

35. Gobierno de Chile. *Política de salud de migrantes internacionales*. Santiago: Ministerio de Salud-FONASA-Superintendencia de salud; Gobierno de Chile (2015). Available online at: https://www.minsal.cl/wp-content/uploads/2015/09/2018.01.22.POLITICA-DE-SALUD-DE-MIGRANTES.pdf (accessed November 29, 2022).

36. Sepúlveda C, Cabieses B. Rol del facilitador intercultural para migrantes internacionales en centros de salud chilenos: Perspectivas de cuatro grupos de actores clave. *Rev Peru Med Exp Salud Publica.* (2019) 36:9. doi: 10.17843/rpmesp.2019.364.4683

37. Urria-Yáñez I. *Impacto de la población migrante en el mercado laboral y arcas fiscales entre 2010 y 2019 en Chile*. Santiago de Chile: Fundación Avina (2020).

38. Iribarne-Wiff J, Fernández-Benítez A, Pezoa-González M, Padilla C, Chepo M, Leyva-Flores R. Política de salud de migrantes internacionales en Chile, 2014-2017. *Int Dev Pol.* (2022) 14:5090. doi: 10.4000/poldev.5090

frontiers | Frontiers in Public Health

ORIGINAL RESEARCH
published: 14 July 2022
doi: 10.3389/fpubh.2022.921417

Access to Health Care for Migrants Along the Mexico-United States Border: Applying a Framework to Assess Barriers to Care in Mexico

César Infante[1†], Isabel Vieitez-Martinez[2], César Rodríguez-Chávez[3], Gustavo Nápoles[3], Silvana Larrea-Schiavon[2] and Ietza Bojorquez[3†]*

[1] Center for Health Systems Research, Instituto Nacional de Salud Pública, Cuernavaca, Mexico, [2] Population Council México, Ciudad de Mexico, Mexico, [3] Department of Population Studies, El Colegio de la Frontera Norte, Tijuana, Mexico

OPEN ACCESS

Edited by:
Michael A. Flynn, National Institute for Occupational Safety and Health (NIOSH), United States

Reviewed by:
Ryan Logan, California State University, Stanislaus, United States
Amy Liebman, Migrant Clinicians Network, United States

***Correspondence:**
Ietza Bojorquez
ietzabch@colef.mx

[†]These authors have contributed equally to this work

Specialty section:
This article was submitted to Public Health Education and Promotion, a section of the journal Frontiers in Public Health

Received: *15 April 2022*
Accepted: *23 June 2022*
Published: *14 July 2022*

Citation:
Infante C, Vieitez-Martinez I, Rodríguez-Chávez C, Nápoles G, Larrea-Schiavon S and Bojorquez I (2022) Access to Health Care for Migrants Along the Mexico-United States Border: Applying a Framework to Assess Barriers to Care in Mexico. Front. Public Health 10:921417. doi: 10.3389/fpubh.2022.921417

Background: Migrants in Mexico are entitled to care at all levels, independently of their migration status. However, previous studies show that access to care is difficult for this population. As the movement of in-transit migrants and asylum seekers has been interrupted at the Mexico-United States border by migration policies such as the "Remain in Mexico" program, and by border closures due to the COVID-19 pandemic, the Mexican health system has the challenge of providing them with health care. Levesque et al.'s framework, according to which access occurs at the interface of health system characteristics and potential users' abilities to interact with it, is a useful theoretical tool to analyze the barriers faced by migrants.

Objective: The objective of this article is to analyze the barriers to access the public Mexican health system, encountered by migrants in cities in Mexican states at the Mexico-United States border during the COVID-19 pandemic.

Methods: Data came from a multiple case study of the response of migrant shelters to health care needs during the COVID-19 pandemic. The study consisted of a non-probability survey of migrants with a recent health need, and interviews with persons working in civil society organizations providing services to migrants, governmental actors involved in the response to migration, and academics with expertise in the subject. We analyzed the quantitative and qualitative results according to Levesque et al.'s framework.

Results: 36/189 migrants surveyed had sought health care in a public service. The main limitations to access were in the availability and accommodation dimension (administrative barriers decreasing migrants' ability to reach the system), and the affordability dimension (out-of-pocket costs limiting migrants' ability to pay). Civil society organizations were a major source of social support, helping migrants overcome some of the barriers identified.

Conclusions: While Mexico's health regulations are inclusive of migrants, in practice there are major barriers to access public health services, which might inhibit migrants

Infante C, Vieitez-Martínez I, Rodríguez-Chávez C, Nápoles G, Larrea-Schiavon S and Bojórquez I. Access to health care for migrants along the Mexico-United States border: applying a framework to assess barriers to care in Mexico. Front Public Health. 2022;10:921417. https://doi.org/10.3389/fpubh.2022.921417

from seeking those services. In order to comply with its commitment to guarantee the right to health of all persons, the Mexican health authorities should address the implementation gap between an inclusive policy, and the barriers to access that still remain.

Keywords: health services access, migrants, health systems, accessibility, implementation gap, Mexico

INTRODUCTION

Globally, migrants face multiple barriers in accessing health services, which go beyond those of the local, non-migrant population. These include legal barriers such as the exclusion of irregular migrants from publicly funded health care systems, the cost and availability of services, limited information on how to access services, language and cultural differences, and discrimination (1). From the perspective of rights and universal health coverage, there is a need to develop policies that consider this underserved population, and to include them in the health systems of the recipient countries (2, 3). Access to health care in the context of migration is one of the structural determinants of the health outcomes of migrants (4).

Access to health services is defined as the possibility a person has of getting in contact with a service when in need, and to see the need solved -within the ability of current knowledge and procedures- (5–7). The classic concept of access by (7) included five dimensions: i) availability (the presence of health care facilities); ii) accessibility (geographical proximity); iii) accommodation (the fit between the organization of services and the characteristics of potential users); iv) affordability (related to cost); and v) acceptability (perceptions of potential users regarding the services, as well as the attitudes of providers toward users). Later models have kept similar dimensions, adding the role of demand-side (potential users) characteristics to the supply-side (health system) ones in determining the possibility to access care.

More recently, (6) proposed a model centered on the person (or "patient"), in which access is understood as a process that begins with a health need, and in the best case scenario continues through the contact and interaction with health services, ending in the resolution of the need. The model emphasizes the interplay between people's "abilities" and the characteristics of the health services, and how elements from both can impact access. A recent scoping review found that Levesque et al.'s framework has been increasingly employed in the past few years, because of its combination of individual and health system factors, and also for its focus in access as a process with multiple steps where barriers can occur (8). However, only nine of 31 studies included in that review were conducted in low- and middle-income countries (LMICs), and only one of them (9) focused of migrants. Another six studies which did focus on migrants had been conducted in high-income countries of Europe or Eastern and South Eastern Asia. To the best of our knowledge, this is the first studies to apply Levesque et al.'s framework to the health care access of migrants in Latin America.

Historically, the main migration flow in Mexico has been the movement of Mexicans to and from the United States of America (US). Added to this, Mexico has been a major route for in-transit migrants from other countries who aim to reach the US. More recently, the number of in-transit migrants has increased, their demographic profile has diversified, and this flow has included more and more persons who flee their countries of origin because of violence, natural disasters, or political prosecution, and intend to apply for asylum (10). Therefore, what used to be a population of in-transit, mainly economic migrants, is better described now as a mixed migrant flow, composed of economic migrants, asylum seekers and displaced persons (11).

In 2018, during the Trump administration, the US federal Government implemented the "Remain in Mexico" program, which forced asylum seekers presenting at the Mexico-US land border to wait in the former country while their case was being considered in the latter (12). Following the onset of the COVID-19 pandemic, a second obstacle was passed by the US Government. This was the "Title 42" measures, which allowed migration authorities to return persons to Mexico without processing their asylum claims, on the basis of the health risks associated with receiving them in migration facilities (13). This combination of migration policies has resulted in large numbers of migrants becoming stranded in Mexican border cities for prolonged periods, many of them residing in migrant shelters operated by civil society organizations (CSOs). Although there are no accurate estimates of the number of migrants living in these conditions, some studies show that the arrivals into Mexican border cities of persons who aim to apply for asylum in the US have been in the thousands per month in the past years for cities such as Ciudad Juárez and Tijuana, with occasional outbursts such as the "migrant caravans" (14). In the fiscal year 2021, there were 1.7 million encounters with (persons detained by) the US Border Patrol in the US-Mexico border (15), and even though this number includes an important percentage of recidivists, it still points to the important numbers of persons that can at some point be staying in cities in the Mexican side of the border.

In this new situation, the Mexican health system has the challenge of guaranteeing migrants access to health services, as mandated by its recognition of health as a human right independent of migration status (16, 17). A recent amendment to the Art 77 bis 7 of Mexico's General Health Law grants free access to public health services (including medicines and supplies) to all persons in the country, so that migrants (including irregular migrants) are entitled to health care at all levels of the health system (18). However, an implementation gap remains, and in

practice the members of mixed migrant flows are not always able to access services (19).

Our objective in this article is to analyze the barriers to access the public Mexican health system, encountered by migrants in cities in Mexican states at the Mexico-US border during the COVID-19 pandemic. We employ Levesque et al.'s model as an analytic tool to describe how supply- and demand-side elements interact in the process of access. In what follows, we begin with a brief description of Levesque et al.'s model. Then, we present the methods and results of our study. We close with a discussion of the main barriers faced by migrants, and a reflection on Levesque et al.'s model.

Levesque et al.'s Health Access Model

As referred above, (6) describe access as a process that goes from health care needs to health care results. At each phase of the process, a person's abilities interact with dimensions of the health care system in a way that either hinders or facilitates access. The five abilities, according to the framework, are: 1) to perceive a health need; 2) to seek care; 3) to reach health care services; 4) to pay for services; and 5) to engage with health care. These abilities are determined by personal characteristics, as well as by the social context at different levels. Correspondingly, the five dimensions of the health care system are 1) approachability by potential users; 2) acceptability by potential users; 3) availability and accommodation to the potential users' needs; 4) affordability for the users; and 5) appropriateness of the service.

The process begins with the ability to perceive a health need, and to know which health care is required and exists. This perception can be determined by a person's knowledge and beliefs related to health. The system's approachability also influences those perceptions, so that people in need of care are either detected by the system (*via* screening) or know that the system is there for them to use. A health service can be more or less approachable as it becomes more or less visible to potential users, for example by means of outreach strategies.

In the second phase, access depends on a person's ability to seek care in a given service, a decision that will depend on personal values, cultural norms and the knowledge of health care options. Ability to seek is related to personal autonomy. It also depends on the acceptability of the system to the people it is supposed to serve. A service will achieve acceptability if its professional values, norms, and culture are adjusted to those of potential users. If services are less acceptable to some groups of the community, then inequities in access will result. For example, discrimination of some groups can make a service less acceptable to ethnic, sexual or other minorities.

Thirdly, a person needs to have the ability to reach the system, getting in actual contact with it. Among the personal characteristics that can limit the ability to reach are difficulties with physical mobility, working hours or living arrangements. Also important in this sense are material resources (e.g. economic means for transportation). On the supply side, geographical location, hours of opening and facility settings are examples of characteristics that constitute the dimension of availability and accommodation. Administrative or bureaucratic barriers can also be included in this dimension.

Fourthly, ability to pay is an important determinant of access, and is dependent on income and other sources of economic resources such as savings, and loans, that allow the person to cover health care expenditures, ideally without incurring in catastrophic expenses. It also encompasses the opportunity cost related to loss of income when an individual dedicates time to health care seeking. The relevance of individual ability to pay, however, is contingent to the health system's organization in terms of its charging (or not) for services, out-ot-pocket expenses vs. different types of insurance, cost of services, and social insurance schemes, which define the system's affordability dimension.

Finally, the ability to engage with the system once contact has been established requires all the elements that enable a person to adhere and follow up with treatment. Ability to engage refers to individuals' participation and involvement in their health-related decision-making including treatment. On the supply side, this requires an organization capable of providing continuity of care, and good quality services that can address the health need, which are part of the dimension of appropriateness. Appropriateness is thus the fit between services and the clients' needs. The appropriateness of a service is determined by the correct assessment of a health problem and quality of treatment (both technical and interpersonal).

MATERIALS AND METHODS

Design

In this article, we report on the secondary analysis of data from a comparative case study (20). The parent study's objective was to analyze how migrant shelters acted during the COVID-19 pandemic in order to promote migrants' right to health. This was a mixed methods study, in which quantitative and qualitative methods (described below) were combined with a complementarity rationale, meaning the methods were used to measure overlapping but also different facets of a phenomenon, yielding an enriched, elaborated understanding of it (21). In the study design, the two methods had the same importance, and were implemented simultaneously and interactively. Four shelters (cases) were selected for the parent study, with the aim of obtaining a sample that varied in terms of internal capacities (as evidenced by time in operation, internal organization and services that the shelters provide beyond humanitarian assistance, number of paid staff, and number of people they could receive) and context (presence in the city of other migrant protection organizations, presence of federal human right agencies, population of the city, number of health care facilities and personnel). Data were collected from June to September 2021.

The quantitative component consisted of a survey of migrants residing in or receiving services such as food donations from the shelters. Since the main focus was on health care access, a non-probability, theory driven sample strategy was followed, in which we recruited participants who had experienced a health need during their time in the shelter. Given budgetary and logistic limitations, we did not calculate a sample size, but aimed to reach a quota of 80 adults who had experienced a health need during

their time in the shelter, 80 adults in charge of a minor who had experienced a health need during their time in the shelter, and 80 women who were pregnant or had recently given birth. For the purposes of this article, we employ the survey's responses of the first two groups, and of women who reported that, in addition to their pregnancy-related need, they had experienced another health issue during their time in the shelter. Selection criteria for the quantitative phase were: a) having stayed or being in touch with the shelter for at least two nights; b) being 18 years of age or older; and c) having had a health need (or being in charge of a minor who had one) during their time in the shelter. The survey included questions about sociodemographics, migration, health issues, health care seeking, health services utilization, and satisfaction with health services.

The qualitative component consisted of semi-structured interviews with key actors of the response to migrants' needs. This included staff and volunteers of the migrant shelters, and informants working with SCOs, governmental and international agencies. Selection criteria for this component were: a) having knowledge of the situation of health and health care access of migrants in the city; and b) being 18 years of age or older. The interview guide was designed to target the parent study's objectives of describing the elements that facilitated or hindered the shelters' health-related response. It included questions on the main health care needs of migrants from the informants' point of view, barriers and facilitators to health care access, and how the shelters responded to the above before and during the COVID-19 pandemic. Since data collection took place during periods of high transmission of SARS-CoV-2, we conducted all interviews over video-conference. We recorded the audio of the interviews, and, because of budgetary constraints, conducted analysis of the records without transcribing them. To avoid losing important aspects of the data, we prepared a matrix with the main analytic dimensions of interest, and two researchers independently listened to the records and took notes about each dimension, as well as on novel aspects emerging from the interviews. When a quote was considered of relevance, the researcher transcribed it into the matrix. Then, a round of discussion was conducted between all researchers, in which the matrix was refined. The main qualitative data source for the analysis in this article was the final version of the matrix, but we went back to the original recordings for reference when needed during the iterative process of discussion of results described below.

Analysis

For this article, we applied Levesque et al.'s model a posteriori (i.e., we did not use it as a guide for study design). Instead, after data collection we identified that our results regarding migrants' health care access could be best summarized by this model, and conducted a secondary analysis integrating quantitative and qualitative data with the model as a framework. In accordance to the mixed methods approach of the study, we sought to increase the meaningfulness and trustworthiness of the results by illustrating them with results from both methods.

In order to do this, we followed an iterative cycle, in which all authors of this article equally participated. First, we familiarized ourselves with the matrix of interviews results and with the quantitative results. Second, we prepared a table with the five abilities and dimensions proposed in the model, and classified the results according to them. We then discussed how well the results mapped to the dimensions and abilities, and changed the table's content accordingly. We also took notes on aspects of the results that did not match the model. Finally, we employed the final version of the table to organize the presentation of results according to each phase of the process in Levesque et al.'s model, considering both demand side (abilities) and supply side (dimensions) elements at each phase.

TABLE 1 | Characteristics of migrants surveyed in shelters ($n = 189$)[a], by group.

Variable	Adults with a health care need ($n = 102$)	Minors with a health care need[b] ($n = 74$)	Women with a pregnancy-related need ($n = 13$)
Female	32 (31%)	33 (45%)	13 (100%)
Age, years (mean, s.d.)	36 (15)	5 (4)	24 (4)
Country/region of birth			
Central America	90(88%)	62 (84%)	11 (85%)
Mexico	10 (10%)	12 (16%)	2 (15%)
Colombia	1 (1%)		
Cuba	1 (1%)		
Years of education (mean, s.d.)	8 (3)	4 (2)	6 (2)
Migration plans			
Returned from the US, plans to cross again[c]	22 (22%)	21 (28%)	2 (15%)
Waiting to cross into the US	63 (62%)	49 (66%)	11 (85%)
Plans to stay in Mexico or return to country of origin	17 (17%)	7 (9%)	

[a]Analysis sample: participants who responded questions on health care seeking. [b]As reported by the adult in charge of the minor. Migration plans in this group refers to plans that include the minor, and responses are not mutually exclusive. [c]Returned as part of the "Remain in Mexico" policy, expedited return or deportation.

Ethical Considerations

The study protocol was reviewed and approved by the Ethics Committee of El Colegio de la Frontera Norte. All participants were informed of the objectives and procedures of the study, or their right to refuse and withdraw consent, and of the measures that would be taken to preserve confidentiality. Participants read or were read an informed consent script, and gave verbal consent.

RESULTS

We recruited 219 migrants for the quantitative survey. Of them, 189 had valid responses to questions regarding health care seeking, and are therefore included in this analysis. Their distribution by groups and general characteristics of the analysis sample appear in **Table 1**. Most of them were originally from Central American countries, had a low level of education, and were waiting to cross to the US or had been returned after crossing.

For the qualitative component, we interviewed 22 key informants, of whom 11 were women and 11 men. Two were academics (both of also active in CSOs), nine worked for international organizations, nine for CSOs, and two for governmental agencies (one in health services, one in migration).

As per our sampling strategy, all migrants (or a minor they were on charge of) had experienced a health issue during their time in the city. The most frequently reported issues among adults were acute respiratory infections (including COVID suspect or confirmed cases), injuries as a result of accidents or violence, and mental health issues (self-reported depression, anxiety and insomnia). Likewise, acute respiratory infections were the most frequent health need among minors, followed by headache with non-specific causes, allergies and asthma.

Figure 1 shows the number of participants with valid responses in the questions about health care seeking. Of the 144 who sought care, 36 did so in a public facility. The rest of them were mostly seen in the shelters, in pharmacies, or in private services. A small number (7 cases) employed non-medical services such as a traditional healer, acupuncture or another.

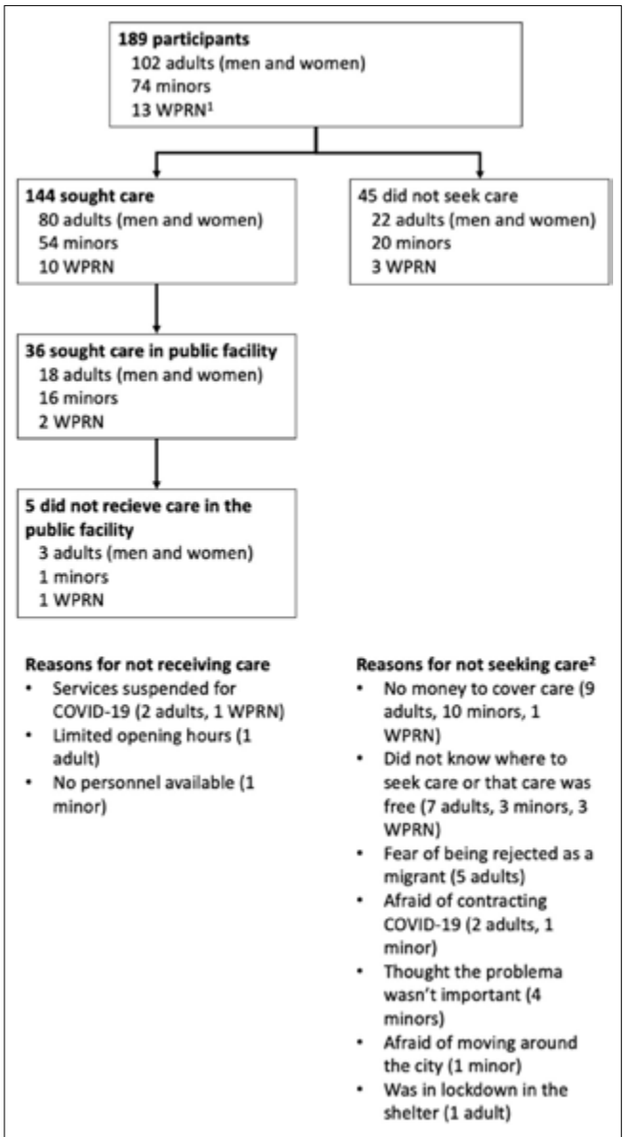


FIGURE 1 | Health care seeking by migrants who responded the quantitative survey. [1]WPRN: Women with a pregnancy-related need, responding questions on an additional, unrelated health need. [2]Responses to this question were not mutually exclusive. For minors, the reason was given by the adult in charge of them.

Step 1: System's Approachability and the Person's Ability to Perceive

In order to be approachable, a health system must reach out to potential users. According to interviewees, the public health system sometimes engages in outreach activities in the form of visits to the shelters of teams from the local health jurisdictions that provide preventive services and care. In one of the cases, a doctor had been commissioned by the jurisdiction exclusively to provide services to migrants. Most of these services had been scaled back in the first months of the COVID-19 pandemic, but at the same time the health jurisdiction got in touch with the shelters' director in order to facilitate detection and care of COVID-19 cases.

> There's a [primary care clinic] close to the shelter. Since I've been here they [periodically] invited us three or five times to receive them for health fairs [. . .] [IN THE FAIRS CONDUCTED IN THE SHELTER] they provide vaccination, talks, and other activities (*Female, staff of shelter*).

Approachability also requires that the system provides persons with information about available health care options, but the outreach activities described did not include this component. Added to this, we found that not knowing where to seek care was the second main reason for leaving a health need unattended, as reported by 12/45 (27%) participants who had not sought care. This was also mentioned by key informants.

> [MIGRANTS] are not going to go to the health services because they do not have any type of advice or anyone to guide them or refer them to where to go in case they require attention (*Female, staff of international organization*).

While we did not collect detailed information on the ability to perceive a health issue as a need, according to the survey only in four cases (all of them of minors) care was not sought because the informant didn't think the problem was important. Two of these had symptoms of an acute infectious disease, one had chickenpox (as reported by the adult), and the other one's only symptom was lack of appetite. None of the adults abstained from seeking care because of this reason, so it seems that the need for health care is perceived by participants, but barriers arise in other aspects.

Thus, the main barrier to access in this step that we identified was lack of information about the services available, an aspect that was not considered in the health jurisdictions outreach activities.

Step 2: System's Acceptability and the Person's Ability to Seek

Acceptability, in the sense of conflict between the health care system organization and migrants' values or cultural expectations, did not appear as an issue in either the quantitative nor the qualitative components of our research. None of our interviewees mentioned cultural aspects that could impact the public health system's acceptability to migrants, and neither did respondents to the survey cited this as a reason for not seeking care. However, some mentioned that lack of awareness of migrants' rights on the part of health system workers was a barrier to access.

> […] we have challenges associated with the lack of knowledge, as I was telling you, of the rights and the possibility of accessing, the rights of persons, because of lack of knowledge on the part of […] health system staff (*Female, staff of shelter*).

Since 45/189 (24%) of participants in the survey had not sought care, there was evidence of limitations in the ability to seek. The main reason for not seeking care they referred was lack of money to pay for it, mentioned by 20/45 (44%), so that ability to pay and affordability, which are part of the fourth step in the model, actually had effects earlier in the process, by limiting a person's ability to seek care.

Another barrier to the ability to seek was migrants' lack of awareness of their right to receive care in the public services, which was mentioned by key informants during qualitative interviews.

> […] many of them, not being familiar with the city, didn't know that they are supposed to be accepted in [public health care services] (*Female, staff of international organization*).

Thus, the main limitations in this step were lack of awareness of migrants' rights on the part of health care staff (which could be considered an element of the professional culture), and lack of ability to pay (which will be described in more detail in step four below).

Step 3: System's Availability and Accommodation, and the Person's Ability to Reach

In the cities where the four shelters were located, public health services were geographically available. All four had primary care services within a five-kilometer radius (an indicator of geographical accessibility) (22). Three of them also had general hospitals within that distance, and one a maternity hospital in that range. All four cities had general hospitals, and three had specialty hospitals (e.g., geriatrics, children's hospital). Distance from a healthcare facility was not listed as an issue among the migrants who had not sought care when experiencing a health issue.

However, location is not the only aspect of geographical availability that matters for access (8). The time and cost of traveling to the health care facility are also important in this regard, and, as one interviewee pointed out, the cities where the shelters are located have deficient and costly public transport, and poor walkability. Extreme climate and security (e.g., safety, crime) concerns, as well as lack of knowledge of the surroundings, also constituted barriers for migrants' ability to reach care in public health facilities.

> It's a challenge, because […] all health services are either there [DOWNTOWN] or in another area, which is [NAME OF ZONE] […] And that is the middle-class, more established area, so the shelters are far away (*Male, staff of international organization*). Added to that, another challenge is transport, [NAME OF CITY] is a city made for cars, public transport is deficient, apps like Didi or Uber are too expensive (*Female, staff of international organization*).

According to most interviewees, a major barrier in accessing the public health system was the exigency of presenting certain identification documents before being admitted for care in either primary care clinics or hospitals (this did not seem to be a barrier in the case of emergency services). This administrative barrier can be situated in the dimension of accommodation in the Levesque et al.'s model, as it implies a lack of adaptation of the system to the characteristics of its potential users (in this case, migrants without the required documents). While some interviewees mentioned that since the recent changes to the Mexican Health Law documents were no longer required by the public health facilities, most reported that this requisite was still in place. None of the migrants who responded the survey failed to receive care because of this reason, but it is possible that they were aware of the potential difficulty, and therefore did not even bother to go to the public services when in need. Access in these circumstances depended on discretionary decisions by the staff of public services, and of the arrangements migrant shelters were able to come to with them.

> Migrants are required to present and ID, or a letter from the migrant shelter, in order to be seen at the General Hospital. They can't just go to any primary care facility. We send them to the [NAME OF PRIMARY CARE CENTER] which is 10 min away by car and 40 min away walking, because there they accept them with or without an ID. There are three primary care centers where migrants without papers can go, not all centers receive them. There's one more that does receive asylum seekers as they already have a CURP. Whether they are received without or with identity documents depends on the center's administration (*Female, staff of shelter*).

Therefore, while geographical availability in terms of location was not a major barrier in the cases we studied, there were other difficulties related to transportation, and administrative barriers affecting the migrants' ability to reach the system also emerged. Support by CSOs and international organizations was the main facilitator in this step, as they provided transportation, accompanied migrants to help them navigate the system, or, as in the quote above, made agreements with the public health services so they would receive migrants sent there from the shelters.

Step 4: System's Affordability and the Person's Ability to Pay

Even though Mexico's public health care system is free of charge for all of those who have no other source of social security-related health services (18), chronic underfunding and other problems mean that, in most cases, patients have to pay out of pocket for expenses such as medicines or laboratory tests that are not available in the health care facility (Centro de Investigación Económica y Presupuestaria (23, 24). This constituted a major barrier, which as described above was the most frequent reason for not seeking care mentioned by the survey's respondents. Of the ones that sought and received care in the public system, 11/31 were required to pay for either medicines, laboratories or other services.

The migrants' ability to pay was limited by the fact that most of them had no source of income or were living of their savings. Besides, monthly income was low: 53/76 participants who responded a question about it had an income of <$3,500 Mexican pesos (about US$175), under the country's minimum wage (about US$220 at the time). Sometimes migrants were able to surpass the economic barriers to access public health services with the aid of the SCO's operating the migrant shelters.

> The shelter covers the expenses and medicine required when the primary care center doesn't have the medicines, or when the migrant doesn't have the resources. If there's a medicine needed, we check in the shelter to see if we have it, and if we don't there's an agreement with a pharmacy. The medicines are paid with funds from UNHCR and with money that we receive as donations (*Female, staff of shelter*).

Another aspect of affordability and the ability to pay had to do with the costs of transportation. We have mentioned this before, as part of the ability to reach, but as other authors have pointed, transportation could also be considered part of the expenses a person has to incur in order to reach services (8).

Thus, affordability was one of the dimensions in which barriers to access were more apparent in our data. As with accommodation, it could also influence the migrants' perception of the system, so that their ability to perceive could have been diminished by knowing beforehand that they would not be able to pay for care, and therefore decided not even seek contact with the health care facility.

System's Appropriateness and the Person's Ability to Engage

The dimension of appropriateness is better assessed through the results of the contact between the person and the health system, ideally ending in the resolution of the need. In our data, we only have evidence of the degree of satisfaction of those who had received some form of care in the public health system, which in general was high: 12/15 adults receiving care for themselves in the public system and 13/15 in charge of a minor who received care in the same system said they were satisfied with care. On the other hand, a process indicator that reflects the quality of care, and also the ability to engage on the patient's side, is whether the health care provider facilitates the patient's autonomy by explaining him/her the diagnosis and procedures to be followed. When asked about doctor-patient interactions, almost all who were seen in the public system or brought a minor in to receive care in it, reported they had been treated with respect, received a diagnosis, and were provided with written indications and explanations for how to take medicines. The only aspect relatively lacking was that 4/15 had not been asked if they had any doubts.

Thus, once in touch with the public health system, appropriateness and ability to engage seemed to be reasonably good. However, the small number of cases and lack of information on the resolution of the health need limits our capacity to reach conclusions in this regard.

DISCUSSION

In this article, we identified the barriers to access the public health care system in Mexico faced by members of mixed migrant flows. Given that according to the law the public system is open at all levels, free of charge, for migrants in Mexico, the fact that it is not the most sought-after option points to the fact that an implementation gap remains in Mexican health policies. We framed the barriers that help to explain this gap using Levesque et al.'s model. Our main conclusions are depicted in **Figure 2**.

In summary, we found that the main barriers occurred in the dimensions of affordability/ability to pay and availability and accommodation/ability to reach. This is similar to the results of other studies using Levesque et al.'s framework, which also have identified these two areas as relevant (8). An important finding, however, was that barriers classified as part of those dimensions could operate even in the first steps of the process, as migrants' ability to seek health care in the public health system might be hindered if the expectation of barriers makes them rule it out as a possibility. The decision to seek care in the public health system is also probably made after weighing the costs and benefits of different therapeutic options as well as the severity of health needs (25).

Using Levesque et al.'s framework in an empirical case study allowed us to assess its strengths and limitations. As other authors report, some results are difficult to categorize in a single dimension. For example, the distance or time to reach a health facility can be classified as an issue or availability, or of ability to pay (8). Some dimensions or aspects of dimensions that are important in the case of migrants are not completely captured by this model, as in the case of administrative barriers to access that persist even in the face of a normative right to care. Also, the model could be enhanced by considering the social determinants of individual abilities to access, such as the possibility of migrants to have decent work and sufficient salary, or their inclusion in other systems of social protection (1). Still, similar to other versions of access as a process (26–28), the model allowed us to systematically describe the barriers faced by migrants at each step.

A limitation of our study is that, since data came from a comparative case study of four sites, with non-probability sampling, we cannot claim that our results represent the situation of all member of mixed-migrant flows in Mexico. The intended sample size for women with reproductive care needs was not

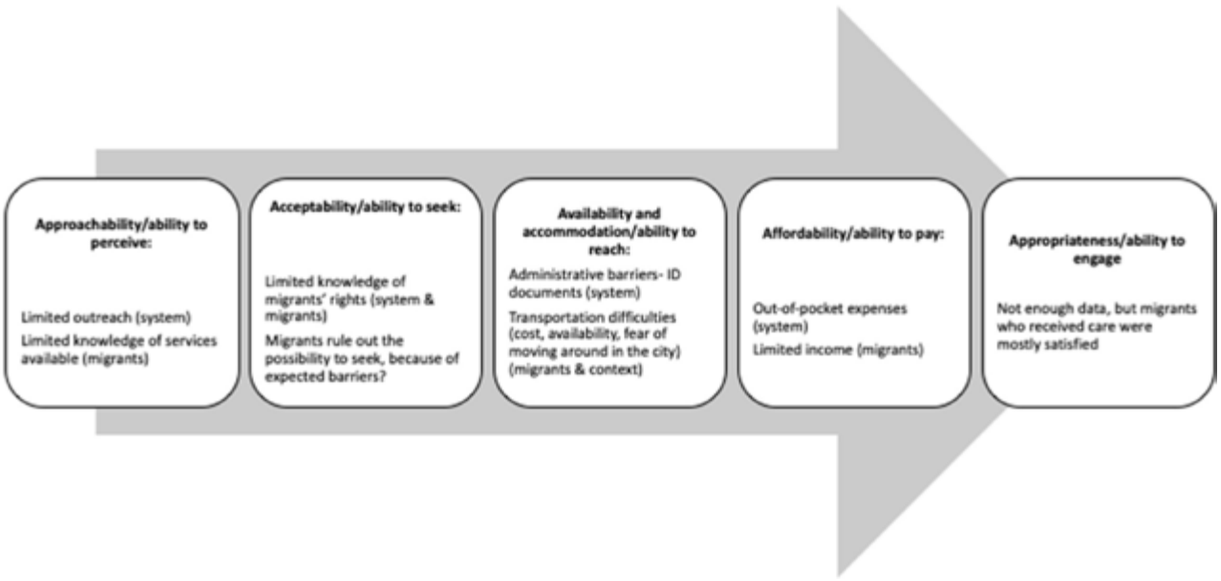


FIGURE 2 | Barriers in the process of accessing health care. [1]Adapted from (6).

reached because there were not enough eligible women in the shelters during the period of data collection, and we had no members of the LGBTQ+ community among participants. Neither were we able to interview migrants who were not Spanish speakers.. Since not all shelters keep detailed records of the sociodemographic characteristics of migrants, we are not able to assess the representativeness of our sample, but as different groups might have different experiences in accessing health care, future studies should aim to include a more diverse sample. Another limitation is that data were collected during a peak of the COVID-19 pandemic, so some aspects of the health system's functioning might be different in comparison with other periods. However, the similarity of our results with some previous reports (29) makes us confident that they are a good representation of the situation. Not transcribing the interviews could represent a limitation, since transcription facilitates the management and sharing of information for analysis. However, in this work this limitation was resolved through the construction of an analytic matrix, and by having pairs of researchers listening to the interviews and filling the matrix, so that we were able to check the consistency of findings. Finally, we employed data from a study that was not designed with the Levesque et al.'s framework in mind.

As for the study's strengths, in contrast with others using this framework we were able to consider both the system's dimensions and the persons' abilities. Even if we did not have qualitative data on migrants' perspectives, we were able to include information from a migrants' survey, unlike some studies that only consider the opinion of health care providers and other experts.

To conclude, we found evidence that members of mixed migrant flows in Mexico experience barriers to access the public health care system, and identified the main dimensions in which those barriers appear. A corollary of our results is that legislation is not enough to ensure access, and there is a need to address the main gaps, removing administrative barriers, and ensuring that the public health system has the resources needed to protect its users from out-of-pocket expenses. Improving these aspects would be major steps in achieving the right to health for all, as mandated by the Mexican constitution.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Comité de Bioética, El Colegio de la Frontera Norte. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

Conceptualization and writing—original draft preparation: CI and IB. Methodology: CI, IV-M, CR-C, GN, and IB. Analysis

and writing—review and editing: CI, IV-M, CR-C, GN, SL-S, and IB. All authors contributed to the article and approved the submitted version.

FUNDING

Funding for this research was provided by Hispanics in Philanthropy (HIP) (no grant number). The funding source had no role in the decision to publish, data analysis, or manuscript writing.

ACKNOWLEDGMENTS

We acknowledge the contribution of migrants and key informants who dedicated time to sharing their experiences with us.

REFERENCES

1. Abubakar I, Aldridge RW, Devakumar D, Orcutt M, Burns R, Barreto M, et al. The UCL-lancet commission on migration and health: the health of a world on the move. *Lancet*. (2018) 392:2606–54. doi: 10.1016/S0140-6736(18)32114-7
2. Nandi A, Loue S, Galea S. Expanding the universe of universal coverage: the population health argument for increasing coverage for immigrants. *J Immigr Minor Health*. (2009) 11:433–6. doi: 10.1007/s10903-009-9267-2
3. Onarheim KH, Melberg A, Meier BM, Miljeteig I. Towards universal health coverage: including undocumented migrants. *BMJ Global Health*. (2018) 3:e001031. doi: 10.1136/bmjgh-2018-001031
4. Castaneda H, Holmes SM, Madrigal DS, Young ME, Beyeler N, Quesada J, et al. Immigration as a social determinant of health. *Annu Rev Public Health*. (2015) 36:375–92. doi: 10.1146/annurev-publhealth-032013-182419
5. Aday LA, Andersen R. A framework for the study of access to medical care. *Health Serv Res*. (1974) 9:208–20.
6. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health*. (2013) 12:18. doi: 10.1186/1475-9276-12-18
7. Penchansky R, Thomas JW. The concept of access: definition and relationship to consumer satisfaction. *Med Care*. (1981) 19:127–40. doi: 10.1097/00005650-198102000-00001
8. Cu A, Meister S, Lefebvre B, Ridde V. Assessing healthcare access using the Levesque's conceptual framework- a scoping review. *Int J Equity Health*. (2021) 20:116. doi: 10.1186/s12939-021-01416-3
9. Chuah FLH, Tan ST, Yeo J, Legido-Quigley H. The health needs and access barriers among refugees and asylum-seekers in Malaysia: a qualitative study. *Int J Equity Health*. (2018) 17:120. doi: 10.1186/s12939-018-0833-x
10. Torre Cantalapiedra E, Paris Pombo D, Gutierrez Lopez E. El sistema de refugio mexicano: entre proteger y contener. *Frontera Norte*. (2021) 33:1–26. doi: 10.33679/rfn.v1i1.2103
11. International Organization for Migration (IOM). (2019). *Glossary on Migration*. International Migration Law (34).
12. The Hope Border, Institute. *Border Observatory. 2020 Situation Report: Remain in Mexico*. El Paso, TX: The Hope Border Institute (2020).
13. *Public Health Experts Urge U.S. Officials to Withdraw Order Enabling Mass Expulsion of Asylum Seekers*. (2020). Available online at: https://www.publichealth.columbia.edu/public-health-now/news/public-health-experts-urge-us-officials-withdraw-order-enabling-mass-expulsion-asylum-seekershttps:// (accessed June 8, 2020).
14. Contreras Delgado C, Paris Pombo D, Velasco Ortiz L. *Caravanas migrantes y desplazamientos colectivos en la frontera México-Estados Unidos*. Tijuana: El Colegio de la Frontera Norte (2021).
15. USBP. *Southwest Land Border Encounters*. Available online at: https://www.cbp.gov/newsroom/stats/southwest-land-border-encounters (accessed May 29, 2022).
16. Congreso General de los Estados Unidos Mexicanos. Ley de Migración. Diario Oficial de la Federación (2014).
17. Congreso General de los Estados Unidos Mexicanos. Ley Sobre Refugiados. Protección Complementaria y Asilo Político. Diario Oficial de la Federación (2014).
18. Secretaría de Salud. *Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley General de Salud y de la Ley de los Institutos Nacionales de Salud*. Diario Oficial de la Federación (2019).
19. Bojorquez-Chapela I, Infante C, Larrea-Schiavon S, Vieitez-Martinez I. In-Transit migrants and asylum seekers: inclusion gaps in Mexico's COVID-19 health policy response. *Health Aff*. (2021) 40:1154–61. doi: 10.1377/hlthaff.2021.00085
20. Infante C, Bojorquez I, Vieitez-Martinez I, Larrea-Schiavon S, Napoles-Mendez G, Rodriguez-Chavez C. Migrant shelters' response to COVID-19: Comparative case study in four cities close to the Mexico-United States border. *J Migrat Health*. (2022) 6:100110. doi: 10.1016/j.jmh.2022.100110
21. Greene JC, Caracelli VJ, Graham WF. Toward a conceptual framework for mixed-method evaluation designs. *Educ Eval Policy Anal*. (1989) 11:255–74. doi: 10.3102/01623737011003255
22. World Health Organization. *Global reference list of 100 core health indicators*. Geneva: WHO (2015)
23. Centro, d. e. Investigación Económica y Presupuestaria (CIEP). *Sistema Universal De Salud: retos de cobertura y financiamiento*. Mexico: CIEP (2018).
24. Mendez JS. *La contracción del gasto per cápita en salud: 2010–2020*. (2019). Available online at: https://ciep.mx/la-contraccion-del-gasto-per-capita-en-salud-2010-2020/ (accessed March 26, 2021).
25. Tam WJ, Goh WL, Chua J, Legido-Quigley H. Health is my capital: a qualitative study of access to healthcare by Chinese migrants in Singapore. *Int J Equity Health*. (2017) 16:102. doi: 10.1186/s12939-017-0567-1
26. Cabral AL, Martinez-Hemaez A, Andrade EI, Cherchiglia ML. [Therapeutic itineraries: state of the art of scientific production in Brazil]. *Cien Saude Colet*. (2011) 16:4433–42. doi: 10.1590/S1413-81232011001200016
27. Menendez E. Modelos de atención de los padecimientos: de exclusiones teóricas y articulaciones prácticas. *Cien Saude Colet*. (2003) 8:185–207. doi: 10.1590/S1413-81232003000100014
28. Silva N, Sancho L, Figueiredo Wdos S. Between flows and therapeutic projects: revisiting the notions of lines of care in health and therapeutic itineraries. *Cien Saude Colet*. (2016) 21:843–52. doi: 10.1590/1413-81232015213.08572015
29. Leyva Flores R, Infante C, Serván-Mori E, Quintino F, Silverman-Retana O. *Acceso a servicios de salud para los migrantes centroamericanos en tránsito por México*. Guadalajara: CIESAS (2015).

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2022 Infante, Vieitez-Martinez, Rodríguez-Chávez, Nápoles, Larrea-Schiavon and Bojorquez. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

REVUE INTERNATIONALE DE POLITIQUE DE DÉVELOPPEMENT

International Development Policy | Revue internationale de politique de développement

14 | 2022
Governing Migration for Development from the Global Souths

¿El cierre de fronteras y el control de la Covid-19? El caso de Centroamérica y México

René Leyva Flores, Karol Rojas y Belkis Aracena

OpenEdition Journals

Edición electrónica
URL: https://journals.openedition.org/poldev/5125
DOI: 10.4000/poldev.5125
ISSN: 1663-9391

Traducción(es):
Blocking the Spread of COVID-19: Global Border Closure Policies in Central America and Mexico - URL : https://journals.openedition.org/poldev/4894 [en]

Editor
Institut de hautes études internationales et du développement

Este documento es traído a usted por Geneva Graduate Institute

GENEVA GRADUATE INSTITUTE
KATHRYN AND SHELBY CULLOM DAVIS LIBRARY

Referencia electrónica
René Leyva Flores, Karol Rojas y Belkis Aracena, «¿El cierre de fronteras y el control de la Covid-19? El caso de Centroamérica y México», *International Development Policy | Revue internationale de politique de développement* [En línea], 14 | 2022, Publicado el 12 mayo 2022, consultado el 08 junio 2022. URL: http://journals.openedition.org/poldev/5125 ; DOI: https://doi.org/10.4000/poldev.5125

Este documento fue generado automáticamente el 20 mayo 2022.

Creative Commons Attribution-NonCommercial 3.0 Unported License.

¿El cierre de fronteras y el control de la Covid-19? El caso de Centroamérica y México

René Leyva Flores, Karol Rojas y Belkis Aracena

1.Introducción

1 A pesar de las recientes emergencias sanitarias en varias regiones del mundo (OMS, 2017), la magnitud de las consecuencias sanitarias y económicas de la COVID-19, incluso en los países desarrollados, ha tomado al mundo entero por sorpresa (Bauman, 2014). La pandemia Covid-19 mostró que el desarrollo científico-técnico, disponible en la era contemporánea, era poco o nada efectivo para prevenir y atender catástrofes sanitarias masivas y que la sobrevivencia de las personas, como en la antigua premodernidad, dependía esencialmente de la capacidad inmunológica y de las condiciones sociales para el manejo de riesgos.

2 La respuesta global ha sido única, unitaria en su contenido. Entre febrero y marzo de 2020, gobiernos de 70 países del mundo recurrieron a prácticas sanitarias implementadas antes de Cristo: cierre de fronteras (puertos, aeropuertos y cualquier vía de comunicación intrafronteriza). Además, se impuso el confinamiento obligatorio y, en numerosos casos, con aplicación de diferentes sanciones ante su incumplimiento (*Onda cero*, 2020; Coloma, 2020; De Gracia, 2020; Consejo Municipal de Panamá, 2020; Cárdenas y Corro, 2020; Sequeira, A, 2020; López, 2020). La implementación de estas políticas globales fue justificada bajo el argumento de que la reducción de la movilidad poblacional global contribuiría a disminuir la velocidad de transmisión y, en consecuencia, permitiría controlar la diseminación del virus SARS -Cov2.

3 En la fase inicial, la diseminación de la pandemia se explicó, en distintos países del mundo, a través de la llegada de 'casos importados' (OMS, 2020c; OPS, 2020), en su mayoría procedentes de China. Sin embargo, en brevísimo tiempo se identificaron casos italianos, franceses, alemanes, españoles, mexicanos, y una lista amplia de países. Se

omitió considerar la elevada y rápida movilidad poblacional global como elemento regular de la dinámica social contemporánea. De forma que, cuando se recurrió al cierre de fronteras y confinamiento poblacional, el virus ya se encontraba en las diferentes regiones del mundo, concentrando su presencia, de forma inicial, en aquellas con mayor movilidad. Se estima que, en 2018, sólo utilizando la vía aérea, se movilizaron 4,233 mil millones de personas a nivel global, (Banco Mundial, 2020c); en su mayoría (51.2%) procedentes o con destino a las regiones de Europa, China y Estados Unidos. En contraste, Centroamérica y México solo aportaban 1.9% del total global de la movilidad por vía aérea (Banco Mundial, 2020a).

4 Esta explicación de la diseminación de la pandemia Covid-19, asemeja lo acontecido -relatado por Cipolla en su texto *Quién rompió las rejas de Montelupo*- en la pequeña localidad toscana de Montelupo, afectada por la peste entre 1630-1631 (Cipolla, 1984). Como en aquellos años, en la actualidad, las decisiones políticas implementadas para enfrentar el COVID-19 condujeron al 'cierre de las rejas -fronteras- y al aislamiento de las familias'. Al igual que las autoridades de entonces, las contemporáneas -en algunos casos-, 'promovieron una reforma fiscal para aliviar la pobreza de esta gente, encontrando una oposición muy fuerte de parte de las familias ricas de la población, que se niegaran a contribuir con su dinero a los gastos ocasionados por la pandemia. Como consecuencia de esta situación, el tejido social se deteriora, los pobres se ven obligados a abandonar sus casas y se suceden saqueos y robos [...] mientras la peste continúa diezmando a la población' (Tornafoch, 2020).

5 A pesar de la predominancia de la política de cierre de fronteras en la mayoría de los países del mundo, hay posiciones contrastantes de algunos gobiernos que, por distintas razones, se han negado a adoptar esta medida como eje para el control de la pandemia (Paterlini, 2020). En el caso de los países Centroamericanos y de México, que comparten fronteras e historia con alta dinámica de movilidad poblacional intrarregional, las medidas de control de movilidad fueron adoptadas de forma diferente. En los países de Centroamérica (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua y Panamá) se implementó el cierre de fronteras, puertos y aeropuertos. Nicaragua ha sido el único país de Centroamérica que no ha cerrado sus fronteras ni ha impuesto otras restricciones. La mayoría de los países también tomó medidas más drásticas, como toques de queda militares en su interior; de nuevo, Nicaragua es una excepción, al igual que Costa Rica que solo impuso a la población aislamiento voluntario y solo restringió el desplazamiento vehicular. En México, por el contrario, no se dispuso el cierre de fronteras ni el confinamiento obligatorio. Las acciones implementadas por el gobierno federal mexicano tenían más bien carácter persuasivo y buscaban informar y sensibilizar a la población sobre la importancia del distanciamiento social.

6 Se podría suponer que la aplicación de medidas distintas en los diversos países haya conducido a resultados diferentes en cuanto a la evolución de la pandemia del COVID-19. El presente estudio de caso analiza las medidas implementadas a nivel de los países centroamericanos para controlar la pandemia (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua y Panamá) y México, y observa los efectos de estas medidas sobre la propagación del COVID-19, desde el primer caso reportado hasta diciembre de 2020. Contrariamente a lo que era de esperar, la evolución del COVID-19 en cada país fue relativamente similar.

2. Método

7 Se realizó un estudio de caso comparativo de la política de cierre de fronteras y de control de la movilidad interna para la contención de la pandemia del COVID-19 en Centroamérica y México, donde cada país aplicó políticas públicas diferentes para controlar la pandemia del COVID-19. Para ello, se llevó a cabo una revisión documental de las declaraciones en medios públicos (electrónicos) y decretos de políticas públicas. El período de análisis comienza en la fecha del primer caso registrado de COVID-19 para cada país, y termina en diciembre de 2020.

8 Se realizó un análisis de contenido para identificar convergencias y divergencias en las acciones implementadas por los países estudiados. Utilizamos las categorías siguientes: razones o motivos que justifican el cierre de las fronteras (cuándo, porqué, por cuánto tiempo, cuál es el resultado esperado); y cómo se traducen estas declaraciones o decretos en medidas específicas de control de la movilidad poblacional en las fronteras (interna e internacional).

9 La información utilizada en el análisis de contenido se extrajo de las publicaciones diarias en internet, tanto de fuentes oficiales del gobierno como de medios de comunicación, utilizando como motor de búsqueda Google. La información epidemiológica se obtuvo mediante reportes oficiales emitidos por los ministerios de salud de cada país. Toda la información analizada es de carácter público y se siguió una línea ética para garantizar el anonimato, la confidencialidad y la privacidad de las fuentes consultadas.

3. Resultados

10 El análisis permitió analizar cómo se adoptaron, a nivel nacional, medidas globales de control de la pandemia; permitió observar las dificultades en su aplicación, así como los efectos no deseados que tuvieron en términos de derechos humanos. La mayoría de los países centroamericanos impusieron medidas obligatorias de restricción del movimiento de la población. Éstas incluyeron el cierre de las fronteras aéreas, terrestres y marítimas, así como el cierre de escuelas, la suspensión de actos públicos, la restricción general de los viajes internacionales y la aplicación de políticas de trabajo desde casa, excepto en sectores esenciales. Los gobiernos de México y Nicaragua no adoptaron ninguna de estas medidas (tabla 11.1).

Tabla 11.1 Medidas Implementadas para Controlar la Propagación de la Pandemia del COVID-19, Centroamérica y México, 2020

País	Medidas movilidad interna				Medidas movilidad externa		
	Toque de queda	Prohibición de reuniones masivas.	Ley de Restricción de Derechos Constitucionales	Cuarentena domiciliaria a nivel nacional	Prohibición de entrada de personas extranjeras	Cierre de fronteras	Controles fronterizos
México							

Costa Rica		X			X	X	X
El Salvador	X	X	X	X	X	X	X
Guatemala	X	X		X	X	X	X
Honduras	X	X			X	X	X
Nicaragua							
Panamá	X	X		X	X	X	X

Fuente: Elaboración propia a partir de información de CEPAL, 2020.

11 El cuadro 11.1 muestra que la implementación de las restricciones a la movilidad interna fue diferente entre los países centroamericanos. Los gobiernos involucrados elaboraron y difundieron argumentos para justificar la aplicación de medidas de restricción de la movilidad destinadas a contener el COVID-19. Sin embargo, poco o nada se explicó sobre la gestión de los efectos de externalización o las consecuencias no deseadas que afectaron a las poblaciones residentes y a los grupos móviles en las zonas fronterizas. En las siguientes secciones se exponen los procesos emprendidos por los gobiernos para imponer medidas de control y algunas consecuencias de estos procesos y medidas que han cambiado la dinámica de las interacciones sociales, comerciales y políticas.

3.1. Costa Rica

12 El 11 de marzo del 2020, la Organización Mundial de la Salud elevó la situación de emergencia de salud pública ocasionada por el COVID-19 a pandemia internacional, hecho que conllevó a que el país adoptara medidas 'inmediatas y eficaces para hacer frente a esta coyuntura' y, a partir del Decreto Ejecutivo número 42227-MP-S del 16 de marzo de 2020, se declaró estado de emergencia nacional (Gobierno de la República de Costa Rica, 2020e).

13 En este escenario, el Gobierno solicitó valorar el contexto epidemiológico nacional e internacional por COVID-19, para fundamentar las medidas sanitarias en materia migratoria, como parte de las acciones esenciales para controlar la recién emergida pandemia. Se tomaron en consideración las características clínicas de la infección (sintomáticos y asintomáticos) como factor para valorar una eventual saturación de los servicios de salud. De esta forma, el 19 de marzo, con 87 casos confirmados (Ministerio de Salud de Costa Rica, 2020), el gobierno impuso restricciones de ingreso a personas extranjeras, mediante el Decreto Ejecutivo N° 42238 - MGP- S N° 42287-MGP-S. En este se indicó que 'sólo podrán ingresar al territorio nacional los costarricenses y las personas extranjeras con un estatus migratorio otorgado por Migración, es decir, personas que ostenten una Categoría Especial, Residencia Temporal o Permanente, y que hayan salido del país antes del 24 de marzo 2020.' De esta forma, se restringió de manera temporal el ingreso al territorio nacional de las personas extranjeras. Además,

se solicitó a la población aislamiento voluntario y se impusieron restricciones vehiculares (Ministerio de Obras Públicas y Transporte – Ministerio de Salud, 2020).

14 Durante los primeros tres meses de haberse declarado estado de emergencia por motivos de salud, Costa Rica fue catalogado como unos de los países de América Latina con mejor manejo de la pandemia (Brooks, 2020). Esta calificación cambió en el mes de julio, debido al aumento en el número de casos, que afectó al estrato socioeconómico más bajo, integrado, principalmente por migrantes que trabajan en las fincas agrícolas situadas en las proximidades de la frontera con Nicaragua y los habitantes de las zonas con mayor índice de pobreza y hacinamiento (Murillo, 2020).

15 El incremento en el número de casos provocó el recrudecimiento de las medidas de cierre de fronteras aéreas, terrestres y marítimas en el territorio nacional, en respuesta a las demandas ciudadanas que exigían garantizar la 'protección' ante la pandemia. Estas demandas tenían un alto contenido xenofóbico, y exigían reforzar el cierre de la frontera con Nicaragua (Adhanom y Etienne, 2020). El gobierno de Costa Rica respondió con un importante despliegue de policías para controlar las fronteras (Gobierno de la República de Costa Rica, 2020a), aun cuando el reporte de casos en el país vecino era muy bajo.

16 Las acciones implementadas en la frontera entre Costa Rica y Nicaragua, generaron una tensión adicional a la ya frágil relación diplomática entre estos países, y afectaron a las personas nicaragüenses que habitan en Costa Rica (Dirección de Integración y Desarrollo Humano, 2017). Además, este cierre de fronteras implicó mayores barreras para solicitantes de refugio, cuyo número ha incrementado significativamente desde la crisis política del régimen de Daniel Ortega del 2018, y también provocó el aumento de los operativos migratorios para deportación de personas nicaragüenses. Adicionalmente, a pesar de que el Gobierno expresó su compromiso de atender a toda persona con síntomas de COVID-19, emitió una orden para no atender a personas migrantes indocumentadas (Ugarte, 2020), medida que posteriormente fue revocada (Ruíz, 2020).

17 La medida de cierre de fronteras, de carácter temporal, se ajustó a partir del último semestre del 2020: apertura de aeropuertos (Gobierno de la República de Costa Rica, 2020b), reducción del control de las personas que ingresan por esta vía (eliminación de prueba de PCR como requisito de ingreso, para incentivar el turismo), pero mantuvo cerradas las fronteras terrestres (Dirección General de Migración y Extranjería de Costa Rica, 2020; Madrigal, 2021). Esto contrasta con el hecho de que los primeros casos "importados" entraron en el país por vía aérea.

3.2. El Salvador

18 El 14 de marzo de 2020, el gobierno de la República de El Salvador emitió el Decreto No. 593, aprobado por la Asamblea Legislativa, con el que declaró 'Estado de Emergencia Nacional, Estado de Calamidad Pública y Desastres Naturales a raíz de la pandemia por COVID-19 [...] por un periodo de treinta (30) días [...] como consecuencia del riesgo e inminente afectación de la pandemia COVID- 19' (Asamblea Legislativa de la República de El Salvador, 2020); sin embargo, su vigencia se extendió hasta 1º de mayo de 2020. A través de este decreto se prohibía la entrada al país de todos los extranjeros, con excepción de los 'residentes permanentes' y los 'diplomáticos', mientras que los

salvadoreños que se encontraban en el exterior debían someterse a cuarentena o a una prueba clínica, para determinar si estaban o no contagiados con COVID-19.

19 Según el gobierno salvadoreño, se estimaba que, de no frenar el ritmo de contagios del COVID-19 -que a la fecha de emitir el decreto se registraban tres casos confirmados- llegarían a 768 el 14 de abril y a 49,152 el 2 de mayo. El peor de los escenarios, calculado por el Ejecutivo del Gobierno, fue de 3,145,728 contagios al 20 de mayo 2021. Desde esta posición, el gobierno justificó 'tomar medidas rápido para detener esa curva progresiva' y señaló al cierre de fronteras y al estado de excepción, como medidas 'muy exitosas' (*Hoy*, 2020).

20 Muchos de los numerosos migrantes, a menudo indocumentados, que transitan por México hacia Estados Unidos proceden de El Salvador. Las autoridades migratorias mexicanas deportan rutinariamente a los migrantes salvadoreños y, a pesar de la pandemia del COVID-19, el gobierno mexicano ha continuado el proceso de deportación utilizando vehículos que cruzan la frontera terrestre. El gobierno salvadoreño, por su parte, ha rechazado a los migrantes salvadoreños devueltos desde terceros países a su llegada, utilizando como justificación las políticas de cierre de fronteras por el COVID-19 (Mariscal, 2020). El 17 de marzo de 2020, el gobierno nacional había ordenado "el cierre inmediato de la pista de aterrizaje del Aeropuerto Internacional Monseñor Oscar Arnulfo Romero de El Salvador, y anunció que los vuelos que ya se dirigían al aeropuerto debían desviarse" (*BBC News*, 2020). El gobierno de El Salvador bloqueó el aterrizaje de un avión procedente de México y con ello la entrada de ciudadanos salvadoreños, alegando que a bordo había "12 individuos infectados con COVID-19", provocando así tensión diplomática entre México y El Salvador. Para la población residente en el país, se intensificaron las acciones de control de la movilidad interna con la aplicación de sanciones, incluido el encarcelamiento, para quienes no cumplieran con esa regla.

3.3. Guatemala

21 El 06 de marzo de 2020, la Presidencia de la República de Guatemala declaró, mediante el Decreto 5-2020, estado de 'Calamidad Pública', en adhesión al pronunciamiento de la Organización Mundial de la Salud, que definía a la epidemia de COVID-19 como emergencia de salud pública mundial (Gobierno de la República de Guatemala, 2020c). En continuidad con las acciones para el control de la epidemia, y habiéndose confirmado el primer caso de COVID-19, el Presidente de la república difundió a través de radio y televisión el Boletín informativo 092-03-2020 (Ministerio de Desarrollo Social, 2020), del 13 de marzo, las medidas 'para mitigar el contagio de Covid-19' (Gobierno de Guatemala, 2020a).

22 Las medidas se establecieron con vigencia del 17 al 31 de marzo de 2020, y con promesa de ser evaluadas en una semana. Estas incluían 15 prohibiciones que afectaban los distintos ámbitos de la vida cotidiana (laboral, socioeconómico y cultural, movilidad de las personas y atención a la salud). En términos laborales, se dispuso la suspensión de actividades en instituciones públicas y privadas. En el ámbito social se prohibieron todos los eventos (educativos, culturales, religiosos, deportivos y entretenimiento) y de cualquier número de personas; se prohibieron las visitas a centros penitenciarios e instituciones de asistencia a personas de la tercera edad; se dispuso el cierre de centros comerciales, bares, discotecas o cualquier otro lugar de diversión, y de cualquier tipo de

establecimiento comerciales, con un horario de aplicación de 21:00 PM a 4:00 AM, excepto farmacias, gasolineras y proveedoras de servicios básicos esenciales. La venta de bebidas alcohólicas quedó prohibida entre las 18:00 y las 5:00 horas. La movilidad de las personas se afectó con la prohibición de la operación del transporte público (urbano y extraurbano), del ingreso de extranjeros al país y con el cierre de las fronteras aéreas, terrestres y marítimas en todo el territorio nacional. La atención a la salud se afectó mediante la restricción de servicios ambulatorios, se prohibió la oferta de consulta externa, para destinar los recursos a la atención de las emergencias por Covid-19. Además, se prohibió el acaparamiento de artículos de primera necesidad, bienes y medicinas (Gobierno de Guatemala, 2020b).

23 El cierre de las fronteras exceptuaba el trasporte de carga, cuyo ingreso y salida del territorio guatemalteco estaba permitido por tierra, aire y mar. Este explicitaba la prohibición de ingreso a personas procedentes de la República Popular de China (o que hayan estado allí un mes antes), Italia, Francia, Alemania, España, Irán, Corea, Inglaterra o Japón, y de salvadoreños, sin importar el lugar donde se encontraran; no obstante, autorizaba el libre ingreso a ciudadanos y residentes guatemaltecos (temporales y permanentes) y al cuerpo diplomático, independientemente del lugar de procedencia, con el requisito de permanecer en cuarentena. El cierre era casi absoluto para el ingreso al país, no así para las salidas, que estaban permitidas por vía terrestre (Instituto Guatemalteco de Migración, 2020).

24 En seguimiento con las medidas sanitarias, el día 21 de marzo, el Congreso de la República publicó el Decreto Número 8-2020, que extendía el estado de calamidad pública.

3.4 Honduras

25 El gobierno de Honduras emitió el decreto ejecutivo PCM-021-2020, cuyo propósito era 'evitar propagación del virus SARS-CoV-2 2', y para ello se ordenaba el 'cierre de fronteras aéreas, terrestres y marítimas en el territorio nacional [...] excepto para el ingreso de hondureños, residentes permanentes y temporales, así como cuerpo diplomático acreditado en el país'. Para éstos, se indicaba que debían permanecer en cuarentena obligatoria de manera inmediata a su ingreso, de acuerdo con los lineamientos de la Secretaría de Salud. Su vigencia se estableció de forma inicial por siete días, a partir de su publicación el 16 de marzo (Gobierno de la República de Honduras, 2020).

26 Además del cierre de fronteras, dicho decreto ordenó importantes restricciones y sanciones a la movilidad interna en el territorio nacional, y estableció que las 'Fuerzas Armadas, la Policía Nacional, la Dirección Nacional de Investigación e Inteligencia y la Fuerza Nacional Interinstitucional (FUSINA)' entre otras instituciones debían 'Detener a toda persona encontrada circulando fuera de las excepciones establecidas' (Artículo 6 del Decreto 021-2020). Dicho decreto se emitió cuando se habían detectado seis casos comprobados de COVID-19 en territorio hondureño.

27 Las acciones gubernamentales de restricción y control de la movilidad poblacional interna se intensificaron al día siguiente de la emisión del Decreto (17.03.2020) y se informó a la prensa que 'los casos confirmados de Covid-19 subieron a nueve y para evitar que el virus se siga propagando anunció la ampliación del toque de queda absoluto indefinido en cuatro regiones de esa nación [...] el Ministro de Seguridad

indicó que la medida se comenzará a aplicar [...] y que no se permitirá absolutamente a nadie la libre circulación en las calles' (*Noticias Deutsche Welle*, 2020d).

28 De forma inicial, dicha medida se aplicó a los habitantes del municipio del Distrito Central (Tegucigalpa y Comayagüela), la ciudad de Choluteca, La Ceiba en Atlántida, y San Pedro Sula. Las medidas de restricción de la movilidad poblacional interna, que de forma inicial se plantearon para siete días, persistían en octubre de 2020 (*Europa Press*, 2021). Por otra parte, la apertura de fronteras terrestres con los países colindantes (El Salvador, Guatemala y Nicaragua), ocurrió siete meses después (*La Vanguardia*, 2020), cuando se estimaban más de 80,000 personas afectadas por COVID-19.

3.5 Nicaragua

29 La información oficial, de acceso público, sobre la pandemia COVID-19 fue escasa en Nicaragua. De acuerdo con los datos disponibles, el gobierno nicaragüense no impuso restricciones en las fronteras, ni cuarentena, o suspensión de actividades laborales y académicas u otros eventos masivos. El presidente declaró 'el combate contra la Covid-19 en Nicaragua ha sido posible gracias al modelo de salud implementado que está orientado a la prevención' (Álvarez, 2020). En tanto, el Ministerio del Poder Ciudadano para la Salud dispuso que no habría restricción de la movilidad y desplazamiento de las personas provenientes de países con riesgo de transmisión, establecidos por la OMS, y sin sintomatología (Ministerio de Salud de Nicaragua, 2020).

30 El esquema de contención implementado en Nicaragua y que, de acuerdo con las cifras oficiales, ha sido exitoso en el control del COVID-19. Sin embargo, la información proporcionada a través de los canales oficiales ha sido muy criticada por varios grupos regionales (incluyendo el Sistema de Integración Centroamericana (SICA)) y entidades internacionales (incluyendo la Organización Panamericana de la Salud (OPS)) que ha llamado al gobierno a revisar y reforzar las acciones de prevención (*Noticias Deutsche Welle*, 2020a). Sin embargo, desde el gobierno se promovió preservar la dinámica social, sin mayores medidas de distanciamiento, con el fin de no afectar la economía del país. Por otro lado, la sociedad civil se organizó para promover el distanciamiento voluntario mediante la campaña 'Quédate en casa', como estrategia para atender la pandemia. La respuesta gubernamental se expresó con el pronunciamiento del presidente Ortega, que calificó estas medidas como 'radicales' y 'extremas' afirmando que '[...] aquí, si se deja de trabajar, el país se muere, el pueblo se muere' (Romero, 2020).

31 En este contexto, los países con fronteras terrestres con Nicaragua aumentaron los mecanismos de control y despliegue policial y Costa Rica impidió el ingreso de más de 15,580 personas nicaragüenses, entre marzo y junio del año 2020 (Gobierno de la República de Costa Rica, 2020c). Dadas las restricciones impuestas por las autoridades costarricenses, el gobierno de Nicaragua optó por cerrar sus fronteras comerciales e impedir el tránsito de mercancías desde y hacia Costa Rica (*Noticias Deutsche Welle*, 2020b), lo cual afectó de manera significativa el comercio centroamericano.

3.6 Panamá

32 El 12 de marzo del 2020, Panamá decretó estado de emergencia, lo cual conllevó a la implementación de una serie de medidas para la contención de casos, siendo uno de los países de la región con mayor número de acciones implementadas, algunas de carácter

nacional y otras diferenciadas según provincia (cuarentena obligatoria, restricción de la movilidad hacia lugares públicos por días y por sexo, toque de queda a partir de las 17 horas y prohibición de circulación los domingos). Además, a partir del 18 de marzo, se implementó el cierre de fronteras (SICA, 2020b).

33 Las medidas implementadas afectaron la 'Operación Flujo Controlado', lo que ocasionó que más de 1,500 migrantes permanecieran retenidos en la provincia de Darién -en el mes de marzo, en condiciones de hacinamiento, carentes de recursos para alimentación e higiene personal- con alta incertidumbre sobre la respuesta del gobierno panameño (Organización Internacional para las Migraciones, 2020a y 2020b). Las medidas también afectaron el tránsito de transportistas a territorio costarricense. Por ello, se implementó un plan piloto binacional (Costa Rica y Panamá), que no tomó en consideración el Plan de Contingencia Regional, aprobado por el Sistema de Integración Centroamericano (SICA) (Gobierno de la República de Costa Rica, 2020d). A pesar de este acuerdo binacional, la apertura de la frontera terrestre entre ambos países fue posterior a la aérea, al igual que en otros países de la región (*Noticias Deutsche Welle*, 2020c).

34 Por otra parte, respecto a la situación epidemiológica y de detección de personas afectadas por COVID-19, las acciones realizadas por el gobierno lograron que Panamá fuera uno de los países de Centroamérica con mayor número de pruebas de detección aplicadas (Lima, 2020) y, en consecuencia, de casos de COVID-19 reportados. La mayor cantidad de casos corresponden a las áreas indígenas de la comarca Ngabe Buglé, Bocas de Toro y frontera Peñas Blancas, así como zonas periféricas, rurales, del país. Eso conllevó a que el Ministerio de Gobierno, en coordinación con el Ministerio de Salud, movilizara recursos para mejorar los servicios básicos y la infraestructura para fortalecer la capacidad de respuesta en salud en los 12 territorios indígenas del país (Oficina del Alto Comisionado de la ONU, 2020).

3.7 México

35 A finales de febrero de 2020, las autoridades de salud de México declararon su apego a los lineamientos de la Organización Mundial de la Salud. Ante lo cual, la Secretaría de Salud (SSA) definió tres fases y estableció las medidas para el control del COVID-19. En la fase 1, en la que los casos de COVID-19 registrados eran de importación, con expresiones en pequeños brotes aislados (decenas de casos), no se restringieron viajes internacionales hacia territorio nacional, y a las personas procedentes de países con transmisión activa se les aplicó el tamizaje para la detección de síntomas relacionados, consistente en la toma de temperatura e interrogatorio (Secretaría de Salud de México, 2020d). Además, se implementó una campaña para el lavado de manos con agua y jabón, entendiéndose que disminuye hasta un 20% las infecciones respiratorias; estornudo de etiqueta (en el ángulo inferior del codo) o sobre pañuelo desechable y tirarlo a la basura, seguido de lavado de manos; quedarse en casa si se está enfermo y usar cubrebocas, si se requiere salir de casa para atención médica; y descanso para una recuperación más rápida (Secretaría de Salud de México, 2020a). Para enfrentar la fase 2 o de propagación comunitaria, expresada en dispersión del virus en una zona localizada (cientos de casos), por ejemplo, en escuelas, colonias o centros de trabajo (Gobierno de México, 2020), el gobierno mexicano implementó la Jornada Nacional de Sana Distancia y el llamado a quedarse en casa de forma voluntaria cada vez que sea

posible (Secretaría de Salud de México, 2020c). La fase 3 epidémica o brotes regionales (propagación amplia, con dispersión del virus por todo el país, contados en miles de casos), se enfrentó mediante la intensificación de las acciones de sana distancia y de quédate en casa, aunado a la suspensión de actividades no esenciales (Secretaría de Salud de México, 2020b).

36 Las medidas, diseñadas según las características de cada una de las fases y el conocimiento obtenido a partir de la experiencia de países que entraron a la epidemia con anterioridad; fueron difundidas a través de canales oficiales (redes sociales institucionales) y de distintos medios de comunicación masiva. El propósito era informar e incidir (Leyva Flores *et al,* 2020) en el comportamiento de la población para mitigar la epidemia, es decir, reducir la cantidad de infecciones, retrasar el avance de la enfermedad y reducir el número de hospitalizaciones (Secretaría de Salud de México, 2020c) para evitar el colapso del sistema de salud (Martín-Moreno, 2020).

37 Adicionalmente, como en otros países, el Gobierno mexicano abrió un canal formal de comunicación con la población a través de conferencias vespertinas diarias, en las que el portavoz del sector de la salud (Subsecretario de Prevención y Promoción de la Salud) informa sobre la situación mundial y local de la pandemia, y la respuesta social e institucional aplicada en su momento y/o la requerida para su control, basada en la evidencia científica disponible. Dichas conferencias se transmiten a través de canales de televisión, YouTube, Facebook (FB), Instagram, Twitter, entre otras.

4. Efectos de las Acciones Implementadas para Controlar la Pandemia de COVID-19 en Centroamérica y México

38 México fue el primer país de la región en reportar oficialmente un caso de COVID-19, el 27 de febrero de 2020, mientras que Nicaragua fue el último, el 19 de marzo. Treinta días después de reportar su primer caso, Panamá fue el país que reportó el mayor incremento, con un total de 2.200 casos, seguido de lejos por México con 848 casos registrados. Al final del primer trimestre, México, con 78.023 casos detectados, presentaba 92 veces el número de casos registrados que tenía durante el primer mes; Costa Rica fue el país con menor crecimiento de casos entre el primer y el tercer mes (2,6 veces). Al contrastar el noveno mes con el primero, se puede encontrar a México en un extremo, con un aumento de casos de 1.286 veces, mientras que El Salvador mostró el menor aumento (227 veces); no hubo información disponible para Panamá en el noveno mes (tabla 11.2).

Tabla 11.2 Tendencia de Casos Confirmados en Centroamérica y México

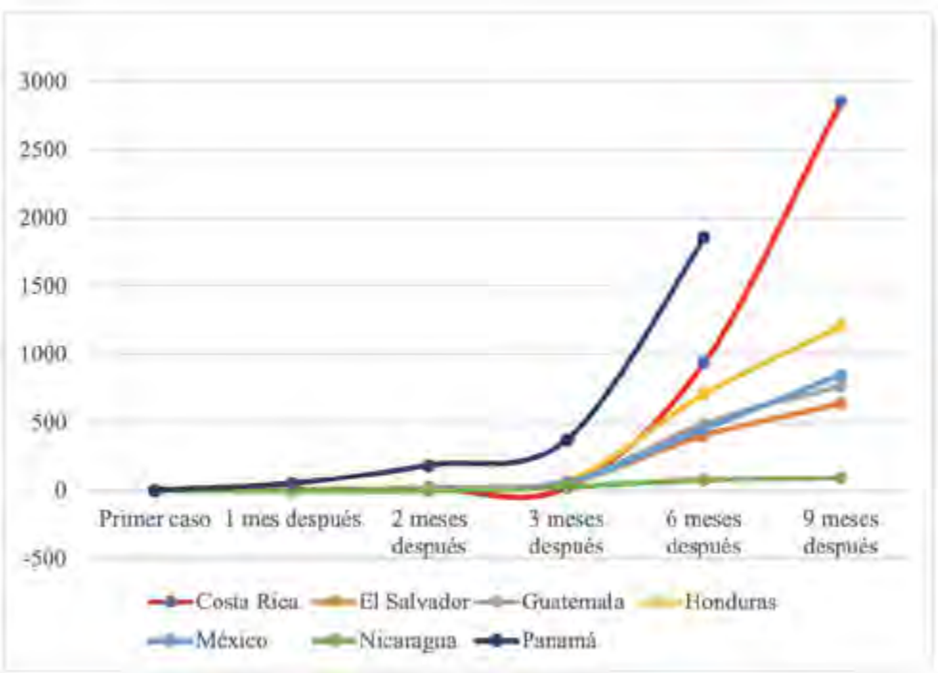
País	Primer caso registrado (entre el 27 de febrero y el 19 de marzo 2020)	Meses después del primer caso registrado				
		1	2	3	6	9
Costa Rica	1	454	755	1,194	47,947	145,845
El Salvador	1	190	1,413	4,066	27,420	43,195

Guatemala	1	181	1,389	9,607	82,136	129,427
Honduras	1	382	1,736	6,450	65,802	112,337
México	1	848	15,529	78,023	579,914	1,090,675
Nicaragua	1	10	25	1,823	4,961	5,938
Panamá	1	2,200	7,900	16,000	79,400	N/A

Fuentes: Elaboración propia con base en información de las Secretarías y Ministerios de Salud de los países centroamericanos y de México.

39 Un análisis de la tendencia de los casos confirmados de COVID-19 por cada 100.000 habitantes, como se muestra en la figura 11.1, permite observar una tendencia común en todos los países durante los tres primeros meses de la pandemia. Esta tendencia común se mantuvo constante durante los seis primeros meses, con la excepción de Panamá, que registró un crecimiento del número de casos mucho más rápido que los demás países (a pesar de importantes restricciones a la movilidad de la población). En el punto final de la medición, nueve meses después del primer caso registrado, Costa Rica registró la mayor tasa (2.853,4 por cada 100.000 habitantes), casi 2,4 veces mayor que el país que ocupa el segundo lugar, Honduras, que registró una tasa de 1.207,5.

Figura 11.1. Tendencia de Casos Confirmados de COVID-19 por 100,000 Habitantes en 2020, Centroamérica y México



Fuentes: Elaboración propia con base en información de las Secretarías y Ministerios de Salud de los países centroamericanos y de México.

5. Discusión

40 Los resultados de este estudio revelan que (utilizando los datos oficiales disponibles) la evolución de la pandemia no ha sido sustancialmente diferente entre los países centroamericanos que aplicaron políticas de confinamiento público obligatorio -toques de queda- junto con medidas de restricción de la movilidad y cierre de fronteras y aquellos, como México y Nicaragua, que optaron por mantener las fronteras abiertas y permitir la libre circulación interna.

41 Con estos resultados, podemos inferir que en Centroamérica acciones como el cierre de fronteras y el control de la movilidad de la población, junto con otras en los que se ven a los países vecinos como fuente de riesgo (Embajada de Italia en España, 2021), funcionaron como medidas relativamente simbólicas y/o políticas, con importantes repercusiones para los derechos humanos y el comercio, mientras que no sirvieron para controlar la pandemia. Aunque desde una perspectiva epidemiológica tradicional se ha establecido que la restricción y el control de los movimientos de la población representan el fundamento de las medidas de contención de las enfermedades infecciosas, entre ellas el SARS-CoV-2 (Honigsbaum, 2017), las pruebas que apoyan esta posición son escasas. Las violaciones de derechos humanos vinculadas a las medidas del COVID-19 se sumaron a las dificultades ya experimentadas por los migrantes en múltiples contextos (Anderson, 2012). No obstante, podrían constituir una oportunidad para entablar un diálogo sobre las políticas en torno a la migración, especialmente en los países desarrollados (Czaika y De-Haas, 2013).

42 Se puede constatar que los movimientos internacionales de población a nivel mundial están relacionados con la transmisión inmediata de enfermedades; sin embargo, este hecho no puede llevar a la respuesta mecánica de imponer el cierre de fronteras como medida eficaz de control de enfermedades, sobre todo si se tiene en cuenta la alta densidad, el ritmo y la concentración de los movimientos que se correlacionan directamente con las regiones de mayor movimiento económico mundial (Banco Mundial, 2020a). Estas regiones pueden ser "puntos de origen" y facilitadores de un "proceso de exportación" global, como ha sido el caso de la pandemia del COVID-19, donde las regiones geográficas de mayor movimiento económico y poblacional coinciden directamente con el origen y la diseminación de la pandemia. En estas circunstancias, el cierre de fronteras siempre será tardío e ineficaz para contener la distribución global de infecciones con altas tasas de transmisión, como ha sido el caso del COVID-19.

43 En los países analizados -México y los países de Centroamérica- los niveles de movilidad son muy bajos en comparación con los estándares globales. Estos países pueden considerarse predominantemente lugares de destino de poblaciones globales, aunque esto contrasta con la forma en que los migrantes internacionales -muchos de ellos viviendo en condiciones de indocumentación- identifican estos lugares como países de origen. A estos grupos móviles se les asigna un papel equivalente al de los vectores (transmisores de agentes infecciosos o patógenos), sobre los que se deben imponer rigurosos procedimientos de máxima restricción de movimiento con el objetivo de controlar la propagación del riesgo (Leyva Flores, 2018). Esto contrasta con otras poblaciones móviles a nivel mundial -turistas, hombres y mujeres de negocios, diplomáticos, europeos, estadounidenses, asiáticos, etc.- que no representan un "riesgo" social para sus destinos previstos. Esta perspectiva puede ayudar a explicar la

aplicación diferencial de las medidas de control de la movilidad entre estos grupos, así como la prioridad otorgada a la reapertura de los aeropuertos centroamericanos a los vuelos procedentes de Europa y Estados Unidos (no de América Latina), a pesar de que los primeros casos "importados" se registraron como ingresados por vía aérea desde estos mismos lugares; mientras tanto, las fronteras terrestres permanecieron cerradas.

44 Las medidas de cierre de fronteras están en consonancia con el Reglamento Sanitario Internacional (OMS, 2005), que subraya la importancia de aplicar medidas de control sanitario, sobre todo en los pasos "fronterizos terrestres", ya que pueden ser el escenario del tránsito informal de individuos, que son considerados propagadores de enfermedades (OMS, 2020b). Por el contrario, se supone que quienes transitan por puertos y aeropuertos están sujetos a un mayor "control" y seguridad que rige sus movimientos. Estas prioridades sirven para revelar el estigma y las actitudes xenófobas o discriminatorias como factores comunes en la política de control de la movilidad, política cuya razón y objetivo van más allá de la dimensión de medidas sanitarias de prevención de enfermedades. Estas políticas sanitarias globales, basadas en una perspectiva de seguridad nacional, contradicen otros marcos de gobernanza global, como los Objetivos de Desarrollo Sostenible 2030, que pretenden reducir las desigualdades, el estigma y la discriminación, buscar alianzas locales y globales para afrontar los retos sociales y sanitarios, y en el caso de las migraciones trabajar por su gestión segura, ordenada y regular.

45 Durante la primera fase de la pandemia, los casos "importados" de COVID-19 eran atribuibles a grupos socioeconómicamente privilegiados -aquellos que se desplazaban en aviones y cruceros- y esto se utilizó como justificación para el cierre de puertos y aeropuertos. Una vez que la pandemia siguió su curso "natural", los grupos afectados se multiplicaron y, reflejando la distribución de la pobreza, los estratos de ingresos más bajos pasaron a ser el principal grupo afectado por el COVID-19 (Banco Mundial, 2020b). Las medidas para restringir la movilidad interna de la población dentro de los países se convirtieron en la principal acción preventiva de los países.

46 La mayoría de los países centroamericanos aplicaron medidas obligatorias para restringir la movilidad de la población, que en casos extremos incluyeron la declaración de circunstancias excepcionales por la emergencia sanitaria y políticas de toque de queda para poblaciones que viven en condiciones de alta vulnerabilidad social. Más del 50% de la población de estos países vive en condiciones de pobreza o pobreza extrema, con altas tasas de desempleo o subempleo y violencia endémica, sin seguridad social, y con instituciones gubernamentales con muy limitada capacidad de proporcionar apoyo social a las comunidades (Banco Mundial, 2021). A esto se suma la baja credibilidad social de estas instituciones, que, mucho antes de la pandemia, ya representaba importantes desafíos para la gobernabilidad y funcionalidad de la administración pública.

47 Además, el cierre de las fronteras generó una serie de consecuencias no deseadas, entre ellas el debilitamiento de las instituciones regionales y el aumento de las tensiones políticas entre los países. El SICA formuló un Plan Regional de Contingencia contra el Coronavirus (SICA, 2020a), que podría haber constituido un instrumento político para facilitar la colaboración entre los países y optimizar el uso de los limitados recursos disponibles. Sin embargo, priorizó los aspectos comerciales frente a otros aspectos relevantes como la movilidad, la migración, los derechos humanos y la salud. Los países optaron por centrarse en respuestas nacionales, generando "brotes" de confrontación

entre los gobiernos y tensando las relaciones diplomáticas -esto incluyó el descrédito de los países por su gestión de la pandemia y el bloqueo del tránsito de personas en las zonas fronterizas, lo que, en contra del efecto deseado, provocó una agrupación masiva de individuos y contribuyó potencialmente a la transmisión del COVID-19. El distanciamiento y la mínima colaboración entre gobiernos fueron síntomas de una estrategia global basada en la seguridad nacional, que relegó a un segundo plano las iniciativas sanitarias construidas a nivel regional. En estas condiciones, la pandemia mantuvo su curso, independientemente del cierre de fronteras y de otras medidas de reducción de la movilidad interna de la población.

48 La información disponible sobre el tema de movilidad global, compuesta por millones de personas que se desplazan diariamente por todo el mundo, cuestiona la justificación del cierre de fronteras y la declaración de circunstancias excepcionales cuando se trata de asuntos sanitarios. A pesar de ello, la historia se repite y las experiencias de los habitantes de Montelupo en el siglo XVII se han trasladado al ámbito mundial; los motivos políticos y los efectos socioeconómicos y sanitarios no difieren hoy de los de hace cuatrocientos años. Las experiencias de las comunidades centroamericanas que han sufrido medidas de control de la movilidad especialmente intensas en El Salvador y Honduras constituyen violaciones de los derechos humanos que pensábamos haber dejado atrás, que creíamos haber superado con nuestras nociones de modernidad y "progreso" (Bauman, 2012, 2014). En México, donde no se impusieron cierres fronterizos ni confinamientos obligatorios, la propagación de la pandemia fue similar a la observada en Centroamérica, sin la consecuencia de las violaciones de derechos evidenciadas en otros países.

6. Conclusiones

49 El cierre de fronteras, los confinamientos obligatorios y las declaraciones de circunstancias excepcionales debido a la emergencia sanitaria contribuyeron a exacerbar las frágiles relaciones entre los gobiernos y las sociedades, crearon violaciones de los derechos humanos y agravaron la débil dinámica social que ya se observaba en la región centroamericana. Mientras tanto, la pandemia siguió su curso, a pesar de las medidas restrictivas aplicadas para reducir la movilidad interna de la población.

50 El cierre de fronteras y las políticas de confinamiento obligatorio no han contribuido a controlar la propagación del COVID-19. No se observaron diferencias en las tendencias del número de casos, ajustado a la población, entre los países que aplicaron estas acciones y los que optaron por no hacerlo.

51 Los países que, como El Salvador, aplicaron medidas extremadamente severas (un toque de queda militar en todo el país y la activación de restricciones a derechos constitucionales) reportaron cifras de casos de COVID-19 similares a las de México, país que centró su respuesta en proporcionar información y apelar a la población para que redujera voluntariamente su movilidad.

BIBLIOGRAFÍA

Adhanom, T. y Etienne C.F. (2020) *Carta a OPS y OMS sobre Nicaragua en la crisis del COVID 19*, letter to the government of Nicaragua, https://cejil.org/publicaciones/carta-a-ops-y-oms-sobre-nicaragua-en-la-crisis-del-covid-19/ (accedido el 22 de junio 2021).

Álvarez, C.F. (2020) 'Nicaragua: Claves para el combate de la Covid-19', *El 19 Digital*, 20 de abril, https://www.el19digital.com/Coronavirus/articulo/titulo:102448-nicaragua-claves-para-el-combate-de-la-Covid-19 (accedido el 16 de enero 2021).

Anderson, B. (2012) 'Who Needs Them? Care Work, Migration and Public Policy', *Cuadernos de Relaciones Laborales*, 30(1), pp. 45–61, DOI: 10.5209/rev_CRLA.2012.v30.n1.39113

Asamblea Legislativa de la República de El Salvador (2020) *Decreto No. 631* (El Salvador: Asamblea Legislativa)., https://www.asamblea.gob.sv/sites/default/files/documents/decretos/B6D83DBF-32D9-4DEF-BE6C-88D49137BC63.pdf (accedido el 1ero de julio 2021).

Banco Mundial (2021) *Unemployment, Total (Percentage of Total Labor Force) (Modeled ILO Estimate)*, https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS (accedido el 23 de junio 2021).

Banco Mundial (2020a) *Transporte aéreo, pasajeros transportados - Nicaragua, Guatemala, El Salvador, Belize, Panamá, Costa Rica, Honduras, México*, https://data.worldbank.org/indicator/IS.AIR.PSGR?locations=NI-GT-SV-BZ-PA-CR-HN-MX (accedido el 16 de enero 2021).

Banco Mundial (2020b) *COVID-19 to Add as Many as 150 Million Extreme Poor by 2021*, conferencia de prensa, 7 de octubre, https://www.worldbank.org/en/news/press-release/2020/10/07/covid-19-to-add-as-many-as-150-million-extreme-poor-by-2021 (accedido el 23 de junio 2021).

Banco Mundial (2020c) *Air Transport, Passengers Carried*, https://data.worldbank.org/indicator/IS.AIR.PSGR (accedido el 16 de enero 2021).

Bauman, Z. (2014) *Mortalidad, inmortalidad y otras estrategias de vida* (Madrid: Sequitur Ediciones).

Bauman, Z. (2012) *Daños colaterales. Desigualdades sociales en la era global.* Ciudad de México: Fondo de Cultura Económica.

BBC News (2020) 'Coronavirus: la polémica entre El Salvador y México por un vuelo con supuestos enfermos de Covid-19', *BBC News*, 17 de marzo, https://www.bbc.com/mundo/noticias-america-latina-51921109 (accedido el 16 de enero 2021).

Brooks, D. (2020) 'Coronavirus en Costa Rica: cuál es la efectiva fórmula en el país de América Latina donde mueren menos pacientes de Covid-19', *BBC News*, 30 de abril, https://www.bbc.com/mundo/noticias-america-latina-52480615 (accedido el 21 de enero 2021).

Cárdenas, H. y V. Corro Ríos (2020) 'Detienen a mil 632 personas durante el fin de semana por incumplir restricciones del toque de queda', *La Prensa Panamá*, 10 de agosto, https://www.prensa.com/judiciales/detienen-a-mil-632-personas-durante-el-fin-de-semana-por-incumplir-restricciones-del-toque-de-queda/ (accedido el 16 de enero 2021).

CEPAL (Comisión Económica Para América latina y el Caribe) (2020) *Dimensionar los efectos del COVID-19 para pensar en la reactivación*, https://www.cepal.org/es/publicaciones/45445-dimensionar-efectos-Covid-19-pensar-la-reactivacion (accedido el 21 de enero 2021).

Cipolla, C. (1984) *¿Quién rompió las rejas de Monte Lupo?* (Madrid: El Aleph).

Coloma, M.A. (2020) 'Siete preguntas sobre el toque de queda: ¿cuál es el importe de las multas?, *Heraldo*, 26 de octubre, https://www.heraldo.es/noticias/aragon/2020/10/26/toque-queda-dudas-respuestas-cual-es-importe-multas-1401983.html (accedido el 18 de enero 2021).

Consejo Municipal de Panamá (2020) 'Acuerdo No. 80 de 28 de abril de 2020', *Gaceta Oficial Digital*, 11 de mayo, https://www.gacetaoficial.gob.pa/pdfTemp/29021/78382.pdf (accedido el 16 de enero 2021).

Czaika, M. y H. De-Haas (2013) 'The Effectiveness of Immigration Policies', *Population and Development Review*, 39(3), pp. 487–508, DOI: 10.1111/j.1728-4457.2013.00613.x

De Gracia, E.M. (2020) 'Sanciones por violar toque de queda, Boletín COVID-19 CCIAP', https://www.panacamara.com/boletinCovid-19cciap/2020/06/21/sanciones-por-violar-toque-de-queda/ (accedido el 18 de enero 2021).

Dirección de Integración y Desarrollo Humano (2017) *Plan Nacional de Integración para Costa Rica. 2018-2022* (San José de Costa Rica: Dirección de Integración y Desarrollo Humano). https://www.migracion.go.cr/Documentos compartidos/DIDH/Plan Nacional de Integración Costa Rica 2018 - 2022.pdf (Accedido el 21 de enero 2021).

Dirección General de Migración y Extranjería (2020), *Cierre de fronteras* (San José: Dirección General de Migración y Extranjería), https://www.migracion.go.cr/Paginas/Cierre-de-Fronteras.aspx (accedido el 16 de enero 2021).

Embajada de Italia en España (2021) COVID-19 (Coronavirus) *Indicaciones de las autoridades españolas e italianas*, 14 de junio, https://ambmadrid.esteri.it/ambasciata_madrid/es/ambasciata/news/dall_ambasciata/emergenza-covid-19-coronavirus.html (accedido el 16 de junio 2021).

Europa Press (2021) 'Honduras prorroga hasta el 6 de junio el toque de queda decretado por la pandemia de coronavirus', *Europa Press*, 24 de mayo, https://www.europapress.es/internacional/noticia-honduras-prorroga-junio-toque-queda-decretado-pandemia-coronavirus-20210524090924.html (accedido el 1ero de julio 2021).

Gobierno de Costa Rica (2020a) 'Histórica integración de todos los cuerpos policiales para proteger las fronteras frente al COVID-19', *Comunicados de la Presidencia de la República de Costa Rica*, 15 de abril, https://www.presidencia.go.cr/comunicados/2020/04/historica-integracion-de-todos-los-cuerpos-policiales-para-proteger-las-fronteras-frente-al-Covid-19/ (accedido el 21 de enero 2021).

Gobierno de Costa Rica (2020b) 'Costa Rica abrirá frontera aérea a todos los países en noviembre', *Comunicados de la Presidencia de la República de Costa Rica*, 16 de octubre, https://www.presidencia.go.cr/comunicados/2020/10/costa-rica-abrira-frontera-aerea-a-todos-los-paises-en-noviembre/ (accedido el 23 de junio 2021).

Gobierno de Costa Rica (2020c) 'Autoridades han rechazado 15.580 extranjeros', *Comunicados de la Presidencia de la República de Costa Rica*, 22 de junio, https://www.presidencia.go.cr/comunicados/2020/06/autoridades-han-rechazado-15-580-extranjeros/ (accedido el 21 de enero 2021).

Gobierno de Costa Rica (2020d) 'Acuerdo entre autoridades de Costa Rica y Panamá ayudará a descongestionar fronteras de la región', *Comunicados de la Presidencia de la República de Costa Rica*, 20 de mayo, https://www.presidencia.go.cr/comunicados/2020/05/acuerdo-entre-autoridades-de-costa-rica-y-panama-ayudara-a-descongestionar-fronteras-de-la-region/ (accedido el 22 de enero 2021).

Gobierno de Costa Rica (2020e) 'Decreto ejecutivo 42227-MP-S', https://www.presidencia.go.cr/bicentenario/wp-content/uploads/2020/03/Decreto-Ejecutivo-42227-Emergencia-Nacional.pdf (accedido el 21 de enero 2021).

Gobierno de Guatemala (2020a) 'Decreto Gubernativo Número 8-2020', *Diario de Centro América*, 20 de abril, https://export.com.gt/covid-19/sites/default/files/pdf/2020-05/DECRETO%20GUBERNATIVO%208-2020.pdf (accedido el 1ero de julio 2021).

Gobierno de Guatemala (2020b) '#InformeNacional: Presidente Alejandro Giammattei da a conocer disposiciones para evitar propagación del coronavirus en el país', página oficial Facebook del gobierno de Guatemala', 17 de marzo, https://srrs.facebook.com/guatemalagob/videos/informenacional-presidente-alejandro-giammattei-da-a-conocer-disposiciones-para-/1072891536418556/ (accedido el 16 de enero 2021).

Gobierno de Guatemala (2020c) 'Decreto gubernativo Número 5-2020', *Diario de Centro América*, 5 de marzo, https://www.contraloria.gob.gt/wp-content/uploads/2020/07/Decreto-Gubernativo-5-2020-COVID-19.pdf (accedido el 1ero de julio 2021).

Gobierno de Honduras (2020) 'Decreto Ejecutivo Número PCM-021-2020', *Comunicados de la Presidencia*, 16 de marzo, https://presidencia.gob.hn/index.php/sala-de-prensa/7016-decreto-ejecutivo-numero-pcm-021-2020 (accedido el 16 de enero 2021).

Gobierno de México (2020) 'Anuncia gobierno federal inicio de fase 2 de la epidemia de COVID-19', *Boletines del Gobierno Federal*, 24 de marzo, https://presidente.gob.mx/anuncia-gobierno-federal-inicio-de-fase-2-de-la-epidemia-de-Covid-19/ (accedido el 16 de enero 2021).

Honigsbaum, M. (2017) 'Between Securitisation and Neglect: Managing Ebola at the Borders of Global Health', *Medical History*, 61(2), pp. 270–294, DOI: 10.1017/mdh.2017.6

Hoy (2020) 'El Salvador en cuarentena obligatoria: el contundente mensaje a los empresarios', *Hoy*, 22 de marzo, https://www.hoy.com.py/mundo/el-salvador-decreta-cuarentena-obligatoria-contundente-mensaje-a-los-empresarios (accedido el 16 de enero 2021).

Instituto Guatemalteco de Migración (2020) *Nacionalidades con restricción de ingreso a Guatemala por Coronavirus (COVID19)*, marzo 2020, https://igm.gob.gt/restricciones-de-ingreso-a-guatemala-por-coronavirus-Covid19/ (accedido el 21 de enero 2021).

La Vanguardia (2020) 'Honduras abre fronteras con El Salvador, Guatemala y Nicaragua pese a COVID', *La Vanguardia*, 19 de octubre, https://www.lavanguardia.com/vida/20201019/484183885216/honduras-abre-fronteras-con-el-salvador-guatemala-y-nicaragua-pese-a-covid.html (accedido el 1ero de julio 2021).

Leyva Flores, R. (2018) 'Conceptos sobre migración y salud: entre las cuarentenas... y los determinantes de la salud', *Cuadernos de Medicina Social*, 58(4), pp. 33–39, https://www.saludymigracion.org/es/system/files/repositorio/7_conceptos_migracion_cuad_med_18.pdf (accedido el 23 June 2021).

Leyva Flores, R., B. Aracena Genao, S. Berenzon Gorn, I. Vargas-Huicochea, G. Millán-Garduño, W.M. Orzúa de la Fuente y A. Carmona Yepez (2020) *Opinión y valoración social de la información situacional sobre la pandemia Covid-19 en México. El mundo en tiempos de pandemia: Covid-19* (México City: Instituto Belisario Domínguez - Senado de la República), pp. 135–146, https://www.researchgate.net/publication/348010009_Opinion_y_valoracion_social_de_la_informacion_situacional_sobre_la_pandemia_covid-19_en_Mexico (accedido el 1ero de julio 2021).

Lima, L. (2020) 'Coronavirus en Panamá: cómo se convirtió en el país de América Latina con más casos nuevos de Covid-19 por número de habitantes', *BBC News*, 9 de julio, https://www.bbc.com/mundo/noticias-america-latina-53313897 (accedido el 21 de enero 2021).

López, Y. (2020) 'Duras sanciones por incumplir Decreto 6-2020', *Diario de Centro América*, 23 de marzo, https://dca.gob.gt/noticias-guatemala-diario-centro-america/duras-sanciones-por-incumplir-toque-de-queda/ (accedido el 16 de enero 2021).

Madrigal, L.M. (2021) 'Costa Rica extiende cierre de fronteras terrestres hasta el 1 de febrero', 4 de enero, *Delfino*, https://delfino.cr/2021/01/costa-rica-extiende-cierre-de-fronteras-terrestres-hasta-el-1-de-febrero (accedido el 16 de enero 2021).

Mariscal, Á. (2020) 'Y ahora... migrantes quedan "atrapados" en México por Covid-19', *Aristegui Noticias*, 25 de marzo, https://aristeguinoticias.com/2503/mexico/y-ahora-migrantes-quedan-atrapados-en-mexico-por-Covid-19/ (accedido el 16 de enero 2021).

Martín-Moreno, J.M. (2020) 'Afrontando el COVID-19: Un reto de colaboración social para evitar el colapso del sistema de salud', *Gaceta Médica*, 20 de marzo, https://gacetamedica.com/opinion/afrontando-el-Covid-19-un-reto-de-colaboracion-social-para-evitar-el-colapso-del-sistema-de-salud/ (accedido el 16 de enero 2021).

Ministerio de Desarrollo Social de Guatemala (2020) 'Disposiciones dictadas por el presidente Alejandro Giammattei para enfrentar el #CoronavirusGT COVID-19', *página oficial Twitter del Ministerio de Desarrollo Social de Guatemala,* 17 de marzo, https://twitter.com/midesgt/status/1239939685734105091 (accedido el 16 de enero 2021).

Ministerio de Obras Públicas y Transporte y Ministerio de Salud de Costa Rica (2020) 'Decreto 42295. Restricción Vehicular Diurna ante el estado de emergencia nacional en todo el territorio costarricense por el COVID-19', *Repositorio sectorial del Ministerio de Obras Públicas y Transportes*, http://repositorio.mopt.go.cr:8080/xmlui/handle/123456789/4281 (accedido el 16 de enero 2021).

Ministerio de Salud de Costa Rica (2020) *Situación Nacional COVID-19*, https://www.ministeriodesalud.go.cr/sobre_ministerio/prensa/img_cvd/img_datos_marzo_2020_09.jpeg (accedido el 16 de enero 2021).

Ministerio de Salud de Nicaragua (2020) *Medidas Frente al Coronavirus*, http://www.minsa.gob.ni/index.php/repository/Descargas-MINSA/Columna-Derecha/Medidas-Frente-al-Coronavirus (accedido el 1ero de julio 2021).

Ministerio de Transportes públicos y Ministerio de Salud de Costa Rica (2020) 'Decreto 42295. Restricción Vehicular Diurna ante el estado de emergencia nacional en todo el territorio costarricense por el COVID-19', *Repositorio sectorial del Ministerio de Obras Públicas y Transportes*, http://repositorio.mopt.go.cr:8080/xmlui/handle/123456789/4281 (accedido el 16 de enero 2021).

Murillo, Á. (2020) 'Coronavirus: Costa Rica pierde el control de la pandemia', *El País,* 14 de julio, https://elpais.com/sociedad/2020-07-14/costa-rica-pierde-el-control-de-la-pandemia.html (accedido el 21 de enero 2021).

Noticias Deutsche Welle (2020a) 'OPS preocupada por inadecuada prevención de Nicaragua ante pandemia', 7 de abril, https://www.dw.com/es/ops-preocupada-por-inadecuada-prevención-de-nicaragua-ante-pandemia/a-53054773 (accedido el 21 de enero 2021).

Noticias Deutsche Welle (2020b) 'Costa Rica y Nicaragua desbloquean frontera para transporte de carga: Las noticias y análisis más importantes en América Latina', 1er junio, https://

www.dw.com/es/costa-rica-y-nicaragua-desbloquean-frontera-para-transporte-de-carga/a-53646648 (accedido el 21 de enero 2021).

Noticias Deutsche Welle (2020c) 'Panamá reabre fronteras a vuelos comerciales para turistas', *Deutsche Welle*, 13 de octubre, https://www.dw.com/es/panamá-reabre-fronteras-a-vuelos-comerciales-para-turistas/a-55251607 (accedido el 16 de enero 2021).

Noticias Deutsche Welle (2020d) 'Honduras amplía toque de queda absoluto en cuatro regiones por COVID-19', 18 de marzo, https://www.dw.com/es/honduras-amplía-toque-de-queda-absoluto-en-cuatro-regiones-por-Covid-19/a-52816601 (accedido el 16 de enero 2021).

Oficina del Alto Comisionado de la ONU (2020) *COVID-19 and Indigenous Peoples' Rights. What is the Impact of COVID-19 on Indigenous Peoples' Rights?*, https://www.ohchr.org/Documents/Issues/IPeoples/OHCHRGuidance_COVID19_IndigenousPeoplesRights.pdf (accedido el 21 de enero 2021).

OIM (Organización Internacional para las Migraciones) (2020a) *Seguimiento a la emergencia: Estaciones de recepción migratoria- Pandemia COVID 19*, Reporte de situación #16, https://migration.iom.int/reports/panama-seguimiento-la-emergencia-estaciones-de-recepción-migratoria-pandemia-Covid-19-10-23 (accedido el 16 de enero 2021).

OIM (2020b) *Seguimiento a la emergencia: Estaciones de recepción migratoria- Pandemia COVID 19*, Reporte de situación #6 (Panamá: OIM), https://migration.iom.int/reports/panama-seguimiento-la-emergencia-estaciones-de-recepción-migratoria-pandemia-Covid-19-3 (accedido el 16 de enero 2021).

OMS (Organización Mundial de la Salud) (2020a) *Declaración sobre la segunda reunión del Comité de Emergencias del Reglamento Sanitario Internacional (2005) acerca del brote del nuevo coronavirus (2019-nCoV)*, 30 de enero, https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov) (accedido el 16 de enero 2021).

OMS (2020b) *Control de propagación de COVID-19 en los pasos fronterizos terrestres*, Boletín de la OMS (Ginebra: OMS), https://apps.who.int/iris/bitstream/handle/10665/332165/WHO-2019-nCoV-Ground_crossings-2020.1-eng.pdf?sequence=1&isAllowed=y (accedido el 21 de enero 2021).

OMS (2020c) *2019-nCoV Outbreak: First Cases Confirmed in Europe*, https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/01/2019-ncov-outbreak-first-cases-confirmed-in-europe (accedido el 31 de agosto 2021).

OMS (2017) *Emergencias sanitarias. Respuesta de la OMS a las emergencias graves a gran escala*, Reporte del Director General, 10 de abril, A70/9.

OMS (2005) *Reglamento Sanitario Internacional.* Ginebra: OMS, https://www.who.int/publications/i/item/9789241580410 (accedido el 1ero de julio 2021).

Onda Cero (2020) 'Multas toque de queda: ¿Cuánto hay que pagar por saltarse el horario de toque de queda en Navidad?', *Onda Cero*, 24 de diciembre, https://www.ondacero.es/noticias/sociedad/multas-toque-queda-cuanto-hay-que-pagar-saltarse-horario-toque-queda-navidad_202012235fe42ba3bc50ef0001fba0ad.html (accedido el 16 de enero 2021).

OPS (Organización Panamericana de la Salud) (2020) *Directora de OPS: Las Américas debe prepararse para responder a casos importados, brotes y transmisión comunitaria de la COVID-19. OPS Media Center*, 6 de marzo, https://www3.paho.org/hq/index.php?option=com_content&view=article&id=15753:paho-director-the-americas-must-prepare-to-respond-to-imported-cases-outbreaks-and-community-transmission-of-covid-19&Itemid=1926&lang=en (accedido el 21 de enero 2021).

Paterlini, M. (2020) '"Closing Borders Is Ridiculous": The Epidemiologist behind Sweden's Controversial Coronavirus Strategy', *Nature*, 580(574), DOI: 10.1038/d41586-020-01098-x

Romero, D.L. (2020) '5 insólitas cosas que ocurren en Nicaragua mientras los expertos advierten de la "grave" falta de medidas ante la pandemia', *BBC News*, 4 de mayo, https://www.bbc.com/mundo/52530594 (accedido el 21 de enero 2021).

Ruíz, P. (2020) 'CCSS deja sin efecto polémica directriz que exigía presencia de policías para atender migrantes sin documentos', *El Observador*, 11 de junio, https://observador.cr/noticia/ccss-deja-sin-efecto-polemica-directriz-que-exigia-presencia-de-policias-para-atender-migrantes/ (accedido el 21 de enero 2021).

Secretaría de Salud de México (2020a) 'Inicia la fase 3 por COVID-19', conferencia de prensa, 21 de abril, https://www.gob.mx/salud/prensa/110-inicia-la-fase-3-por-covid-19 (accedido el 1ero de julio 2021).

Secretaría de Salud de México (2020b) *Sana distancia COVID-19*, https://www.gob.mx/salud/documentos/sana-distancia (accedido el 1ero de julio 2021).

Secretaría de Salud de México (2020c) *Conferencia 29 de febrero*, https://coronavirus.gob.mx/2020/02/29/conferencia-29-de-febrero/ (accedido el 16 de enero 2021).

Secretaría de Salud de México (2020d) 'México permanece en fase uno por COVID-19', conferencia de prensa, 12 de marzo, https://www.gob.mx/salud/prensa/086-mexico-permanece-en-fase-uno-por-covid-19 (accedido el 1ero de julio 2021).

Sequeira, A. (2020) 'Multas por restricción vehicular sanitaria bajarían de ¢107.000 a ¢23.000 y ya no se retiraría la placa', *La Nación*, 2 de septiembre, https://www.nacion.com/el-pais/politica/multas-por-restriccion-vehicular-sanitaria/YJPJZ3A6GBDCJNAVP4FYGPK5NI/story/ (accedido el 16 de enero 2021).

SICA (Sistema de Integración Centroamericana) (2020a) *Plan de Contingencia Regional del SICA frente al Coronavirus,* https://www.sica.int/coronavirus/plan (accedido el 12 de abril 2021).

SICA (2020b) *Decretos y medidas adoptadas por Panamá*, https://www.sica.int/coronavirus/observatorioSICACOVID19/medidas/panama (accedido el 16 de enero 2021).

Tornafoch, X. (2020) '¿Quién rompió las rejas de Montelupo?', *El Cuaderno*, abril 2020, https://elcuadernodigital.com/2020/04/17/quien-rompio-las-rejas-de-montelupo/ (accedido el 21 de enero 2021).

Ugarte, O. (2020) 'Área de salud de Los Chiles prohíbe atender migrantes indocumentados sin presencia de Fuerza Pública o Migración', *Semanario Universidad*, 5 de junio, https://semanariouniversidad.com/pais/area-de-salud-de-los-chiles-prohibe-atender-migrantes-indocumentados-sin-presencia-de-fuerza-publica-o-migracion/ (accedido el 21 de enero 2021).

RESÚMENES

Una de las primeras prácticas usadas para el control de la epidemia de Covid-19, a nivel mundial, fue la restricción de la movilidad poblacional, mediante el cierre de aeropuertos, fronteras terrestres y marítimas, restricción de movilidad y el confinamiento poblacional obligatorio. Estas acciones no exceptuaron a América Latina, ya que varios países de la región, incluido Centroamérica, implementaron, entre otras, el cierre de fronteras y el denominado toque de queda. Entre tanto, otros, como México, optaron por la implementación de medidas de carácter persuasivo, que apelaban a la buena voluntad ciudadana, mediante el llamado a quedarse en casa,

el lavado frecuente de manos y la provisión de información diaria sobre la situación de la epidemia. Se podría suponer que estas intervenciones -en extremos divergentes-, tengan efectos distintos sobre la evolución de la pandemia. Por ello, el presente trabajo tuvo como objetivo analizar las medidas implementadas en Centroamérica y México, y su relación con la evolución de la pandemia de Covid-19, (por tendencia del número de casos), comparando los países en Centroamérica y México. Se utilizaron fuentes documentales provenientes de publicaciones gubernamentales y de informaciones recogidas en medios de comunicación, que daban información sobre las acciones realizadas para controlar la Covid-19 así como los informes epidemiológicos de cada país. La curva epidemiológica, que resume la tasa de casos confirmados por 100,000 habitantes, no muestra diferencias entre países centroamericanos, que implementaron el cierre de fronteras y toque de queda, y México, donde no se implementaron estas acciones. El cierre obligatorio de fronteras y las restricciones a la movilidad interna en los países centroamericanos -con la excepción de Nicaragua, que no impuso ninguna de las dos cosas, y Costa Rica, que impuso controles fronterizos pero sólo restricciones internas mínimas- fueron considerados como violaciones de los derechos humanos.

ÍNDICE

Keywords: governance, migration, migration policies, global south, COVID-19, human rights, security
Índice geográfico: America Latin and Caribbean, Mexico, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama

AUTORES

RENÉ LEYVA FLORES

Profesor-investigador en el Instituto Nacional de Salud Pública (INSP) y miembro del Sistema Nacional de Investigadores de México (SNI). Investigador en Ciencias Médicas “E” en el INSP. Investigador Nacional nivel II del SNI. Director de Evaluación de Sistemas y Economía de la Salud (INSP), y Coordinador de la Unidad de Estudios sobre Migración y Salud (UMyS). Áreas de interés: políticas de salud, movilidad poblacional-migración y salud, inequidad social en salud.

KAROL ROJAS

Docente e Investigadora de la Escuela de Salud Pública de la Universidad de Costa Rica. Sus áreas de interés son investigación de sistemas y servicios de salud, sistemas de protección social, salud y migración, políticas públicas en salud, gestión y evaluación de políticas y programas en salud y salud global.

BELKIS ARACENA

Belkis Aracena es profesora-investigadora en el Instituto Nacional de Salud y miembro del Sistema Nacional de Investigadores de México. Ha colaborado en diversos proyectos científicos en los que se han estudiado distintos problemas de salud pública, desde una perspectiva económica. Sus principales áreas de interés son la administración de los sistemas y servicios de salud y la evaluación económica -utilizada como herramienta para disminuir la desigualdad e injusticia social.

frontiers | Frontiers in Public Health

ORIGINAL RESEARCH
published: 15 April 2022
doi: 10.3389/fpubh.2022.877465

A Window Into Mental Health: Developing and Pilot-Testing a Mental Health Promotion Intervention for Mexican Immigrants Through the *Ventanilla de Salud* Program

Delia Lilian Martínez Rodríguez [1,2]***, Tonatiuh González Vázquez*** [3]*****,***
Margarita Márquez Serrano [3]***, Mary de Groot*** [4]***, Alicia Fernandez*** [5] ***and***
Ines Gonzalez Casanova [6,7]*****

[1] School of Public Health of Mexico, National Institute of Public Health, Cuernavaca, Mexico, [2] Oaxaca Health Services, Oaxaca, Mexico, [3] Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Mexico, [4] Indiana University School of Medicine, Indianapolis, IN, United States, [5] Department of Medicine, San Francisco School of Medicine, University of California, San Francisco, San Francisco, CA, United States, [6] Department of Applied Health Science, Indiana University Bloomington School of Public Health, Bloomington, IN, United States, [7] Hubert Department of Global Health, School of Public Health, Emory University, Atlanta, GA, United States

OPEN ACCESS

Edited by:
Yuka Kotozaki,
Iwate Medical University, Japan

Reviewed by:
Yu Yu,
Yale University, United States
Sitong Chen,
Victoria University, Australia

****Correspondence:***
Tonatiuh González Vázquez
tonatiuh.gonzalez@insp.mx
Ines Gonzalez Casanova
inegonza@iu.edu

Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Public Health

Received: *16 February 2022*
Accepted: *24 March 2022*
Published: *15 April 2022*

Citation:
Martínez Rodríguez DL, González Vázquez T, Márquez Serrano M, Groot Md, Fernandez A and Gonzalez Casanova I (2022) A Window Into Mental Health: Developing and Pilot-Testing a Mental Health Promotion Intervention for Mexican Immigrants Through the Ventanilla de Salud Program. Front. Public Health 10:877465. doi: 10.3389/fpubh.2022.877465

Background: Mexican immigrants in the United States face mental health challenges, disparities, and limited access to healthcare; however, mental health promotion efforts specifically targeting this population have been insufficient. The objective of this study was to develop and test a mental health promotion intervention based on protective mental health factors and coping strategies for Mexican immigrants recruited through a free, consulate-based program in Atlanta.

Material and Methods: Working with the Ventanilla de Salud program, we conducted a longitudinal study in three phases: formative research and design, pre-intervention assessment and post-implementation evaluation. The intervention was designed based on the health promotion model and interviews with stakeholders. Qualitative information was collected by semi-structured interviews with participants before and after the intervention. Quantitative outcomes were knowledge about protective factors and coping mechanisms, and psychosocial distress. Differences were assessed using the Wilcoxon non-parametrical test. Intent-to-treat analysis was conducted with all participants who signed the informed consent (carrying last observation forward), and a complete case analysis was conducted with those who attended at least 70% of the sessions and completed the post- implementation evaluation.

Results: Twenty-five participants were enrolled in the intervention. Mean age was 38 years, and the majority were women. Only nine participants attended at least 70% of the sessions and completed the final evaluation. Men, those who did not complete high school, and workers in service or construction jobs were more likely to drop out. Knowledge about protective factors [pre- vs. post-intervention median (inter-quartile range) = 111 (100, 120) vs. 115 (100, 124)] and coping mechanisms [96 (85, 104) vs. 99 (90, 110)], as well as psychosocial distress [3 (2, 3) vs. 2 (2, 3)] improved after the

Martínez-Rodríguez DL, González-Vázquez T, Márquez-Serrano M, Groot M, Fernández A, González-Casanova I. A window into mental health: developing and pilot-testing a mental health promotion intervention for Mexican immigrants through the Ventanilla de Salud program. Front Public Health. 2022;10:877465. https://doi.org/10.3389/fpubh.2022.877465

intervention in both intent-to treat and complete case analyses ($p < 0.05$). Qualitative results also support improvements in targeted protective factors.

Discussion: The intervention was successful in improving psychological distress among Mexican immigrants. These results support the implementation of evidence-based mental health promotion interventions among Mexican immigrants via free and familiar programs. A limitation was the high attrition; future studies should explore approaches to improve retention in this population.

Keywords: mental health, health promotion, Mexican immigrants in the United States, community based mental health, protective factors, coping strategies

INTRODUCTION

Mexicans are the second largest migrant group in the world and the largest immigrant group in the United States, where there were ∼12.3 million in 2019 (1). This population faces migration-related mental health challenges, socioeconomic disparities, and limited access to healthcare (2). It is estimated that, in 2019, 5.6 million Mexican immigrants in the US were undocumented, 20% lived in poverty and ∼38% did not have access to health insurance (3). This makes linking Mexican immigrants to preventive services or healthcare very challenging, and often results in an accelerated deterioration of the health and wellbeing of this population, which translates into human and economic losses.

Latin American immigrants, including Mexicans, are at high risk of psychological distress and mental illness. A study of mental health among recently arrived Latino immigrants found a prevalence of depression of 26%—three times that of the US population (4). Similarly, migration-related loss and distress were present in all participants in a recent study of undocumented immigrants from Mexico (5). A political climate in the US that emphasized prosecution of undocumented immigrants, fear of being deported, language barriers, and socioeconomic challenges also has impacted the mental health of recent Mexican immigrants. Depression, anxiety, stress, addictions, gender violence, acculturative stress, and Immigrant Syndrome of Chronic and Multiple Stress (also known as Ulises Syndrome) have all been associated with the process of migration (6–8).

Interventions that support the development of coping strategies have been successful in improving mental health and preventing depression and anxiety symptoms in minoritized populations (9, 10). Coping strategies have been defined as group or individual decisions that support adaptation, managing new situations, problem solving, and emotional regulation when dealing with loss or stress. These strategies are the foundations for protective factors including adaptability, social support, and healthy habits (11). Mental health promotion interventions based on coping strategies could be especially important for Mexican immigrants; however, reaching this population can be challenging, and the lack of culturally tailored interventions has made addressing mental health risk factors in this group particularly difficult. Perhaps because of this, there are limited examples in the literature of mental health promotion interventions for Mexican immigrants in the United States (12–15). Most of these efforts have focused on screening and referrals rather than on education or training in mental health coping skills. In this study, we took advantage of a Ventanilla de Salud (VDS) which allowed us to reach Mexican immigrants through a free and familiar program, and design to design and test an evidence-based intervention with the potential to be scaled up through the VDS program.

The VDS program is a health promotion initiative offered through the fifty General Consulates of Mexico in the United States. A very large program, estimated to interact with over one million immigrants per year (16), it plays an important role providing preventive services and linkage to healthcare for Mexican immigrants and could provide an opportunity to address the gap in mental health promotion services among immigrants. Accordingly, as part of a thesis project (17), we developed a mental health promotion intervention based on coping strategies and protective factors and pilot-tested it among Mexican immigrants recruited through the VDS program in Atlanta, which provides preventive services and health education to Mexican immigrants in the Southeast of the United States.

METHODS

Overview and Theoretical Framework

We conducted a longitudinal study in three phases: formative research and design, pre-intervention assessment and post implementation evaluation. We used a mixed methods approach based on the health promotion model that conceptualizes health as a positive state and aims to improve individuals' wellbeing. This model focuses on individual experiences, behavior-related cognitions and affect, and behavioral outcomes (18). Quantitative and qualitative information was collected in these domains.

For the development of the intervention, we followed the World Health Organization's recommendations for mental health promotion that identifies protective and risk factors (19). Protective factors of mental health refer to conditions that improve people's resilience to risk factors and disorders. They have been defined as those factors that modify, ameliorate, or alter a person's response to some environmental hazard that predisposes to a maladaptive outcome. Risk factors are associated with an increased probability of onset, greater severity and

longer duration of major mental health problems (20, 21). In this case, we considered social support networks, adaptability, positive mental health habits, and coping mechanisms, including emotional regulation and stress management when faced with problems, as target protective factors for the intervention.

The educational sessions of the intervention were based on emotional education, which has been previously applied with adults for health purposes (22, 23) and is defined as an educational process, continuous and permanent, whose objective is to promote emotional development as a complement to cognitive development, for the development of a holistic personality. To do this, emotional education promotes the development of knowledge and skills about emotions in order to enable the individual to better face the challenges that arise in daily life (24). Objectives of emotional education are to acquire a better knowledge of one's own emotions, identify the emotions of others, develop the ability to regulate one's own emotions, prevent the harmful effects of negative emotions, develop the ability to generate positive emotions and the ability to positively relate emotionally with others (25).

Setting

The General Consulate of Mexico in Atlanta serves primarily Mexicans living in the states of Georgia, Alabama, and Tennessee. Within this consulate, the VDS Atlanta offers preventive services and health promotion through education, glucose, weight and hypertension screenings, and referrals to community clinics and low-cost services. In 2019, the VDS Atlanta was funded through a partnership between the Mexican Government and Emory University's School of Public Health and provided services to ∼30,000 people.

Formative Research

The formative research consisted in non-participatory ethnographic observation of the functioning, practices and services provided at the VDS Atlanta, three semi-structured interviews with VDS personnel, and a group interview with three VDS clients. The interviews were conducted by the team psychologist (DLMR) and lasted ∼30 min. The topics covered in the interviews were activities and programs conducted by the VDS, barriers to mental health care and prevention, and mental health challenges faced by Mexicans living in the Southeast of the US. Information was summarized into a report highlighting recommendations and potential challenges to implement a mental health intervention. The content of the intervention was adjusted based on results from this phase.

Design and Implementation

The design and implementation of the mental health intervention at the General Consulate of Mexico in Atlanta is summarized in **Figure 1** and a detailed description is presented next.

Participant Recruitment

Participant recruitment was conducted in person at the General Consulate of Mexico in Atlanta between December 2019 and February 2020. The team psychologist (LM) conducted 5–15 min health education talks for Mexicans in the waiting room of the consulate while their documents were being processed and invited them to participate in the intervention; additionally, posters and promotional materials were posted at the consulate, and an invitation to participate in the intervention was posted on the VDS Atlanta Facebook page. Interested participants received a screening and were enrolled in the study if they met the inclusion and exclusion criteria and provided written informed consent to participate in the study. The study was a project to obtain a master's degree in public health (17) approved by Ethics Board of the Mexican National Institute of Public Health (534-R71) and by Emory University Institutional Review Board (IRB00114514).

Inclusion criteria included: age 18 years or older, expressing need or interest in improving their mental health during their visit to the VDS, having an electronic device with internet connection, and being able to read and write. Exclusion criteria included: presence of a severe mental illness that required acute clinical care or having a visual, auditive, or cognitive impairment that impeded their participation in the sessions or in the evaluation.

Intervention Design

This pre-post single arm intervention consisted of ten 120-min group sessions that covered protective factors (social networks, healthy mental health habits, adaptability) and coping strategies (emotional regulation, stress management, and tools to deal with anxiety).

The intervention was conducted between February and May 2020. For the first three sessions, in-person and online options were provided; the remaining sessions were online only. The online component was planned in response to the formative research phase based on concerns related to participants traveling to the consulate on a weekly basis, and on the location of the team psychologist who is based in Mexico. The intervention period also coincided with the COVID-19 pandemic, limiting travel. The online sessions were conducted synchronically through the Virtual platform; they were also recorded and posted on the closed Facebook group that was created for the intervention participants. The closed Facebook group was used as an additional tool to reinforce the session content and was used by the team psychologist to provide instructions and additional material on a weekly basis. Links to the weekly synchronous meetings and pre-post evaluation surveys were posted on this page.

Participants also were given the opportunity of up to two one-on-one meetings with the team psychologist after sessions 5 and 8. The objective of these sessions was to reinforce the material that was being covered during the sessions, to discuss individual progress and challenges, and to address any concerns or issues being faced by the participants. These sessions lasted 45–60 min. Throughout the intervention, the psychologist observed participants to see if there was additional need of emotional support through community referrals.

Evaluation

The evaluation included a quantitative and a qualitative component before and after the intervention (pre-intervention

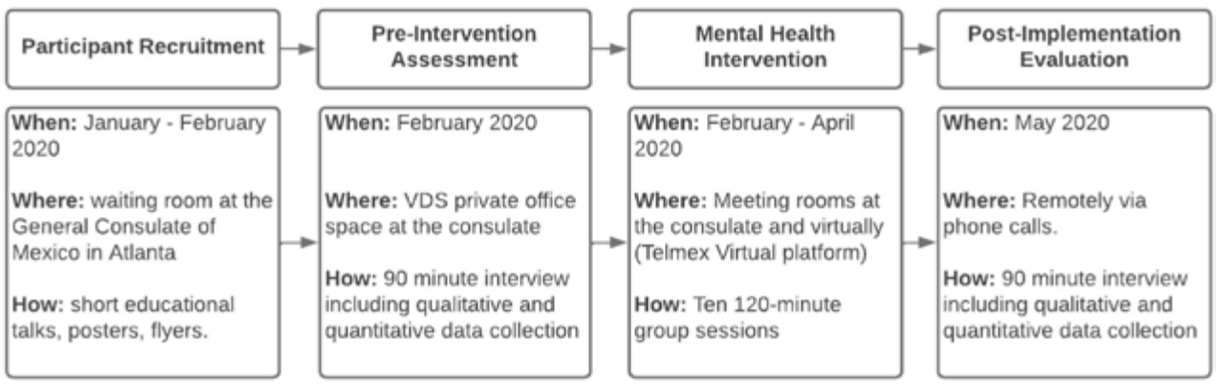


FIGURE 1 | Intervention flowchart.

assessment and post-implementation evaluation), and a process evaluation.

The pre- intervention assessment was conducted in person at the General Consulate of Mexico in Atlanta. It had an average duration of 90 min including the qualitative and quantitative components. The process evaluation was conducted during the third and seventh session to assess the method, materials, logistics, activities, and tools; it had the goal of identifying salient issues and improving the remaining sessions. The post-implementation survey and interview evaluation was conducted remotely a month after the last session.

Quantitative Data Collection

Knowledge

This questionnaire measured knowledge about mental health protective factors, based on the Mental Health and Coping Skills of College Students, and knowledge about coping skills based on the Nursing professional coping attitudes questionnaire, which was used in Hispanic populations (26), and was adapted and pilot tested for this study with returning migrants in Mexico These questionnaires have 38 and 30 questions, respectively, follow a Likert scale, and took ∼20 min to complete. The mental health protective factors knowledge questionnaire can be categorized to assess the level of knowledge into "very low" (1–47), "low" (48–95), "medium" (96–142) and "high" (143–190), it has high validity ($p < 0.01$) and reliability ($\alpha = 0.93$) (26). The coping skills questionnaire can be categorized into "deficient" (1–37), "low" (38–75), "medium" (76–112), and "high" (113–150) and also had high validity ($p = 0.02$) and reliability ($\alpha = 0.70$) (27).

Psychological Distress

We used the Kessler Psychological Distress Scale (20), a 10-item questionnaire designed to provide a global measure of distress based on questions about anxiety and depressive symptoms. It uses a Likert Scale and provides an assessment of psychosocial distress: "low" (10–15), "moderate" (16–21), "high" (22–29) and "very high" (≥30) (28, 29).

Qualitative Data Collection

Semi-structured Interviews

Semi-structured interviews were conducted during the pre and the post evaluation. The pre- intervention interview was conducted in person in the Ventanilla de Salud private office space at the consulate and lasted ∼45–60 min. The topics covered included sociodemographic information, family and individual mental health history, current mental health, effects of migration on mental health, protective factors and coping mechanisms. People with severe mental illness were excluded from the study and referred to local community resources.

The post- interviews were conducted remotely a month after the last session, they also had a duration of 45–60 min and included the following themes: current mental health status, protective factors and coping skills.

Data Analysis

Quantitative

Data collected using the questionnaires were entered into an Excel (v16.3) dataset. Likert scales were converted into numerical values going from 1 to 5. To assess changes in pre- and post-values we used the Wilcoxon non-parametric test, this was selected due to the small sample size and because the data did not meet the normality assumption. Following analysis recommendations for pre-post designs (30), the intent-to-treat analysis included all participants with pre-intervention information and complete case analysis was restricted to participants who attended at least 70% of the sessions and had post-implementation information. The process evaluation data were entered into a Google Form and then descriptive statistics were used to analyze them. All quantitative analyses were conducted using STATA v.15.

Qualitative

Interview data were transcribed into a Microsoft Word (v16.3) document and content matrices were created manually. These were analyzed using deductive codes based on the theoretical framework and the themes that were pre-specified during the development of the interview

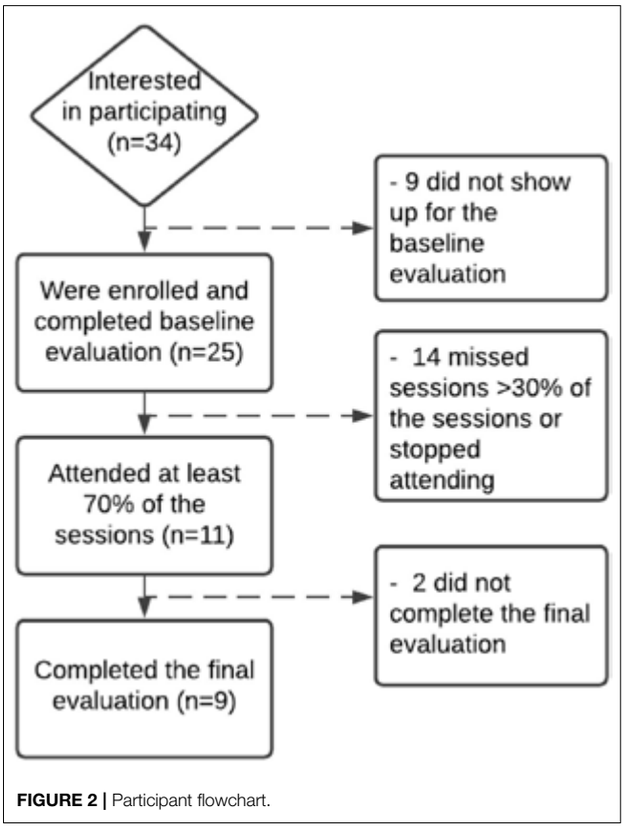


FIGURE 2 | Participant flowchart.

guides. This was further complemented using inductive coding, incorporating themes that had not been considered a priori.

Quantitative and qualitative data was triangulated for the final intervention evaluation report.

RESULTS

Baseline Characteristics

Thirty-four participants expressed interest in participating, met the inclusion criteria, and were invited to the complete the pre-evaluation and participate in the sessions. Twenty-five participants signed the informed consent, completed the pre-evaluation, and were added to the Facebook group. Nine attended at least 70% of the sessions and completed the post-evaluation (**Figure 2**). The average attendance per session was of eleven people, with a minimum attendance of eight and a maximum of thirteen. Most participants who were lost to follow up did not show up to any session. The main reported reasons for not showing up were technical challenges using the platform ($n = 6$), time constraints ($n = 4$), unexpected circumstances such as change of job ($n = 3$), fear of legal consequences as an undocumented immigrant ($n = 2$), and shame of speaking in front of other participants ($n = 1$).

Sociodemographic Characteristics of Study Participants

Participants were on average 39.8 (SD = 9.5) years and the majority (89%) were women. In general, participants that were included in the intervention were similar to those who were excluded from the pre-post evaluation due to missing sessions or not completing the post-evaluation. The main differences between these two groups were that workers in construction, cleaning, or cooking, and participants located outside of Georgia were more likely to not participate in 70% of sessions (**Table 1**).

Group Characteristics From Qualitative Pre-intervention Evaluation ($n = 25$)

Five topics related to the characteristics of the group were identified in the semi-structured interviews implemented during the pre-evaluation: reasons for migration, immigration experience, physical and mental health, risk factors for mental health, and challenges accessing mental health services.

Reasons for Migration

Participants mentioned being encouraged by others as important reasons to migrate to the US. Some had been brought by their parents when they were still underage. Women mentioned traditional gender roles as the reason to come to the US following their husbands or sons. Economic factors also influenced this decision, some participants mentioned that their parents or partners suggested that they migrate to improve their socioeconomic status.

Migration Experience

Participants discussed their experiences with migration in terms of time in the US and the experience evolved as they spent more years in the country. Most came to the US without migratory documents, but many were able to normalize their status with time. The main problems highlighted by the participants were feeling discriminated, judged or rejected by the new environment, challenges learning English, and lack of documentation which, in some cases, resulted in abuse by policemen, and feelings of fear, loneliness, and difficulty adapting to a new country. Participants said these situations directly impacted their mental health.

Physical and Mental Health

Participants expressed that they did not feel that their physical health had been affected by living in the US. However, they considered that living in the US had negatively impacted their mental health. They again identified being undocumented, as well as long work days, having left family behind in Mexico, language barriers, and feeling unable to adapt to the new country as factors affecting their mental health. They expressed that these situations left them feeling frustration, sadness, anxiety, stress, fear, depression, desperation, and like they do not belong in either Mexico or the US. Some women also mentioned problems in the current relationship with their partners as a factor affecting their mental health, which they said generated emotional distress and poor interactions with their social support networks.

TABLE 1 | Sociodemographic characteristics of participants included ($n = 9$) and excluded ($n = 16$) from the pre-post evaluation.

Characteristics [mean ± SD or *n* (%)]	Lost to follow-up[a] (*n = 16*)	Included in post-implementation evaluation (*n = 9*)
Age (years)	37.8 ± 6.5	39.8 ± 9.5
Female	10 (62)	8 (89)
Migratory origin		
Traditional migratory region (Zacatecas, San Luis Potosí, Oaxaca, Michoacán, Guerrero)	9 (56)	5 (56)
Central Region (Mexico City, Mexico State, Hidalgo, Jalisco)	6 (38)	3 (33)
North region (Tamaulipas, Durango)	1 (6)	1 (11)
Married or living with partner		
Married or living with partner	10 (63)	7 (78)
Single/divorced/ widowed	6 (37)	2 (32)
Number of children living in the US		
0	2 (12)	2 (22)
1–3	11 (69)	6 (67)
4–6	3 (19)	1 (11)
Schooling		
Elementary school	3 (19)	0
Some high school	12 (75)	6 (37)
High school degree	0	1 (11)
Bachelor degree	1 (6)	2 (22)
Ocupación		
House wife	3 (19)	4 (44)
Assistants or supervisors (health, legal, bank)		4 (44)
Construction	6 (37)	
Cooks	3 (19)	1 (11)
Cleaning	4 (25)	
Migratory status		
US citizen		2 (22)
Permanent resident	2 (12)	1 (11)
DACA		2 (22)
Undocumented	11 (69)	4 (44)
Work permit	2 (12)	
Refugee	1 (6)	
State		
Georgia	6 (37)	9 (100)
North Carolina	3 (19)	
South Carolina	4 (25)	
Tennessee	1 (6)	
Time in the US (years)	13 ± 8.8	19 ± 3.9
Have health insurance	3 (19)	2 (22)

[a]*Participants who attended < 70% of the sessions or did not complete the post-evaluation were considered lost to follow-up.*

Implementation and Process Evaluation

The ten virtual sessions were implemented as planned and had an average duration of 50 min. After the first in-person session in February 2020, participants had difficulty traveling to the Consulate and all sessions were then conducted virtually.

The two process evaluations yielded perfect satisfaction scores with all participants strongly agreeing that they were satisfied with the helpfulness of the topics, quality and clarity of the materials, the virtual platform, and the skills of the team psychologist conducting the sessions (using clear language, being respectful, etc.). There was 10% dissatisfaction with two sessions due to excessive duration (data not shown).

Pre- and Post-evaluation

Quantitative Results

Participants significantly increased their scores on knowledge of protective factors and coping skills, and had lower scores in the Kessler Scale of Psychological Distress (all $p < 0.05$) (**Table 2**).

Qualitative Results

Based on the theoretical framework, the intervention curriculum and the pre- and post-semi-structured interviews, the themes identified in the qualitative analysis were social support networks, adaptability, positive mental health habits, emotional regulation, stress management when facing a problem, and the role of the intervention during the COVID-19 pandemic. Many participants reported progress in the areas covered by the intervention and described using some of the techniques that were recommended during the sessions. They also identified some challenges applying the new knowledge and reported that they continue to work on those areas (**Table 3**).

DISCUSSION

Despite their large numbers and high levels of emotional distress and mental health problems, reaching the Mexican immigrant population through mental health interventions has been very challenging. Little research has addressed this problem. We leveraged the reach and access of the VDS Atlanta to design and pilot a mental health promotion intervention for Mexican immigrants that was successful in improving psychological distress and knowledge among participants who attended at least 70% of the sessions. These results are encouraging and suggest that efforts to support protective mental health factors and teach coping strategies in groups has the potential to improve mental health outcomes in a distressed population.

This is the first study reporting on a mental health promotion intervention for Mexican immigrants implemented through a VDS; however, other similar preventive interventions have been conducted with ethnic and racial minority groups in the US. Most have focused on mental health assessments and referrals (12). Raval et al. (13) conducted a mental health promotion intervention and were successful improving internalizing and externalizing behaviors among minority youth in New York City. Blumenthal et al. used community based participatory research to develop mental health promotion interventions for African Americans and Latinos that resulted in better self-reported physical health and a decrease in depression symptoms

TABLE 2 | Pre- and post-evaluation scores for protective factors and coping mechanisms knowledge, and psychological distress among Mexican immigrants who participated in a mental health promotion intervention ($n = 9$).

	Intent to treat ($n = 25$)			Complete case ($n = 9$)[b]		
Scales [median (inter-quartile range)]	**Pre-**	**Post-**	***p*-value[a]**	**Pre-**	**Post-**	***p*-value[a]**
Protective factors knowledge	111 (100, 120)	115 100, 124)	0.02	114 (108, 130)	137 (120, 140)	0.01
Coping mechanisms knowledge	96 (88, 108)	99 (90, 110)	0.03	96 (85, 104)	100 (90, 125)	<0.01
Kessler scale of psychological distress	3 (2, 3)	2 (2, 3)	0.01	3 (2, 4)	2 (1, 2)	0.02

[a] *Wilcoxon signed-rank test for non-parametric data.*
[b] *Participants who attended < 70% of the sessions or did not complete the post-evaluation were excluded.*

(14). Another commonly-used approach among community-based mental health initiatives has been through *promotoras* (12). The *Promotoras* Model, where community health workers receive basic training to provide health education or promotion in their communities, has been used successfully in many areas of health and is increasingly used for group or individual mental health promotion interventions. The ALMA (*Amigas Latinas Motivando el Alma*/Latina Friends Motivating the Soul) pilot intervention used this model for a peer- support and education intervention was successful improving depression symptoms, acculturative stress and coping mechanisms among Latina immigrants in North Carolina (15). This is consistent with our findings and highlights the potential impact of community health promotion interventions to improve the health of Latino immigrants in the US. Further, the fact that our study is imbedded into an ongoing, national project that already conducts some screening and referrals could contribute to scaling up improved versions of this intervention.

An important finding of this study was high levels of attrition. High attrition and underrepresentation of Latinos and other racial and ethnic minorities have been important challenges in health research (31). In this study, through the VDS, we were able to reach and enroll a sample of Mexican immigrants, a population that based on the various societal, cultural and economic challenges has been difficult to include in health interventions, but several factors limited the retention of more than half of the sample. The main impediment for participants to join the sessions was problems with technology or signing into the virtual platform. In this sense, technological advances provide an opportunity to deliver health interventions, including in the mental health field, however, a digital divide has been identified where minoritized populations tend to have less access to technological resources (32). If this divide is not addressed, technology could exacerbate disparities in health promotion and care, which is a particular concern after the COVID-19 pandemic increased the need for remote and online interventions (33). A lesson-learned from this pilot-intervention was the need to address technological barriers before the start of the program. Additionally, some participants reported dissatisfaction with session length, and it is possible that 10 session was excessive; future program iterations should assess the feasibility and impact of delivering the program in shorter and fewer sessions.

Fear and anxiety were reported by participants both as barriers to attend the sessions and as one of the main emotions affecting their mental wellbeing. Participants identified being undocumented, working conditions, distance from family, language barriers, and adaptation challenges as factors leading to these emotions. This is consistent with other studies that have identified migration and socio-cultural factors as specific barriers affecting the mental health of Latino immigrants in the US (34). Others have also identified fear and anxiety as factors related to attrition (29), highlighting the importance of addressing these factors as part of health interventions, especially those targeting immigrants and racial or ethnic minorities; this could potentially improve retention and translate into better mental health outcomes (35). Further research is needed to identify potential approaches to address these factors and increase the reach of mental health promotion interventions in this population.

The small sample size was another limitation of this study besides attrition; however, we were still able to detect differences in the sample that completed the final evaluation, supporting the efficacy of the intervention. The COVID-19 pandemic was a challenge that made it even harder for some participants to attend the sessions, but the importance of having this form of support during the beginning of the pandemic was highlighted by participants in the final evaluation. Strengths of this study include the formative research that allowed us to design a culturally-relevant intervention and to take advantage of the community networks and programs of the VDS; the use of theoretical frameworks that incorporate protective factors, coping skills and emotional education for mental health promotion in marginalized populations; and the mixed methods evaluation that allowed us to assess the impact and also understand the psychosocial factors around attrition and effectiveness.

In conclusion, we developed and implemented a mental health promotion intervention for Mexican Immigrants through the VDS program in Atlanta that resulted in increased knowledge and lower distress among those who attended at least 70% of the sessions. The impact of this results was attenuated by high attrition that resulted from technological challenges and psychosocial barriers associated with migration and other socio-economic factors. In order to achieve health equity, particularly in mental health, it is important to continue to implement and study culturally relevant mental health promotion interventions for Latino immigrants and other racial and ethnic minorities that address the particular challenges faced by these populations.

TABLE 3 | Qualitative results for pre- post- evaluation of a mental health promotion intervention for Mexican immigrants.

Theme	Description	Sample quote
Social support networks		
Pre- evaluation	Participants described having networks such as family members (partners, parents, siblings) and identified priests as a secondary source of social support. Many mentioned that their networks are small, limited to family, almost none mentioned having large friend networks. They mentioned that they spend time together with family on a daily basis but seldom with friends. Strategies to broaden their social networks were incorporated into the sessions.	*"Mmm… I have few friends, don't have too many, in general twice a month, something like that, we do something with family, someone invites me to their home, or I invite them to mine."* **(Health assistant, US permanent resident, 36 years, pre-interview)**
Post-evaluation	Participants were better able to conceptualize their social support networks, for example people with whom they feel supported in case of a difficult situation or emergency. Almost all participants said that they felt supported by their nuclear family living in Mexico or in the US, such as spouse, children, siblings, and brothers or sisters in law. They also in general identified larger social support networks that included friends, community organizations, coworkers, and mental health professionals or spiritual counselors (including priests). They also related that they were spending time with their nuclear family every day, either in person with those living in the US or via video calls or text messaging with those living in Mexico. They also mentioned that the increased interactions with extended family or friends were through video calls or messages due to the COVID-19 pandemic.	*"With my close family, meaning my parents, sisters, with…After the sessions where we talked about how we should broaden the circle of persons who we can trust I have tried to become closer with people I know to try to broaden it."* **(Bank assistant, DACA recipient, 25 years, post-interview)**
Adaptability		
Pre-evaluation	For some participants, adapting to the US was easy because they desired to live in this country or because they migrated when they were very young, or because of what they identified as their individual capacity to adapt quickly to new environments. Others expressed that it was difficult due to the radical change of environment, traditions, and language; however, they were eventually able to achieve it.	*"It does affect you to be in another country because imagine that you from one day to another had a job, family, friends and you leave it and well adapting to the language, the traditions, I did not know people, it was very difficult for me at the beginning to get used to it and to help my children at school, it can be quite frustrating."* **(Housewife, US Citizen, 54 years, pre-interview)**
Post-evaluation	Participants expressed that they felt adapted and willing to adapt to new situations.	*"I feel adapted, but I would also like to go back to my country, things are what they are, if it is not possible that is what it is and that is it, right?"* **(Supervisor, DACA recipient, 36 years, post-interview)**
Positive mental health habits		
Pre-evaluation	Practices which participants used were using music or relaxation videos, drinking tea, or using relaxing oils, excercising, or putting their trust in a superior being. A few participants said that they did not take any actions to care for their mental health.	*"Well, I don't know, I like when I have time to listen to relaxing music, to help me relax the mind and all that. But, well, is the only thing that I do, try to take teas to not be stressed, or something like that. But really, well I do not think I take care of my mental health. And well, like I said I try not to.. not to pay too much attention to stuff and that has really helped me."* **(Supervisor, DACA recipient, 36 years, pre- interview)**
Post-evaluation	Participants described that now they understood better the importance of taking care of their mental health; also, that they were practicing the techniques that they learned more frequently, such as diaphragmatic breathing, full breathing, relaxing activities, stop thinking about work worries when they are not working, and regulating their emotions of fear and anxiety, not putting pressure on themselves, excercising, sleeping at least 8 hours per day, eating healthy, engaging in hobbies, taking the sun, and positive thinking. A couple of participants mentioned difficulties with healthy eating and not engaging in any activity.	*"I have done many of the exercises that we covered in the workshops like the full breathing or that one that… How do you call it? Diaphragmatic I think, that one where you fill and empty the stomach, I have tried to let go of my thoughts and I go on walks to take care of my mind."* **(Legal assistant, US citizen, 37 years, post-interview)**
Emotion regulation		
Pre-evaluation	The main emotions identified were anger, fear and sadness. Participants in general mentioned that they tried to avoid feeling or confronting these emotions but identified them as being constantly present in their daily lives.	*"Mmmm… when I get angry, I am often in my temperament very easy to anger and yell a lot, I get pretty exalted."* **(Health assistant, permanent resident, 36 years, pre-interview)** *"The hardest is being without papers, because well my mom can come to visit us, to say that I miss my mom, well no, thanks God she can come to see us, the hardest is that being without papers, that is what worries one, what is going to happen with you. I live with that fear."* **(Housewife, undocumented, 39 years, pre interview)**

(Continued)

TABLE 3 | Continued

Theme	Description	Sample quote
		"I get sad and I go upstairs to my room to pray or something, or sometimes I even cry." **(Housewife, US citizen, 54 years, pre-interview)**
Post-evaluation	Anger: they described dealing with anger in healthier ways such as thinking about the consequences before acting, breathing, and using motion release. A participant said that they are still working on dealing with their anger and that they still show it in an explosive way. Another said that they do not get angry. Fear: they described a decrease in the emotion of fear or dread, the most common response was that they had not felt it lately. A few participants did feel it especially related with the COVID pandemic or because of thoughts that something bad was going to happen. They used some of the emotion regulation techniques such as stopping negative thoughts and exchanging them for positive or facing their fears to control them. There was also a participant that identified that fear detonates other emotions such as anxiety or hopelessness. Sadness: related to sadness, participants said that when they felt it they had used one of the strategies learned in the workshops, such as seeking their social support network to talk about it, and this helped them, also they thought about something else or prayed as a way to control it. A minority said that they had not felt it and did not use any strategy.	*"When I get angry, I have tried to stop yelling a lot, sometimes I remember and I continue to work on that."* **(Health assistant, permanent resident, 36 years, post-interview)** *"I try with fear, as well as not letting it affect me so much thinking about a situation that I don't know if it will happen, trying not to be thinking and thinking that it hasn't arrived yet. If solutions can be found to solve the problem that is causing fear."* **(Bank assistant, DACA recipient, 25 years, post-interview)** *"In the sadness, well, sometimes, well, I cry and it helps or I talk, talk to the person, my son or my husband and I explain that it was not right and after that one can express themself better, and well try to talk about it and sort it out."* **(Housewife, US Citizen, 54 years, post- interview)**
Capacity to manage stress when facing a problem		
Pre-evaluation	Participants were not able to define what stress means, however they did acknowledge living situations and symptoms related to it.	*"Mmmm… It is when someone has something to do things that is stress but when it is excessive that is distress and that is the one that hurts you."* **(Housewife, 37 years, undocumented, pre interview)**
Post-evaluation	Participants defined the concept of stress and some signs and symptoms such as headache, hair loss, neck pain, tiredness and psychological symptoms such as tension and mental fatigue. To manage their stress they described having used one or many of the techniques covered in the sessions, such as meditation, mindfulness, directed fantasy, full and diaphragmatic breathing, Jacobson progressive relaxation technique, technique to stop thinking, and exercise.	*"Well I think that the same things that I have done have helped me, I do 30 breathings three times and that I only did once. I do breathing in the morning, laying down when I wake up, but turns out I fell asleep ha,ha,ha, then I did other exercises. What I still cannot do correctly is the breathing when you should think of nothing, thinking about nothing, I cannot, many things come to mind all the time and sometimes I think silly things. Well, that is how I am doing my breathing and something comes to mind and I say, well what am I doing, and then I concentrate again in the breathing and I think I cannot keep it for long, ha,ha."* **(Housewife, undocumented, 56 years, post interview)**
COVID-19		
Pre-evaluation	The basal evaluation was conducted before the COVID-19 pandemic reached the United States. The theme did not appear during the pre-implementation evaluation. The COVID-19 pandemic was an unexpected event for the participants. Predominant emotions emerged in the participants who were planned to address during the educational sessions. However, not for the context of pandemic and confinement that the world was experiencing. Some participants were coping many days of confinement due to quarantine, exposure to the media, social networks with both trustworthy and false information that only instilled fear, others were developing essential jobs. All these experiences caused them to experience fear, anxiety, stress, and worry of contracting the disease or that it was contracted by a member of their family, children or husband.	*"And with fear because I try to think positive, if I was afraid of the virus [coronavirus] for my girl, because if something happens to her or to me, I can't imagine leaving her alone, but I've taken care of myself, we do everything to clean and we don't go out."* **(Legal assistant, US citizen, 37 years, post-interview)**
Post-evaluation	The COVID-19 pandemic was an event that exposed to the participants to an unprecedented situation, triggering negative emotions. However, some participants stated using at that time some of the tools learned in the educational sessions to coping these negative emotions and they were useful.	*"With much more confidence, with many more tools to reach out and cope the current situation of the coronavirus, because I believe all this came at the right time, because who would have known that all this was going to happen and at the same time that you were teaching us. The pandemic showed up and it has affected everyone, there is a lot of fear among people and all the things that are put on social media that are lies and many are true."* **(Housewife, US Citizen, 54 years, post- interview)**

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because of the small number of participants and the sensitive nature of this data. Requests to access the datasets should be directed to IG, inegonza@iu.edu.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by National Institute of Public Health Ethics Review Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

DM, TG, MM, and IG contributed to conception and design of the study. DM conducted the data collection, implemented the pilot intervention, and analyzed the data. TG, MM, and IG guided the analysis of the data. MG and AF contributed to the interpretation of the data and wrote sections of the manuscript. DM and IG wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

FUNDING

The Ventanilla de Salud Atlanta at the time of the study was funded through a shared cost agreement between Emory University and Mexico's Secretary of Health (SSA) and Institute for the Mexicans in the Exterior (IME). The intervention was funded through funds that were destined for mental health promotion by SSA and IME in 2019. IG received funds from the National Heart, Lung and Blood Institute as part of UCSF's Research in Implementation Science for Equity small research project (5R25HL126146).

REFERENCES

1. *World Migration Report*. Geneva, Switzerland: International Organization for Migration, United Nations (2020).
2. Alonso AD. Mexicans in the United States. In Pursuit of Inclusion. *Current History*. (2016) 115:305–11. doi: 10.1525/curh.2016.115.784.305
3. Israel E, Batalova J. *Mexican Immigrants in the United States. Migration Information Source* (2020).
4. Shobe MA, Coffman MJ, Dmochowski J. Achieving the American dream: facilitators and barriers to health and mental health for Latino immigrants. *J Evid Based Soc Work*. (2009) 6:92–110. doi: 10.1080/15433710802633601
5. Garcini LM, Galvan T, Peña JM, Klonoff EA, Parra-Medina D, Ziauddin K, et al. "A high price paid": migration-related loss and distress among undocumented Mexican immigrants. *J Latinx Psychol*. (2019) 7:245–55. doi: 10.1037/lat0000127
6. Orozco Vargas AE. Migración y estrés aculturativo: una perspectiva teórica sobre aspectos psicológicos y sociales presentes en los migrantes latinos en Estados Unidos. *Norteamérica*. (2013) 8:7–44. doi: 10.20999/nam.2013.a001
7. Moya EM, Chávez Baray SM, Esparza ÓA, Calderón Chelius L, Castañeda E, Villalobos G, et al. El Síndrome de Ulises en inmigrantes económicos y políticos en México y Estados Unidos. *EHQUIDAD Revista Internacional de Políticas de Bienestar y Trabajo Social*. (2017) 0:11–50. doi: 10.15257/ehquidad.2016.0001
8. Ornelas IJ, Perreira KM. The role of migration in the development of depressive symptoms among Latino immigrant parents in the USA. *Soc Sci Med*. (2011) 73:1169–77. doi: 10.1016/j.socscimed.2011.07.002
9. Greer TM. Coping strategies as moderators of the relation between individual race-related stress and mental health symptoms for African American women. *Psychol Women Q*. (2011) 35:215–26. doi: 10.1177/0361684311399388
10. *Addressing the Mental Health Needs of Racial and Ethnic Minority Youth - A Guide for Practitioners*. Washington, DC: American Psychological Association (2017).
11. Min J-A, Lee C-U, Lee C. Mental health promotion and illness prevention: a challenge for psychiatrists. *Psychiatry Investig*. (2013) 10:307–16. doi: 10.4306/pi.2013.10.4.307
12. Stacciarini JM, Shattell MM, Coady M, Wiens B. Review: community-based participatory research approach to address mental health in minority populations. *Community Ment Health J*. (2011) 47:489–97. doi: 10.1007/s10597-010-9319-z
13. Raval G, Montañez E, Meyer D, Berger-Jenkins E. School-based mental health promotion and prevention program "turn 2 us" reduces mental health risk behaviors in urban, minority youth. *J School Health*. (2019) 89:662–8. doi: 10.1111/josh.12805
14. Bluthenthal RN, Jones L, Fackler-Lowrie N, Ellison M, Booker T, Jones F, et al. Witness for wellness: preliminary findings from a community-academic participatory research mental health initiative. *Ethn Dis*. (2006) 16 (1 Suppl. 1):S18–34.
15. Tran AN, Ornelas IJ, Kim M, Perez G, Green M, Lyn MJ, et al. Results from a pilot promotora program to reduce depression and stress among immigrant Latinas. *Health Promot Pract*. (2014) 15:365–72. doi: 10.1177/1524839913511635
16. Rangel Gomez MG, Tonda J, Zapata GR, Flynn M, Gany F, Lara J, et al. Ventanillas de Salud: a collaborative and binational health access and preventive care program. *Front Public Health*. (2017) 5:151. doi: 10.3389/fpubh.2017.00151
17. Martinez Rodriguez DL. *El uso de e-Health con usuarios de la ventanilla de salud del consulado de Atlanta, EEUU. para el fomento de factores protectores de salud mental en migrantes mexicanos*. Cuernavaca, Mexico: Instituto Nacional de Salud Publica (2020).
18. Kobau R, Seligman MEP, Peterson C, Diener E, Zack MM, Chapman D, et al. Mental health promotion in public health: perspectives and strategies from positive psychology. *Am J Public Health*. (2011) 101:e1–e9. doi: 10.2105/AJPH.2010.300083
19. World Health Organization. *Prevention of Mental Disorders: Effective Interventions and Policy Options: Summary Report/A Report of the World Health Organization Dept. of Mental Health and Substance Abuse; in Collaboration With the Prevention Research Centre of the Universities of Nijmegen and Maastricht*. Geneva: World Health Organization (2004).
20. Coie JD, Watt NF, West SG, Hawkins JD, Asarnow JR, Markman HJ, et al. The science of prevention. A conceptual framework and some directions for a national research program. *Am Psychol*. (1993) 48:1013–22. doi: 10.1037/0003-066X.48.10.1013
21. Saxena S, Jané-Llopis E, Hosman C. Prevention of mental and behavioural disorders: implications for policy and practice. *World Psychiatry*. (2006) 5:5–14.
22. Guerrero AB, Gutierrez AC. Elements for the emotional learning in adults. *Int J Learn*. (2008) 15:89–94. doi: 10.18848/1447-9494/CGP/v15i02/45632
23. Ferrer RA, Fisher JD, Buck R, Amico KR. Pilot test of an emotional education intervention component for sexual risk reduction. *Health Psychol*. (2011) 30:656–60. doi: 10.1037/a0023438
24. Góralska R. Emotional education discourses: between developing competences and deepening emotional (co-) understanding. *Qual Sociol Rev*. (2020) 16:110–25. doi: 10.18778/1733-8077.16.1.08
25. Saini IK. Strengthening life skills through emotional intelligence education. *Educ Quest*. (2016) 7:5–11. doi: 10.5958/2230-7311.2016.00011.8

26. Fernández-Castillo E, Molerio-Pérez O, Herrera-Jiménez LF, Grau R. Validity and reliability of a questionnaire in exploring the protective factors of mental health in Cuban university students. *Actualidades en Psicologia.* (2017) 31:103–17. doi: 10.15517/ap.v31i122.24584
27. Peña Chagua MA, Gomez Perez KK. *Estrés laboral y actitud de afrontamiento del profesional de enfermería del servicio de emergencia del hospital docente clínico quirúrgico Daniel Alcides Carrión, Huancayo—2017*. Peru: Universidad Nacional del Callao (2018).
28. Valencia-Garcia D, Bi X, Ayón C. Sensitivity and specificity in three measures of depression among Mexican American women. *J Immigr Minor Health.* (2017) 19:562–71. doi: 10.1007/s10903-016-0512-1
29. Vargas Terrez BE, Villamil Salcedo V, Rodríguez Estrada C, Pérez Romero J, Cortés Sotres JJ. Validación de la escala Kessler 10 (K-10) en la detección de depresión y ansiedad en el primer nivel de atención. *Propiedades psicométricas.* (2011) 34:323–31.
30. Xi W, Pennell ML, Andridge RR, Paskett ED. Comparison of intent-to-treat analysis strategies for pre-post studies with loss to follow-up. *Contemp Clin Trials Commun.* (2018) 11:20–9. doi: 10.1016/j.conctc.2018.05.008
31. Yu Z, Kowalkowski J, Roll AE, Lor M. Engaging underrepresented communities in health research: lessons learned. *West J Nurs Res.* (2021) 43:915–23. doi: 10.1177/0193945920987999
32. Ramos G, Chavira DA. Use of technology to provide mental health care for racial and ethnic minorities: evidence, promise, and challenges. *Cogn Behav Pract.* (2019) 29:15–40. doi: 10.1016/j.cbpra.2019.10.004
33. Ojha R, Syed S. Challenges faced by mental health providers and patients during the coronavirus 2019 pandemic due to technological barriers. *Internet Interv.* (2020) 21:100330. doi: 10.1016/j.invent.2020.100330
34. Fortuna LR, Álvarez K, Ramos Ortiz Z, Wang Y, Mozo Alegría X, Cook BL, Alegría M. Mental health, migration stressors and suicidal ideation among Latino immigrants in Spain and the United States. *Eur Psychiatry.* (2016) 36:15–22. doi: 10.1016/j.eurpsy.2016.03.001
35. George S, Duran N, Norris K. A systematic review of barriers and facilitators to minority research participation among African Americans, Latinos, Asian Americans, and Pacific Islanders. *Am J Public Health.* (2014) 104:e16–31. doi: 10.2105/AJPH.2013.301706

Conflict of Interest: IG served as Emory University's director of the Ventanilla de Salud Atlanta program at the time of the implementation of the study.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2022 Martínez Rodríguez, González Vázquez, Márquez Serrano, Groot, Fernandez and Gonzalez Casanova. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

PLOS ONE

RESEARCH ARTICLE

Migrants in transit through Mexico to the US: Experiences with violence and related factors, 2009-2015

René Leyva-Flores[1☯], Cesar Infante[1☯*], Juan Pablo Gutierrez[2☯], Frida Quintino-Perez[3‡], MariaJose Gómez-Saldivar[1‡], Cristian Torres-Robles[4‡]

1 Health Systems Research Center, National Institute of Public Health, Cuernavaca, Morelos, México, **2** Center for Policy, Population and Health Research, School of Medicine, National Autonomous University of Mexico, Mexico City, Mexico, **3** College of Science and Humanities, Autonomous University of Mexico City, Mexico City, Mexico, **4** Faculty of Medicine, University of Valparaiso, Valparaiso, San Felipe, Chile

☯ These authors contributed equally to this work.
‡ These authors also contributed equally to this work.
* cesar.infante@insp.mx

Check for updates

OPEN ACCESS

Citation: Leyva-Flores R, Infante C, Gutierrez JP, Quintino-Perez F, Gómez-Saldivar M, Torres-Robles C (2019) Migrants in transit through Mexico to the US: Experiences with violence and related factors, 2009-2015. PLoS ONE 14(8): e0220775. https://doi.org/10.1371/journal.pone.0220775

Editor: Mary C. Smith Fawzi, Harvard Medical School, UNITED STATES

Received: May 25, 2018

Accepted: July 23, 2019

Published: August 21, 2019

Copyright: © 2019 Leyva-Flores et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: Data are from the Multicenter Project: International Migration and Sexual and Reproductive Rights of Migrants from Mexico and Central America, 2009-2015, whose authors may be contacted at: rene.leyva@insp.mx; cesar.infante@insp.mx. Data base are available at: Data base: https://osf.io/2sq8b; Do files: https://osf.io/4d5vw; Qualitative: https://osf.io/uwz2q; Zip file: https://osf.io/fs6x9. The data files uploaded to Open Science Framework represent the underlying data necessary to replicate the findings of this

Abstract

Objectives

The objectives of the study are to 1) estimate the burden of physical, sexual, and psychological violence among migrants in transit through Mexico to the US; and 2) examine the associations between experiencing violence and sociodemographic characteristics, migratory background, and health status in this vulnerable population.

Method

A cross-sectional study combining qualitative and quantitative methods was carried out from 2009 to 2015 with a sample of 12,023 migrants in transit through Mexico to the US. Information on gender (male, female, and transsexual, transgender and transvestite -TTTs-); nationality; health status; migratory background; and experiences with violence was obtained. Fifty-eight migrants participated in in-depth interviews to explore any experiences of violence during their journey. A descriptive analysis was performed and a probit regression model was applied to analyze the factors associated with violence. Qualitative information was analyzed to understand experiences, meanings and responses to violence.

Results

The overall prevalence of suffering from any form of violence was 29.4%. Nearly 24% reported physical violence, 19.5% experienced psychological violence, and approximately 2% reported sexual violence. TTTs experienced a significantly greater burden of violence compared to men and women. Violence occurred more frequently among migrants from Central American (30.6%) and other countries (40.0%) than it did among Mexican migrants (20.5%). Experiences involving sexual, physical and psychological violence as well as theft and even kidnapping were described by interviewees. Migrants mistrust the police,

study in their entirety. For additional information regarding the project, interested researchers may also contact the President of Ethics Committee at INSP (PhD. Angelica Angeles) at: aangelica@insp.mx.

Funding: This study was funded by the Ford Foundation for Mexico and Central America, grant 1100-0482 to RL-F. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: The authors have declared that no competing interests exist.

migration authorities, and armed forces, and therefore commonly refrain from revealing their experiences.

Conclusion

Migrants are subjected to a high level of violence while in transit to the US. Those traveling under irregular migratory conditions are targets of even greater violence, a condition exacerbated by gender inequality. Migrants transiting through Mexico from Central American and other countries undergo violence more frequently than do Mexican migrants. Protective measures are urgently needed to ensure the human rights of these populations.

Introduction

Throughout the world, traditional migration routes have turned into high-risk corridors with alarming consequences for the safety, integrity and health of migrants [1,2,3,4,5,6,7].

In an effort to understand the vulnerability of migrants, various studies have explored related socioeconomic factors, political issues and migration policies in both countries of origin and destination [8, 9, 10, 11,12].

Globally, there were an estimated 258 million international immigrants in 2017 of which 57% have established themselves in developed regions. Among this group, 61% originated from developing countries [13]. The largest number of immigrants resided in the United States (US), which hosted 49.8 million (19% of the world's total) in 2017. The migration corridor from Latin America and the Caribbean to Northern America was the third largest worldwide in 2017, with over 26 million international migrants [13]. For Mexico and Central American countries, the US is the primary country of destination [13, 14]. The World Bank (2017) estimates the number of migrants from Mexico and Central American countries in the US as follows: Belize (48,918), Costa Rica (85,133), El Salvador (1,387,022), Guatemala (935,707), Honduras (651,059), Mexico (11,573,680), Nicaragua (243,024) and Panama (94,958) [13]. In regards to undocumented migrants from Central America entering Mexico, the Mexican Ministry of the Interior estimated 390,000 individuals in 2014 [15].

Migrants are frequently subjected to violence in their home countries and continue to be victims of violence throughout their transit in Mexico, while crossing the US border and at their destination, where they often remain with an irregular migratory status [16,17]. Between 1998 and 2015 a total of 6,571 migrants were found dead in the US and in 2015 the US-Mexico border ranked third globally with the highest number of migrants dead and missing [18]. Furthermore, Mexico is a major transit country for Central American migrants travelling to the US; many go missing on the journey, and many unidentified human remains are found [19]. Also, according to the National Human Rights Commission in Mexico, migrants in transit are prey to varied forms of violence; despite this danger, 88% of the victims decide to continue their travel [7]. Those that succeed in entering the US live in constant fear of being deported. It is estimated that, overall, during the Obama administration about 3 million immigrants were deported between 2009 and 2017 [17,20]. According to US Immigration and Customs Enforcement, during the Trump administration, removals increased by 17% in 2017, and in the first semester of 2018 a total of 109,296 repatriation events of Mexicans were registered [21].

In this social context, non-governmental human rights organizations have come forward to report and document cases of extreme violence [22]. However, few studies have addressed

both the magnitude and forms of violence perpetrated or the personal experiences of the victims as they grapple with violence in Mexico.

The twofold purpose of this study was to: estimate the overall burden of violence, including physical, sexual, and psychological violence, experienced by migrants in transit through Mexico to the US from 2009 to 2015; and to examine factors placing people at risk of violence in this vulnerable population.

Methods

This paper is part of a broader research project initiated in 2002 in collaboration with migrant shelters in Mexico (*Casas del migrante*). These faith-based non-governmental organizations not only provide humanitarian services; they also promote and defend the human rights of migrants. A cross-sectional study that combined quantitative and qualitative methods was carried out between February 2009 and December 2015 in five *Casas del migrante* located at strategic points along the migrant transit route. The shelters were located in the cities of Tapachula in the state of Chiapas; Ixtepec in Oaxaca; San Luis Potosí (SLP); Saltillo in Coahuila; and Tijuana in Baja California Norte. All of these sites are located along the railway of a cargo train, which to date, provides one of the most important means of transportation for irregular migrants in Mexico [7].

During this period, a strategy to promote human rights, facilitate access to health care, prevent HIV/AIDS, and alleviate sexual and reproductive health problems, was implemented in the *Casas del migrante*. At these shelters, group activities were carried out with migrants in order to provide them with basic information on the subjects previously mentioned. After the activities, migrants were invited to participate voluntarily, in a non-random and confidential manner, to answer a questionnaire that gathered information on their sociodemographic characteristics, gender, migratory background, country of origin, and experience of different risks and types of violence during their transit through Mexico. Staff from the shelters that were trained by the research team administered the questionnaire. The training lasted three days whereby researchers and staff from the shelters reviewed the objectives of the study, the importance of the different variables included in the questionnaire and ethical issues related to data collection. Subsequently, researchers supervised the collection of the data and provided feedback to the staff. Information was also gathered regarding sexual behavior during the trip, specifically focusing on casual sex, condom use at last sexual relationship, and relations under the influence of alcohol or drugs. Finally, those who indicated having experienced violence were asked whether or not they had reported the event to the authorities or to human rights civil society organizations. A total of 12,023 migrants participated voluntarily and their informed consent was obtained: 3,941 at Tapachula, 1,861 at Ixtepec, 2,503 at SLP, 2,334 at Saltillo, and 1,384 at Tijuana. *Casas del migrante* did not gather data on non-participants, but reported that there were few of those invited that declined participation.

This study combined qualitative and quantitative methods using a complementary approach. In such a design, qualitative and quantitative approaches are used to examine overlapping but also different facets of a certain phenomenon seeking for an enriched, elaborated understanding. This allowed us to describe the sociodemographic characteristics of migrants, provide an estimate of the frequency of self-reported violence, as well as further explore and understand the violent experiences migrants have faced while in their transit through Mexico [23]. First, quantitative data were collected through the questionnaire following the procedures described above. This strategy allowed us to identify migrants that experienced violence who were then invited for an in-depth interview. For both quantitative and qualitative analysis, violence was the main consideration for analysis, and it was defined as any action perpetrated by a person or group causing direct harm to another person and generally occurring in

circumstances of unequal power relations [24,25,26]. The dimensions of violence included in this analysis were: a) Physical violence (beatings, thefts, extortions and kidnappings); b) Psychological violence (humiliation, threats, rejection, insults); and c) Sexual violence (rape or sex in exchange for goods, money, protection, transportation and/or food, among others) [24,25,26]. In order to maximize available quantitative information, we used data available for each variable, i.e. the number of respondents was different for some variables; this was in order to avoid discarding observations due to periodic adjustments to the questionnaire used in this survey from 2009 to 2015. Missing values were excluded from the analysis.

We recognize that our categories generalized the experiences of migrants by highlighting a particular characteristic of violence according to the perception of the victim. It is a fact, however, that violent events often include various forms of violence simultaneously [7,24,25,27,28]. For the quantitative data, descriptive statistics were reported in order to compare the characteristics of the populations affected and not affected by violence, while pinpointing gender-based violence experiences. Point estimates for the differences by experience of violence and by gender were calculated. Finally, a probit regression model was used to analyze the variables associated with the violent experiences of migrants (outcome variable), and to identify the marginal effects of these variables. For these models, the dependent variable is any experience of violence as reported by migrants and is coded as "yes" or "no." Independent variables are gender, schooling, country of origin, migration experience, having children, experience of discrimination and year of the survey. In the probit model, the coefficients aim to estimate the probability of a given observation to fall in a particular category, which in this case is the outcome of experiencing violence during transit.

Design effect in data analysis was considered including each *Casa del migrante* as a primary sampling unit, and each year as a stratum [29]. This allowed adjustment of estimates both for similarities among the populations served by each *Casa del migrante* and for changes in the variables of interest over time. This design effect is included both in descriptive and probit analysis. Statistical analysis was performed using Stata, version 15.0.

Qualitative component

In-depth interviews were held with migrants who reported in the questionnaire some form of violence during their transit through Mexico. Informants were included according to the following criteria: having experienced violence (sexual, psychological or physical), gender, and country of origin. Following these criteria 30 men and 28 women were interviewed, with a mean age of 30.7 years, from Guatemala, El Salvador, and Honduras. The interviews were conducted by two researchers and were held in private spaces within the shelters in order to guarantee confidentiality and privacy for the informants. Interviews were audio recorded and lasted between 45 and 60 minutes each.

The objective of the qualitative component was to understand the meaning of the violence experienced by migrants. The codes were based on the existing literature that explores violence and previous research undertaken by the research team [7,24,25,27,28]. An interpretivist approach to data analysis was adopted in which emphasis was placed on the individual's experience of migration, the different forms of violence and its consequences [30]. Initial analysis took place during data collection by listening to recordings, transcribing, and making field notes. As a result of this process, the different dimensions of violence (psychological, physical and sexual) present in the migrants' discourse could be identified. To enhance reliability, members of the research team continuously discussed the coding scheme, the development of themes and categories, and the interpretation of the data [30]. Atlas.ti computer software was used to organize and analyze the qualitative data.

Participants were advised of the purpose of the interviews and asked to provide their informed consent to being audio-recorded. The confidentiality of respondents was guaranteed by assigning a code to each interview. Procedures for contacting migrants, conducting interviews and surveys, processing data and publishing related information were approved and monitored by the Ethics Committee of the National Institute of Public Health in Mexico (Registration Code 917).

Results

The sociodemographic characteristics, migratory background and health status of the migrants who did/did not suffer violence while in transit through Mexico and provided data for the quantitative analysis are presented in Table 1.

As reported, 3,539 of the total 12,023 migrants experienced violence: that is, 29.4%. Prevalence of violence was 30.9% for males, 23.5% for females and 55.2% for TTTs. Reporting of violence by location of *Casa de migrante* ranged from 18.3% in Tapachula to 38.3% in Saltillo.

The majority of migrants came from Central America (81.9%) and had an average of seven years of schooling. Up to 42.8% reported having an intimate partner and two thirds (66.8%) had children. In regards to their migratory experience, the number of previous attempts to enter the US was 2.4 on average, and 43.2% had reached the US. In relation to health, 39.2% reported a health problem or an accident in the two weeks prior to the interview, 16.7% mentioned having sexual relations during their current transit, and violence was reported by 29.4% of migrants.

Statistically significant differences were observed by gender (p-value for the difference in the proportion of experience violence between males and females is 0.053, males and TTTs 0.003, and between females and TTTs 0.001 –data not shown in the table), education, health status (marginally significant with p-value of 0.053) and frequency of sexual relations during the trip between migrants who reported having suffered and those who did not report some kind of violence. Additionally, of the total number of migrants who reported having had sexual relations during the trip, violence occurred most frequently among those who did so under the influence of alcohol or drugs (Table 1).

Overall, 19.5% of all migrants reported psychological violence, 23.7% physical violence, and 1.6% sexual violence. Of those that reported suffering violence, psychological violence was reported more frequently by women and TTTs (52.7% and 64.8%, respectively) in comparison with men. Humiliation was the most common form of psychological violence affecting women and TTTs (52.7% and 64.8%, respectively) and threat was the most common form of psychological violence affecting males (55.9%).

Rejection for being female was reported by 9.19% of women. Only 1.3% of all migrants felt rejected for being indigenous. Sexual preference was reported as motive of rejection by 1.0% of all migrants, although for TTTs this was reported by 47.7%. Being undocumented was reported as motive of rejection by 25.9% of all migrants, and was higher for females and TTTs as compared to males (46.7%, 32.8% and 20.0%, respectively, with p-values of 0.008 for the difference between females and males and no significance for other differences). Rejection and discrimination by Mexicans against migrants in transit stem from common stereotypes regarding the undocumented, including stigmatizing labels such as "wetbacks" and "tattooed," which dismiss the migrants as delinquents or violent gang members.

> "The local people treat us the same. It doesn't matter if you are from Honduras or Nicaragua because we are wetbacks, we don't have documents to migrate. People have discriminated [against] me because I have tattoos. I want to have a better life and that's the reason I

Table 1. Migrants in transit through Mexico: Sociodemographic characteristics, migratory background and health status according to experience with violence, 2009–2015.

		Total population	Violence		
		n = 12,023	n = 8,484	n = 3,539	
	Variable	Percentage (95% confidence interval)	No Percentage (95% confidence interval)	Yes Percentage (95% confidence interval)	p-value*
Gender	Male	77.72	76.10	81.60	0.074
n = 12,023		(65.98–89.46)	(63.81–88.38)	(70.44–92.77)	
	Female	21.73	23.55	17.35	0.048
		(9.96–33.49)	(11.28–35.82)	(6.11–28.59)	
	Transexual, transgender, transvestite	0.56	0.35	1.05	0.005
		(0.24–0.87)	(0.10–0.61)	(0.51–1.58)	
Marital status	Has partner	42.86	43.35	41.68	0.16
n = 11,824		(40.00–45.81)	(40.69–46.01)	(37.60–45.76)	
Education	Years of schooling	7.04	6.96	7.24	0.013
n = 10,940		(6.76–7.32)	(6.67–7.25)	(6.93–7.54)	
Has children	Yes	66.68	66.63	66.78	0.887
n = 10,815		(63.17–70.18)	(63.09–70.18)	(62.89–70.67)	
	No	2.43	2.47	2.32	0.02
		(2.29–2.57)	(2.32–2.62)	(2.18–2.47)	
Country of origin	Mexico	12.01	13.53	8.36	0.15
n = 12,023		(0.15–23.87)	(0.67–26.39)	(2.30–19.03)	
	Honduras/Guatemala/El Salvador	81.92	80.53	85.25	0.182
		(70.78–93.06)	(68.46–92.60)	(75.06–95.44)	
	Others	6.07	5.94	6.39	0.435
		(4.95–7.19)	(4.70–7.19)	(5.17–7.60)	
Migratory background	Number of attempts to reach US	2.40	2.34	2.53	0.022
n = 11,425		(2.27–2.53)	(2.21–2.47)	(2.35–2.71)	
	Has reached US	43.24	42.70	44.50	0.429
		(37.80–48.68)	(37.22–48.18)	(37.86–51.14)	
	Has stayed in another *Casa del migrante*	67.53	64.46	75.05	0.026
		(57.44–77.63)	(53.43–75.49)	(65.02–85.08)	
Health status	Has had health problem	39.27	36.50	45.92	0.053
n = 12,023		(31.06–47.49)	(26.04–46.97)	(39.18–52.65)	
Sexual behavior during trip	Has had sex	16.70	14.32	22.30	0.001
		(13.13–20.26)	(10.49–18.14)	(17.64–26.96)	
n = 10,470	Used condom at last sex	43.32	43.95	42.09	0.571
		(35.33–51.31)	(34.18–53.71)	(36.73–47.45)	
	Has had sex under the influence of alcohol or drugs	19.95	16.22	25.59	0.001
		(14.86–25.04)	(11.62–20.81)	(19.61–31.56)	

*p <0.05 comparison of groups who did/not experience violence

The number of observations presents differences among variables as a result of missing values.

Source, Leyva R, Infante C. Multicenter Project: International Migration and Sexual and Reproductive Rights of Migrants from Mexico and Central America, 2009–2015.

https://doi.org/10.1371/journal.pone.0220775.t001

am here away from my family in El Salvador. I am asking for refugee [status] in Mexico but it is difficult to have a relationship with other persons because of my tattoos. There was a time when I did bad things but I am a human being and I am uncomfortable of being discriminated against just because I am from abroad." (Male migrant from El Salvador, 33 years of age)

Given the situations of violence in their home communities, some migrants, including the ones currently interviewed, seek refugee status or asylum in Mexico. Nonetheless, as is shown in the previous testimony, they tend to experience and perceive great difficulties in gaining this migratory status. Regarding those that experienced physical violence, extortion and theft of belongings ranked as the most common (68.7%), followed by beating (24.1%) and kidnapping (9.6%). No significant differences were observed according to gender (Table 2).

Theft of personal belongings is one of the forms of violence making the transit through Mexico even more precarious.

"Some local police guys came, searched us and took 1,500 pesos (US 87.1) from us. They said: 'this is fine. If not, we would have handed you over to Immigration'." (Migrant, male, 20 years of age, from Guatemala)

In addition to theft of money and belongings as well as physical assault, aggressors commonly threaten to turn migrants in to authorities for deportation, as described in the following testimonies.

"He hit us with a club and they broke my rib. They wanted my money. If not, they were gonna throw her [friend] off [the train] and call immigration authorities. It wasn't much; it was 300 pesos (US 17.5). I didn't cower though. I pounced on one of them and he bit my finger and beat me with a stick. I gave him the money, and that's how I got to Monterrey, all beat up." (Migrants, female, 26 and 27 years of age, from El Salvador)

The theft, assaults, and threats finally amount to a form of "payment" by the migrants to the aggressors so that they may continue their journey or access the cargo train—the most utilized mode of transport across Mexico to reach the US.

One of the most serious manifestations of violence during transit is kidnapping of migrants by delinquent groups in Mexico, which in the most extreme cases can lead to the death of the victim when ransom is not paid. These events can occur individually or towards groups, and accounts of migrant kidnappings are frequently reported to other migrants during their transit, as shown in the following testimony:

"Some men got on [the bus]. One of them didn't, and the driver stood with him, on the ground, laughing. They got all of us off and took us to a hotel. There, they searched us. Then a cab came for us and took us to a house. We got to the house and there they had another 30 people kidnapped: migrants, Mexicans, small kids." (Migrant, TTT, 23 years of age, from Honduras)

In the same testimony, the complexity of the criminal network is noted, which can include drivers of public transport, owners of hotels, and more. Neither nationality nor age appears to be a factor in kidnapping of migrants in Mexico.

Of the total number of migrants having suffered some form of violence, 6.5% reported sexual violence: six out of ten were raped, and four out of ten performed sexual favors in exchange

Table 2. Migrants in transit through Mexico: Forms of violence by gender, 2009–2015.

	Variables	General N = 12,023 Percentage (95% confidence interval)	Male N = 9,344 Percentage (95% confidence interval)	Female N = 2,612 Percentage (95% confidence interval)	TTTs N = 67 Percentage (95% confidence interval)	p-value (1)	p-value (diff male/ TTTs)	p-value (diff fem/ TTTs)
Suffered some form of violence		29.44	30.91	23.51	55.22	0.053	0.003	0.001
n = 12,023		(22.57–36.30)	(23.61–38.20)	(16.00–31.01)	(40.54–69.91)			
Psychological violence	Humiliation	37.92	34.42	52.77	64.86	0.037	0.001	0.295
n = 3,539		(28.61–47.24)	(25.14–43.69)	(35.60–69.94)	(46.68–83.05)			
	Threat	52.30	55.99	35.34	45.95	0.015	0.17	0.356
		(40.39–64.21)	(44.50–67.49)	(18.24–52.45)	(25.75–66.14)			
Rejection:	for being a woman			9.19				
n = 11,225				(6.47–11.91)				
	for being indigenous	1.38	0.97	2.72	1.49	0.000	0.689	0.365
		(0.87–1.89)	(0.62–1.32)	(1.84–3.60)	(-1.14–4.13)			
	because of sexual preference	1.09	0.76	1.07	47.76	0.304	0.000	0.000
		(0.69–1.49)	(0.41–1.11)	(0.58–1.56)	(31.83–63.69)			
	because of undocumented status	25.90	20.02	46.75	32.84	0.008	0.141	0.245
		(16.94–34.86)	(13.79–26.26)	(27.03–66.46)	(17.30–48.37)			
	for not having money	12.40	11.94	13.63	28.36	0.489	0.039	0.055
		(8.62–16.19)	(7.68–16.21)	(9.01–18.25)	(14.57–42.15)			
	because of age	2.42	2.17	3.33	1.49	0.192	0.616	0.276
		(1.53–3.31)	(1.23–3.12)	(1.66–5.00)	(-1.14–4.13)			
Physical violence	Kidnapping	9.66	9.38	10.75	13.51	0.61	0.406	0.58
n = 3,539		(5.58–13.75)	(4.87–13.89)	(5.72–15.78)	(3.13–23.89)			
	Theft	68.72	71.85	53.75	72.97	0.052	0.918	0.164
		(53.73–83.71)	(56.18–87.52)	(35.29–72.20)	(52.37–93.57)			
	Beating	24.16	24.48	22.64	24.32	0.524	0.982	0.82
		(19.54–28.78)	(19.55–29.41)	(16.37–28.91)	(10.78–37.87)			
Sexual violence	Rape	3.90	1.49	14.17	21.62	0.000	0.003	0.243
n = 3,539		(2.13–5.67)	(0.73–2.24)	(10.19–18.15)	(9.14–34.10)			
	Sex in exchange for goods and/or money	2.63	1.97	4.07	29.73	0.025	0.006	0.01
		(1.47–3.78)	(0.78–3.16)	(2.45–5.70)	(10.64–48.82)			

(1) for difference between males and females

The number of observations presents differences among variables as a result of missing values.

Source, Leyva R, Infante C. Multicenter Project: International Migration and Sexual and Reproductive Rights of Migrants from Mexico and Central America, 2009–2015

https://doi.org/10.1371/journal.pone.0220775.t002

for goods (e.g., food, transportation, or clothing, and/or money). Sexual violence was observed more frequently among TTTs and women compared with men. 21.6% and 14.1% of females and TTTs reported rape, respectively, compared to only 1.5% of males (p-values of 0.000 and 0.003). Transactional sex was more common among TTTs and women,–but particularly in TTTs- (29.7% and 4.0%) compared to 2.0% for males (Table 2) (p-values of 0.006 and 0.025). The reported frequency of sexual violence shows a marked difference by gender. Experiences of sexual violence emerge as part of the unequal dynamic between migrants and the local population during their journey, and tend to occur in certain transit routes where there is

significant presence of delinquent groups: in the train, in other modes of transportation, and other spaces.

> "Only once, a person raped me right after I got on the train. (. . .) It was one of those workers that are there; on the railway (. . .) He grabbed me by the hair, got me off the train and put me in his car." (Migrant, female, 35 years of age, from El Salvador)

> "They said, 'the deadline [for paying ransom] is over and we're gonna screw you.' They took off my pants and stripped me. He tried and I resisted. They couldn't penetrate me completely and they made me bleed." (Migrant, male, 51 years of age, from El Salvador)

The conditions of violence as described during transit have normalized sexual violence from a perspective of gender differentiation. In the cases of women, some perceive unwanted sexual relations–that were associated with violence, or in unequal and disadvantaged situations–as one of the tools necessary to facilitate their passage and protect themselves from greater harm.

> "The advantage of being a woman is that men will help you just to have sex with you. Just think of it as paying for protection with [your] body." (Migrant, female, 28 years of age, from Guatemala)

In the same context of inequality and violence, the threshold to accept sexual relations is lowered as part of the exchange necessary to ensure survival within the migration process.

> "If we have to get things with sex then we have to do it. Maybe you don't want to but they take advantage of it. But if I have to eat, wear a jacket or sleep somewhere, so I get it because there is no choice. You do everything on this trip. You have to drink water in puddles from the watering holes where cows have been. It's what you do to survive." (22 year old Gay man from Guatemala)

Food, clothing, water, and shelter for the night or to rest, are all human necessities that aren't easily found in the insecure and precarious situations in which migrants find themselves. The presence of each of these elements differentiates the individual capacities of migrants to manage the aggression and violence they experience during transit. Even so, it is gender and nationality which weigh most heavily in determining the likelihood that a migrant will suffer violence while crossing Mexico, as seen in the following multivariable model.

Table 3 presents the results of the regression model designed to identify the factors related to suffering violence in any form. The multivariate analysis confirmed the relevance of gender in the likelihood of suffering violence: compared to males, TTTs proved 21.7 percent more likely and women 4.5 percent less likely than men to experience violence (model 1); however, after including demographic and migratory background variables (model 3), the TTTs' differential dropped to 14 percentage points and the correlation was weak ($p<0.1$) while the females ´ differential increased to 7.4 points ($p<0.001$).

Regarding country of origin, migrants from Central America and other countries were more likely to suffer violence than Mexican migrants (30.6% and 40.0% vs 20.5%). Finally, years of schooling, having children (only marginally significant in model 2) and having entered the US previously did not correlate with the likelihood of experiencing violence.

It is also important to highlight that migrants have minimal access to legal, health and other public services and little possibility of exercising their rights. Of the total number of migrants who suffered any type of violence during transit, only 13.9% reported the event to authorities or social organizations. Migrants experience various forms of violence throughout their

Table 3. Marginal effects of factors associated with any experience of violence among migrants in transit through Mexico to US, 2009–2015.

		(1)	(2)	(3)
	Variables	**Violence Marginal effects (standard error)**	**Violence Marginal effects (standard error)**	**Violence Marginal effects (standard error)**
Sex	Male		-	-
	Female	-0.045*	0.075***	0.074***
		(0.025)	(0.024)	(0.021)
	TTTs	0.217***	0.130	0.140*
		(0.069)	(0.080)	(0.074)
Education	Years of schooling	0.001	0.001	0.001
		(0.001)	(0.001)	(0.001)
Country of origin	Mexico			
	Honduras/Guatemala/El Salvador	0.072	0.158***	0.171***
		(0.070)	(0.050)	(0.044)
	Others	0.071	0.166***	0.178***
		(0.064)	(0.047)	(0.041)
Has children	No			
	Yes		0.016*	0.018
			(0.009)	(0.011)
Has reached US previously	No			
	Yes		0.019	0.013
			(0.018)	(0.015)
Discrimination	No			
	Yes		0.249***	0.241***
			(0.024)	(0.021)
Year of survey	2011			0.056
				(0.076)
	2012			-0.068
				(0.082)
	2013			-0.047
				(0.070)
	2014			-0.072
				(0.095)
	2015			0.034
				(0.093)
	Observations	11,424	9,904	9,904

*p<0.1

** p<0.05

***p<0.01

Source, Leyva R, Infante C. Multicenter Project: International Migration and Sexual and Reproductive Rights of Migrants from Mexico and Central America, 2009–2015

https://doi.org/10.1371/journal.pone.0220775.t003

journey to the US, carried out by different perpetrators that vary from the local population, the army, police and organized crime. The violence is so frequent and generalized that migrants have accepted it as part of the price they have to pay for migrating. The following statement conveys the perspective of the directors of the *Casas del migrante* regarding the violence suffered by migrants as they transit through Mexico: "In Central America and Mexico, violence is

generalized and unpredictable. In the past, people knew where violent events were likely to happen. . . Now it is impossible to know where violence will occur. . . They carry their caskets on their backs from the moment they leave home, because any day, any place, they are apt to encounter death".

Discussion

Globally, the dynamics of population mobility are growing complex, and human rights violations are frequent and devastating. Risk exposure under migratory conditions is escalating, and the effects of these factors on health are mirrored in increasingly acute problems, or even death [7,18]. Further aggravating the situation is the framework of restrictive measures and policies surrounding migration [19,20,21,31,32].

Violence against migrants starts in their own countries of origin and persists throughout their transit in Mexico and into their destinations [7,16,17,27]. Under these precarious conditions, violence is neither unknown nor unexpected to migrants. However, leaving everything behind to flee from violence in their home communities does not necessarily lead migrants to a secure place. Most are aware of the distinctively violent social conditions they must contend with in Mexico [6,33,34]. And once in their destination of the US, the majority of those who succeed in crossing the border are constantly haunted by the fear of being deported [20,21,35].

The results of our study suggest that migrants from Central American and other countries are more likely to experience violence while in transit to the US than are Mexican migrants. This may be attributable to their irregular migratory conditions, minimal social support, and certainly the violent conditions encountered in Mexico [7,19,24,25,27,28,34]. The majority of these migrants seek to evade, rather than face, the myriad risks inherent in their journey, namely the presence of migration authorities, organized crime and common criminals. Migrants from Central American and other countries prefer to take "safer" alternate routes: ones less controlled by authorities but, by the same token, are teeming with criminal organizations [19,34].

In order to understand the dimensions of the violence narrated by the migrants in transit through Mexico, we used the experiences of the local Mexican population as reference, and found that they were not significantly different. Over all migrants interviewed in this study, 29.4% reported having experienced some form of violence, versus. 28.2% of the local Mexican population [35]. There exists a widespread distrust of authorities, which, in the case of transitory migrants, prevailed among travelers from Central America and other countries who feared deportation [36,37]. Of the total number of migrants who have suffered some form of violence, only one out of ten reported the event to an authority or a human rights organization. Similarly, only 10.7% of Mexicans reported their violent experiences to the authorities [35].

Regarding the distribution of violence by gender, we identified that, overall, men suffered more violence than women, but less than TTTs. In contrast, within the Mexican migrant population, we found no statistically significant variation in the distribution of violence between male and female victims [35]. However, in our study, the distribution of violence according to gender shows that TTTs experience the highest incidence of all forms of violence. The number of TTTs included in the study, only 67, is a limitation in drawing conclusions for this group; nevertheless, due to their apparently increased vulnerability, it is still important to discuss the results for this population.

One of the most relevant explanations for the differential distribution of violence by gender during the migratory process refers to the increasing relations of inequality and pervasive gender roles present within particular migrant groups. This phenomenon may be related to the numerical composition of the migrant flow; men outnumber both women and TTTs, which enables "*machista*" social interactions between migrants, assigning women and TTTs the

traditional roles of dependence and subordinance. The perception of transit through Mexico may also contribute to the phenomenon, a country traditionally associated with gender-based inequality and violence [38,39,40,41]. TTTs represent the small minority of the migrant population (less than 1% of the total sample), and are unlikely to obtain social support since they represent stereotypes of individuals whose identities do not conform to the normative male gender standards [42,43]. In this case, hate crimes are exacerbated within migratory contexts, where TTTs represent a minority amidst minorities and usually travel with the exacerbated risks of irregular migratory conditions [44]. In the case of women, traditional gender roles are intensified throughout transit. As shown in this and other similar studies, from the perspective of the male migrant, female migrants require "protection" and are therefore given domestic tasks such as food preparation and laundry in exchange for "protection and security" throughout the journey [38]. Hampered by domestic responsibilities, women are also a focus of harassment and sexual violence. In addition, they are frequently pressured into transactional sex as a means of achieving transit not only for themselves but also for the other members of their migrant groups [45].

Violence against migrants occurs in social contexts of high homicide rates, both in the countries of origin and destination. The countries that form the "Northern Triangle" have the highest homicide rates in Latin America and the Caribbean: El Salvador (60 for every 100,000 inhabitants), Honduras (42.8), and Guatemala (26.1). Mexico, the country of transit for the migrants in question, had a rate of 22.5 homicides for every 100,000 inhabitants in 2017. San Pedro Sula, Honduras, was considered the most violent city in the world in 2013, with a rate of 90.4 homicides for every 100,000 inhabitants [46]. This violent context, present in most countries of origin, is one of the principal motives reported by migrants in their search for a better quality of life. Nevertheless, as the results of this study demonstrate, reports of violence increase over two-fold (2.1) in communities near the US-Mexico border (Saltillo, Coahuila: 38.3%), as compared to the communities in the south where transit begins (Tapachula, Chiapas: 18.2%). This indicates that the more extended the journey, the greater the risk of exposure to violence during the migration process.

Implications for public policy regarding migration and human rights

The continuously violent context in countries of origin and countries of transit has been reinforced by anti-immigration policies in the US: intensified in the Obama administration and worsened in the current Trump administration with a steeper uptick of persecution and deportation. However, despite these conditions, the majority of migrants who suffer violence in transit decide to continue their journey towards the US.

A periodic update of the migratory context that included our study brings us to lay out the current scene in 2018 and 2019, where new forms of transit through Mexico have been defined: notably, "migrant caravans" [34,47]. Even so, the current government of Mexico (2018–2024) has implemented protective measures for the human rights of transitory migrants, by means of providing a total of 13,270 visitor visas on humanitarian grounds to members of the migrant caravans up to February 11th 2019 [46]. These methods appear to constitute a new social, political, and migratory scene to face the significant challenges related to the prevalent violence in these countries. Migrants are becoming visible, and at the same time, being perceived by the current US government as a threat to national security and has resulted in an emergency response, including militarization at the border, and construction of a wall between the US and Mexico.

Study limitations

From the start, it is important to note that incidences of violence are largely underreported mainly because victims have normalized and trivialized violence in Central America and

Mexico. This may be a reflection of the fact that the interviewees did not consider the majority of their migratory experiences related to violence (i.e., psychological hostility, physical aggressions, and theft) "serious" enough to report. With respect to the way in which violence was categorized, it is important to take into account the difficulty of differentiating between different types of violence, as a result of the complexity of aggressions and the form in which they were reported (self-report).

This study presents limitations related to its cross-sectional design, which limits ability to examine temporal relationships. The study was carried out only with migrants currently occupying the *Casa de migrante*, in order to control the factor of local insecurity and ensure a higher level of participant safety. The process of self-selection of the population which uses the shelters introduces bias in the results obtained, and may affect the generalizability of the findings. However, other studies present a similar prevalence of violence among migrants in general (both users and non-users of shelters) and their sociodemographic characteristics do not differ from the sample considered for this study [27]. Despite its limitations, we believe this study contributes important information and analyses that aid understanding of the role violence plays in the experience of undocumented migrants living in situations of high social vulnerability.

Conclusions

The results of this paper show that violence is one of the main risks for migrants during their transit through Mexico due to the highly vulnerable conditions they face. In order to understand how violence is exercised, we must fully comprehend its complex dimensions and the social structures that perpetuate it. In this violence-imbued context, migrants in transit are vulnerable to high social risks requiring urgent intervention for the promotion and protection of their rights. The Mexican government has received and committed to comply with a number of recommendations by national and international organizations. However, little has been done to monitor their implementation or outcomes [19,22,47,48,49].

The efforts of the *Casas del migrante*, civil organizations and advocates and defenders of the human rights of migrants are framed in the previously described context of structural violence. Because—or in spite—of this, however, they have come to embody a substantial part of the social response to the consequences of violence against migrants in transit through Mexico. The *Casas del migrante* represent one of the few places where this population can find social support and alleviate some of the negative consequences associated with the violence experienced while migrating. However, shelters do not have the capacity to transform the conditions that determine the magnitude and consequences of violence; this is an issue that must be addressed by the Mexican government and its institutions. To do so, a series of mechanisms should be implemented for effective enforcement of the universal human right to security and social protection. It is necessary to define strategies, which promote and protect the human rights of migrants and secure that they can fully access treatment and care when needed during the entire migration process. The discussion should include and distinguish between the concepts of risks and vulnerability and consider differences based on gender, nationality, ethnicity, and social class among the most relevant for this population. Such response must also address social issues such as stigma, discrimination, and human rights and should be based on the contextual realities. This urgently warrants further investigation aimed at providing evidence for the implementation of the human rights policies necessary to guarantee migrants the effective exercise of their rights.

Author Contributions

Conceptualization: René Leyva-Flores, Cesar Infante.

Data curation: Juan Pablo Gutierrez.

Formal analysis: René Leyva-Flores, Cesar Infante, Juan Pablo Gutierrez, Frida Quintino-Perez, MariaJose Gómez-Saldivar, Cristian Torres-Robles.

Funding acquisition: René Leyva-Flores.

Investigation: René Leyva-Flores, Cesar Infante, Frida Quintino-Perez, MariaJose Gómez-Saldivar, Cristian Torres-Robles.

Methodology: René Leyva-Flores, Cesar Infante, MariaJose Gómez-Saldivar.

Supervision: René Leyva-Flores, Cesar Infante, Juan Pablo Gutierrez.

Writing – original draft: René Leyva-Flores, Cesar Infante, Juan Pablo Gutierrez, MariaJose Gómez-Saldivar, Cristian Torres-Robles.

Writing – review & editing: René Leyva-Flores, Cesar Infante, Juan Pablo Gutierrez, Frida Quintino-Perez.

References

1. Bejarano J. La primera víctima del Estrecho. Pateras, veinte años de muerte. La inmigración en las costas del sur suma la cifra de 18.000 víctimas. In: La Vanguardia. 2008. http://medios.mugak.eu/noticias/noticia/175587. Accessed 15 Oct 2016.
2. Giorgio M, Townsend L, Zembe Y, Guttmacher S, Kapadia F, Cheyip M et al. Social Support, Sexual Violence, and Transactional Sex Among Female Transnational Migrants to South Africa. Am J Public Health. 2016; 106(6): 1123–1129. https://doi.org/10.2105/AJPH.2016.303107 PMID: 27077356
3. Infante C, Aggleton P, Pridmore P. Forms and Determinants of Migration and HIV/AIDS-Related Stigma on the Mexican-Guatemalan Border. Qualitative Health Research. 2009; 19(12):1656–1668. https://doi.org/10.1177/1049732309353909 PMID: 19949216
4. Keygnaert I,Guieu A. What the eye does not see: a critical interpretive synthesis of European Union policies addressing sexual violence in vulnerable migrants. Reproductive Health Matters. 2015; 23(46): 45–55. https://doi.org/10.1016/j.rhm.2015.11.002 PMID: 26718996
5. Martínez-García J, Martín-López M. Group Violence and Migration Experience among Latin American Youths in Justice Enforcement Centers. The Spanish Journal of Psychology. 2015; https://doi.org/10.1017/sjp.2015.87 PMID: 26514376
6. Ruiz OM. Los riesgos de cruzar. La migración centroamericana en la frontera México-Guatemala. Ciudad de México: El Colegio de la Frontera Norte, A.C; 2011.
7. Servan-Mori E, Leyva-Flores R, Infante C, Torres-Pereda P, Garcia-Cerde R. Migrants Suffering Violence While in Transit Through Mexico: Factors Associated with the Decision to Continue or Turn Back. Journal of Immigrant and Minority Health. 2014; 16(1): 53–59. https://doi.org/10.1007/s10903-012-9759-3 PMID: 23292730
8. Coral I. Desplazamiento por violencia política en el Perú, 1980–1992. Perú. In: Instituto de Estudios Peruanos. 1994. http://repositorio.iep.org.pe/bitstream/IEP/432/1/documentodetrabajo58.pdf. Accesed 9 Sept 2016.
9. Gómez-Builes GM, Astaiza-Arias GM, De Souza-Minayo. Las migraciones forzadas por la violencia: el caso de Colombia. Ciência & Saúde Colectiva. 2008; 23(5):1649–1660.10. Appleyard R. International Migration Policies: 1950–2000. International Migration. 2001; 39(6):7–20.
10. Destremau B, Salama P. La pobreza enredada en las turbulencias macroeconómicas en América Latina. 2015. Espiral. Estudios sobre Estado y Sociedad; 9(25):179–227.
11. Massey DS, Pren KA, Durand J. Nuevos escenarios de la migración México–Estados Unidos. Las consecuencias de la guerra antiinmigrante. Papeles de Población. 2009: 15(61):101–128.
12. Zolberg A. R. International migration policies in a changing world system. In: McNeill WH, Adams RS, editors. Human migration: patterns and policies. Bloomington Indiana: Indiana University Press; 1978. p. 241–286.
13. United Nations, Department of Economic and Social Affairs, Population Division International Migration Report 2017: Highlights, 2017. Available from: http://www.un.org/en/development/desa/population/migration/publications/migrationreport/docs/MigrationReport2017_Highlights.pdf. Cited 17 February 2019.

14. Benítez- Manaut R. México, Centroamérica y Estados Unidos: migración y seguridad. In: Colectivo de Análisis de la Seguridad con Democracia, editor. Migración y seguridad: nuevo desafío en México. México: Colectivo de Análisis de la Seguridad con Democracia; 2011. p. 179–192
15. SEGOB. Estimaciones con base en Boletines estadísticos, información del U.S. Department of Homeland Security: Statistical Yearbook of the Immigration and Naturalization Service; U.S. Border Patrol; U.S. Census Bureau: American Community Survey (ACS), varios años. Datos preliminares. 2014.
16. Vogt WA. Crossing Mexico: Structural violence and the commodification of undocumented Central American migrants. American Ethnologist. 2013; 40(4): 764–780.
17. Martínez DE, Reineke RC, Rubio-Goldsmith R, Parks BO. Structural Violence and Migrant Deaths in Southern Arizona: Data from the Pima County Office of the Medical Examiner, 1990–2013. Journal on Migration and Human Security. 2014; 2(4), 257–286. https://doi.org/10.1177/233150241400200401].
18. Tara B, and Laczko F, editors. Fatal Journeys Volume 2: Identification and Tracing of Dead and Missing Migrants. Geneva: International Organization for Migration; 2016. https://publications.iom.int/system/files/fataljourneys_vol2.pdf.
19. Comision Nacional de los Derechos Humanos. Informe Especial sobre Secuestro de Migrantes en México. México: CNDH, 2011 Feb. 108 p.
20. pewresearchcenter.org [Internet]. Key findings about U.S. immigrants; c2018 [cited 2019 Feb 20]. Available from: http://www.pewresearch.org/fact-tank/2018/11/30/key-findings-about-u-s-immigrants/
21. ice.gov [Internet]. ICE Enforcement and Removal Operations Report. U.S. Immigration and Customs Enforcement Fiscal Year 2018; 2018 c2018 [cited 2019 Feb 23]. Available from: https://www.ice.gov/doclib/about/offices/ero/pdf/eroFY2018Report.pdf).
22. CNDH. Recomendación No. 80/2013. Caso de privación de la vida de 72 personas migrantes y atentados a la vida de los extranjeros V73 y V74, en el Municipio de San Fernando, Tamaulipas. Mexico, December 23. http://www.cndh.org.mx/sites/all/fuentes/documentos/Recomendaciones/2013/REC_2013_080.pdf. Accessed 18 Sept 2013.
23. Creswell J. Research Design. Qualitative, Quantitative and Mixed Methods Approaches. Los Angeles: Sage; 2009.
24. Jimenez-Bautista F. Conocer para comprender la violencia: origen, causas y realidad. Convergencia. 2012; 19(58):13–52.
25. B du Plessis D, Kaminer A, Hardy B. The contribution of different forms of violence exposure to internalizing and externalizing symptoms among young South African adolescents. Child Abus. Negl. 2015; 45:80–89
26. Bourdieu P. Language and symbolic power. Cambridge: Harvard: University Press; 1991.
27. Infante C, Idrovo JA, Sánchez-Domínguez M, Vinhas S, González-Vázquez T. Violence Committed Against Migrants in Transit: Experiences on the Northern Mexican Border. J Immigr Minor Health. 2012; 14(3): 449–459. https://doi.org/10.1007/s10903-011-9489-y PMID: 21655940
28. Keygnaert I, Dialmy A, Manço A, Keygnaert J, Vettenburg N, Roelens K et al. Sexual violence and sub-Saharan migrants in Morocco: a community-based participatory assessment using respondent driven sampling. Globalization and Health [Internet]. 2014 [cited 2019 Feb 24];10(32):[16 p.]. Available from: https://globalizationandhealth.biomedcentral.com/track/pdf/10.1186/1744-8603-10-32
29. Kish L. Survey Sampling. New York: John Wiley & Sons, Inc; 1965
30. Green J and Thorogood N. Qualitative Methods for Health Research. London: Sage Publications Ltd; 2004.
31. Bustamante J. Report of the Special Rapporteur on the human rights of migrants. Geneva: United Nations; 2011.
32. Human Rights Watch. Informe Mundial 2014: Estados Unidos. http://www.hrw.org/es/world-report/2014/country-chapters/121937. Accessed 7 Oct 2016
33. Médicos Sin Fronteras. Forzados a huir del triangulo norte de centroamérica: una crisis humanitaria olvidada. MSF-E. http://www.msf.mx/sites/mexico/files/attachments/msf_forzados-a-huir-del-triangulo-norte-de-centroamerica_0.pdf. Accessed 12 Aug 2017.
34. Regeneración Radio. Frente al muro: La odisea de la Caravana Migrante en su paso hacia EUA [Film]; 2018. Available from: http://www.caritasancristobal.org/documental-frente-al-muro-la-odisea-la-caravana-migrante-en-paso-hacia-eua/
35. ENVIPE. Encuesta Nacional de Victimización y Percepción sobre Seguridad Pública. 2016.http://www.beta.inegi.org.mx/proyectos/enchogares/regulares/envipe/2016. Accesed 22 Aug 2016
36. Amnistía Internacional. Víctimas invisibles. Migrantes en movimiento en México. London: Amnesty International Publications; 2010.

37. Mora L. Vulnerabilidades de las mujeres en el procesomigratorio. In: Primera Reunión Centroamericana sobre Trata de Mujeres. San José, Costa Rica: Fondo de Población de Naciones Unidas; 2006. 37.

38. Caballero M, Leyva-Flores R, Bronfman M. Mujer, migración y violencia en la frontera sur de México. In: Durán-González, editor. Memoria. Mujeres afectadas por el fenómeno migratorio en México. Una aproximación desde la perspectiva de género. Instituto Nacional de las Mujeres; 2007. pp 100–107.

39. Connell RW. Masculinities and globalization. In: Parker R and Aggleton P, editors. Culture. Society and sexuality. Routledge, London; 2007. pp. 263–274.

40. Donaldson M, Howson R. Men, migration and hegemonic masculinity. In: Donaldson M, Hibbins R, Howson R, Pease B, editors. Migrant Men: Critical Studies of Masculinities and the Migration Experience. Routledge, London; 2009. pp. 210–217.

41. Gutmann MC. The meanings of macho: Being a man in Mexico City. Berkeley: University of California Press;1996

42. Coll-Planas G. La policía del género. In: Missé M, Coll-Planas G, editors. El género desordenado: Críticas en torno a la patologización de la transexualidad. Barcelona: Egales; 2010. pp. 55–64

43. Molina-Rodríguez NE, Guzmán-Cervantes OO, Martínez-Guzmán A. Identidades transgénero y transfobia en el contexto mexicano: Una aproximación narrativa. Quaderns de Psicologia. 2015; 7(3):71–82.

44. Boeckmann RJ, Turpin-Petrosino C. Understanding the Harm of Hate Crime. Journal of Social Issues. 2002: 58(2): 207–225.

45. Bronfman M, Leyva R, Negroni M, Caballero M, Infante C, Cuadra S et al. Migración, género y SIDA: Contextos de vulnerabilidad. Género y Salud en Cifras. 2003: 1(3): 8–12.

46. es.insightcrime.org [Internet]. Balance de InSight Crime sobre homicidios en Latinoamérica en 2017; c2018 [cited 2019 Feb 18]. Available from: https://es.insightcrime.org/noticias/analisis/balance-de-insight-crime-sobre-homicidios-en-latinoamerica-en-2017/

47. gob.mx [Internet]. El INAMI entrega Tarjetas de Visitante por Razones Humanitarias a miembros de la caravana migrante; c2018 [cited 2019 Feb 18]. Available from: https://www.gob.mx/inm/prensa/el-inami-entrega-tarjetas-de-visitante-por-razones-humanitarias-a-miembros-de-la-caravana-migrante?idiom=es

48. Aikin O, Muñoz AA. Crisis de derechos humanos de las personas migrantes en tránsito por México: redes y presión transnacional. Foro Internacional. 2013; 53:143–181.

49. Human Rights Watch. Puertas cerradas: El fracaso de México en la protección de niños refugiados y migrantes de América Central. 2016. https://www.hrw.org/es/report/2016/03/31/puertas-cerradas/el-fracaso-de-mexicoen- la-proteccion-de-ninos-refugiados-y. Accessed 10 jun 2016.

Capítulo 10.
Prevención de lesiones y violencia: una línea estratégica en el CISS

Desde su fundación, el CISS del INSP ha desempeñado un papel fundamental en el fortalecimiento de los sistemas de salud mediante la generación de evidencia científica rigurosa, pertinente y comprometida con la equidad. A lo largo de las tres últimas décadas, una de las líneas de investigación más sólidas y con mayor impacto ha sido la de prevención de lesiones y violencia, con la que se ha consolidado como un referente nacional e internacional en la investigación de estas problemáticas.

Esta línea ha abordado, de manera integral, las múltiples expresiones de las lesiones y la violencia, articulando proyectos orientados tanto a la comprensión de sus determinantes como a la evaluación de políticas e intervenciones para su mitigación. El enfoque del CISS ha abarcado desde el análisis de costos y utilización de servicios de salud, hasta el desarrollo de estrategias de prevención con impacto en políticas públicas. De manera destacada, el trabajo del CISS en lesiones no intencionales, como las provocadas por el tránsito, ha contribuido a posicionar esta temática en la agenda pública. Asimismo, el estudio de distintas formas de violencia —como la violencia de pareja, la obstétrica y, más recientemente, las conductas suicidas en poblaciones vulnerables— ha evidenciado el compromiso del CISS con los grupos históricamente desprotegidos.

Uno de los principales hitos en esta trayectoria fue el reconocimiento del CISS como Centro Colaborador de la OMS/OPS en investigación en lesiones y violencia en 2005. Esta designación consolidó su liderazgo en la región y permitió fortalecer alianzas estratégicas con actores clave como el Consejo Nacional para la Prevención de Accidentes (Conapra), el Centro Nacional de Equidad de Género y Salud Reproductiva (CNEGySR) y el Programa Nacional para la Prevención del Suicidio (Pronaps), entre otros.

Como muestra del impacto científico y social de esta línea, se presentan a continuación cinco de los trabajos más relevantes desarrollados por investigadoras e investigadores del CISS en las últimas décadas. Estos artículos reflejan la vocación del CISS por contribuir, desde la investigación, a la construcción de entornos más seguros, equitativos y saludables para toda la población.

Journal of Affective Disorders 298 (2022) 65–68

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Short communication

Comparison of suicide attempts among nationally representative samples of Mexican adolescents 12 months before and after the outbreak of the Covid-19 pandemic

Rosario Valdez-Santiago [a], Aremis Villalobos [b,*], Luz Arenas-Monreal [a], Catalina González-Forteza [c], Alicia Edith Hermosillo-de-la-Torre [d], Corina Benjet [c], Fernando A. Wagner [e]

[a] Center for Health Systems Research, National Institute of Public Health (INSP), Mexico
[b] Center for Population Health Research, National Institute of Public Health (INSP), Mexico
[c] Department of Epidemiology and Psychosocial Research, National Institute of Psychiatry (INP), Mexico
[d] Psychology Department, Autonomous University of Aguascalientes (UAA), Mexico
[e] School of Social Work, University of Maryland, Baltimore, USA

ARTICLE INFO

Keywords:
Suicide attempts
Adolescents, Covid-19

ABSTRACT

Background: There is serious concern over the increase in mental health problems during the coronavirus disease 2019 (Covid-19) pandemic.
Methods: Based on data from two Mexican National Health and Nutrition Surveys conducted in 2018–2019 and 2020 (n = 17,925 and 4,913, respectively), we estimated the prevalence of suicide attempts among adolescents 10–19 years old in the previous year. We constructed a multivariate logistic regression model adjusted by sociodemographic characteristics and contextual variables for the Covid-19 pandemic.
Results: The prevalence of suicide attempts in the previous year was similar in both surveys. We found that women, youth in urban localities and individuals living in households where a family member had lost her/his job as a result of the Covid-19 contingency were more likely to attempt suicide compared to their counterparts. On the other hand, attending classes online proved to be a protective factor (aOR=0.3, 95% CI=0.1, 0.8, p = 0.022).
Limitations: The principal limitation of our study concerned the restricted size of our sample for the 2020 survey wave.
Conclusions: Population-level policies aimed at providing economic protection and helping youth to return to school would exert a favorable impact on the mental health and suicidal behavior of youths.

1. Introduction

On March 11, 2020, the World Health Organization (WHO) declared Covid-19 a global pandemic (World Health Organization, 2020); 22 days later, Mexico announced a national state of emergency and implemented a series of precautionary measures including home confinement. It is well known that pandemics affect mental health in proportion to the magnitude of the event and levels of population vulnerability. Covid-19 has posed unexpectedly high mental health risks for the world at large (Xiong et al., 2020), and Mexico is no exception. Suicide is a public mental health problem characterized as an unnatural and preventable death.

Suicide attempts (SAs) constitute an important risk factor for death by suicide (Rockstroh et al., 2021). They are multifactorial and have specific characteristics, for instance, women are more likely to attempt suicide than men. In Mexico, SAs have risen for both sexes in the last three national health surveys (Valdez-Santiago et al., 2021), with adolescents and young adults representing a major risk group (Hermosillo-de la Torre et al., 2021). Furthermore, SAs have trended downward with marked differences in the incidence of SAs observed between urban and rural areas (INEGI, 2019).

In light of the characteristics of this public health problem, its rising prevalence, its association with sociodemographic and psychological factors (Hermosillo-de la Torre et al., 2020; Rivera-Rivera et al., 2020)

* Corresponding autor.
E-mail address: alvillalobos@insp.mx (A. Villalobos).

https://doi.org/10.1016/j.jad.2021.10.111
Received 3 June 2021; Received in revised form 10 September 2021; Accepted 23 October 2021
Available online 29 October 2021
0165-0327/© 2021 Elsevier B.V. All rights reserved.

and its potential upsurge as a result of confinement, the aim of this report is to compare the prevalence of SAs in the Mexican adolescent population during the 12 months prior and subsequent to the implementation of Covid-19 confinement restrictions. We had no *a priori* hypothesis given the novelty of the pandemic situation. Additionally, our work sought to disaggregate estimates by sex, age and urban/rural area, and to assess the association between SAs and sociodemographic as well as psychosocial factors.

2. Methods

Based on data from the 2018–2019 National Health and Nutrition Survey (*ENSANUT*) as well as the 2020 Covid *ENSANUT* (*ENSANUT-COVID*), we estimated the prevalence of last-year SAs (LYSAs) in adolescents 10–19 years old.

2.1. Sample selection

The 2018–19 *ENSANUT* and 2020 *ENSANUT-COVID* were household surveys with a probabilistic, multi-stage sample design, representative at the national, regional and rural/urban levels ($n = 17{,}925$ and 4,812, respectively) (Romero-Martínez et al., 2019; Romero-Martínez et al., 2021). The 2018–19 *ENSANUT* was also representative at the state level; this was impossible to accomplish in 2020 because of the protective measures implemented to prevent Covid-19 infection among field staff and participants, that limited sample size. In both surveys, households were randomly selected, and then an additional list of one randomly selected adolescent per household was compiled. Exclusion criteria consisted of refusing to participate and having auditive or cognitive disabilities that would render individuals unable to respond to the survey. All participants signed informed-consent forms. Our study was approved by the Institutional Review Board of the National Institute of Public Health in Mexico.

2.2. Variables of interest

Data were collected from July 2018 to June 2019 (*ENSANUT 2018,19*) and from August to November 2020 (*ENSANUT-COVID 2020*). Comparable standardized questionnaires for adolescents were administered personally, at the homes, by trained personnel.

2.2.1. Last-year suicide attempts

The term suicide attempt was defined as "any action taken by a given person that could cause them to die." (Remus, 2020) We created a dichotomous variable for LYSA occurrence based on two questions: (1) "Have you ever attempted to harm yourself or deliberately cut, intoxicated or hurt yourself in any way for the purpose of dying?" and (2) "Was this in the last 12 months?"

2.2.2 Sociodemographic variables included sex, age and type of locality (urban or rural). We generated a socioeconomic indicator grouping households into income deciles; the method used has been described elsewhere (Gutiérrez, 2013).

2.2.3 Covid-19 context indicators included the following: at least one household member had stopped receiving income because of the contingency (yes, no); at least one household member had lost his/her job because of the contingency (yes, no); household members had been forced to reduce their spending during the contingency (yes, no); school-aged household members were attending virtual classes (yes, no).

2.3. Statistical analyses

We tabulated the characteristics of participating adolescents according to whether or not they had attempted suicide, with 95% confidence intervals. Poisson regression was used to estimate the prevalence ratios of SAs. Based on logistic bivariate and multivariate models with a 5% level of significance, we estimate variables associated to last-year suicide attempts in 10–19-year-old adolescents. The numbers have been rounded to one decimal place. Statistical analyses were performed using STATA SE 14.0 software, with estimates taking into account the probabilistic, multi-stage sample design and unequal selection probabilities.

3. Results

Table 1 depicts LYSA prevalence over 12 months as well as sample characteristics, stratifying the data according to whether the attempt took place prior to or during the survey. Prevalence estimates for were 1.8% (95% Confidence Interval, CI = 1.6, 2.1) prior to Covid-19 and 2.1% during the first month of the pandemic (95% CI = 1.4, 3.1), showing a non-significant statistical difference. Interestingly, the prevalence of SAs decreased among men in 2020 (0.3%, 95% CI = 0.1, 0.8) as compared to 2018–19 (1, 95% CI = 0.7, 1.4), but increased among women (3.8, 95% CI = 2.4, 5.9 in 2020, vs. 2.7, 95% CI = 2.3, 3.2 in 2018–19). Prevalence among youth 10–14 years old was 1.4% in both surveys (95% CI = 1.1, 1.8 and 0.8, 2.6, respectively), but increased slightly among those 15–19 years old in 2020; however, confidence intervals overlapped markedly (2.3% in 2018–19 vs. 2.8% in 2020; 95% CI = 1.9, 2.8 and 1.4, 5.3, respectively). The figures revealed a downward trend in SA prevalence by socioeconomic level: those at the lowest level showed the highest prevalence (2.2% in 2018–19 vs. 2.3% in 2020) and those at the highest level the lowest prevalence (1.6% vs. 1.7%, respectively). However, the corresponding confidence intervals overlapped, indicating a non-significant statistical difference. Finally, while no difference was observed in SA prevalence between youth in rural as opposed to urban areas pre-Covid-19 (1.8%), prevalence in 2020 proved higher among the latter (2.6%, 95% CI = 1.6, 4.1) and lower among the former (0.8%, 95% CI = 0.4, 1.9).

Table 2 illustrates the results of three groups of logistic regression models comparing estimates for the covariates in our analysis. Model 1 included unadjusted estimates. Model 2 was adjusted simultaneously for sociodemographic variables, and Model 3 included fully adjusted estimates for all variables. We found no evidence of major confounding variables, but registered a number of noteworthy associations, namely that women were more likely to attempt suicide than men, with other variables remaining unchanged (adjusted odds ratio, aOR = 12.5, 95% CI = 4.7, 33.4, $p < 0.001$); urban youth were 4.4 times more likely to attempt suicide than their rural counterparts (95% CI = 1.5, 12.9; $p = 0.008$); and SAs were more likely to occur in households where a family member had lost his/her job because of Covid-19 (aOR = 2.8, 95% CI = 1.2, 6.5, $p = 0.014$). However, they were less likely among participants who had been forced to reduce their expenses during the contingency (aOR = 0.5, 95% CI = 0.3, 1.0, $p = 0.039$) as well as in those cases where school-aged –including adolescent– members of the household were attending classes online (aOR = 0.3, 95% CI = 0.1, 0.8, $p = 0.022$).

4. Discussion

We found no significant difference in the prevalence of SAs among adolescents prior to and during the pandemic, with a pre-pandemic rate of 1.8% compared to 2.1% during the pandemic period. This is consistent with a study of 21 mostly high-income countries, which found no evidence of an increase in suicide deaths among the total population during the initial months of the Covid-19 pandemic (Pirkis et al., 2021). Mexico was one of the few upper-middle-income countries included in this study. A meta-analysis of 54 studies found a 2.68% SA rate for all age groups in community samples during the pandemic. While females, younger individuals and those in less democratic countries were more vulnerable to suicidal ideation during the pandemic, only the level of democracy was associated with actual SAs (Dubé et al., 2021).

While there may have been no overall increase in SAs among adolescents in Mexico during this period, some individuals in this age group were at greater risk than others. We observed that female adolescents (as

Table 1
Prevalence of last-year suicide attempts in adolescents by sociodemographic characteristics: Mexican National Health and Nutrition Surveys 2018–19 ($n = 17,925$) and 2020 ($n = 4,812$).

	Suicide Attempts 2018–19			Suicide Attempts 2020					
Characteristics	n	%*	95% CI	n	%*	95% CI	PR	*P*-Value	95% CI
Total	333	1.8	[1.6,2.1]	101	2.1	[1.4,3.1]	1.1	0.625	[0.7,1.8]
Sex									
Men	77	1.0	[0.7,1.4]	13	0.3	[0.1,0.8]	0.3	0.019	[0.1,0.8]
Women	256	2.7	[2.3,3.2]	88	3.8	[2.4,5.9]	1.4	0.220	[0.8, 2.4]
Age Group									
10–14 years	141	1.4	[1.1,1.8]	40	1.4	[0.8,2.6]	1.0	0.948	[0.5,1.9]
15–19 years	192	2.3	[1.9,2.8]	61	2.8	[1.4,5.3]	1.2	0.583	[0.6,2.4]
Socioeconomic level									
Low	139	2.2	[1.7,2.7]	36	2.3	[0.9,5.7]	1.1	0.908	[0.4,2.7]
Medium	107	1.8	[1.4,2.3]	40	2.2	[1.1,4.1]	1.2	0.553	[0.6,2.4]
High	87	1.6	[1.1,2.1]	25	1.7	[0.8,3.5]	1.1	0.819	[0.5,2.4]
Type of locality									
Rural	102	1.8	[1.4,2.4]	18	0.8	[0.4,1.9]	0.5	0.076	[0.2,1.1]
Urban	231	1.8	[1.5,2.2]	83	2.6	[1.6,4.1]	1.4	0.171	[0.9,2.3]

*Weighted percentages; CI=confidence interval; PR=prevalence ratio. The numbers have been roundend to one decimal place.

Table 2
Multivariate logistic regression models for last-year suicide attempts in 10–19-year-old adolescents: Mexican National Health and Nutrition-COVID Survey 2020.

	Descriptive Satistics for Suicide Attempts				Model 1			Model 2			Model 3		
	n	%* 95% CI	95% CI	P-Value	OR	95% CI	P-Value	aOR	95% CI	P-Value	aOR	95% CI	P-Value
Sex													
Men	13	0.3	[0.1,0.8]		1.0	reference		1.0	reference		1.0	reference	
Women	88	3.8	[2.4,5.9]	<0.001	11.5	[4.3,30.6]	<0.001	11.9	[4.5,31.6]	<0.001	12.5	[4.7,33.4]	<0.001
Age Group													
10-14 years	40	1.4	[0.8,2.6]		1.0	reference		1.0	reference		1.0	reference	
15-19 years	61	2.8	[1.4,5.3]	0.243	1.9	[0.7,5.4]	0.206	1.8	[0.7,5.1]	0.244	1.8	[0.7,5.1]	0.253
Type of locality													
Rural	18	0.8	[0.4,1.9]		1.0	reference		1.0	reference		1.0	reference	
Urban	83	2.6	[1.6,4.1]	0.015	3.1	[1.2,7.9]	0.019	3.4	[1.3,9.0]	0.011	4.4	[1.5,12.9]	0.008
At least one household member had lost his/her job as a result of the contingency.													
No	57	1.9	[1.1,3.2]		1.0	reference					1.0	reference	
Yes	44	2.4	[1.0,5.7]	0.665	2.7	[1.1,7.1]	0.037				2.8	[1.2,6.5]	0.014
Household had been forced to reduce expenses during the contingency.													
No	72	2.0	[1.1,3.7]		1.0	reference					1.0	reference	
Yes	29	2.2	[1.6,2.9]	0.891	1.0	[0.5,1.9]	0.892				0.5	[0.3,1.0]	0.039
School-aged household members were attending virtual classes.													
No	33	4.0	[1.7,9.2]		1.0	reference					1.0	reference	
Yes	68	1.5	[1.0,2.4]	0.196	0.4	[0.1,1.1]	0.086				0.3	[0.1,0.8]	0.022

n=sample size; *weighted percentages; OR=odds ratio (crude); aOR=adjusted odds ratio; CI=confidence interval
Model 1: ORs estimated through bivariate analyses of the association between each variable and suicide attempts
Model 2: aORs for the association between each sociodemografic variable and suicide attempts (entered simultaneously)
Model 3: aORs obtained introducing all variables simultaneously

is often found in pre-pandemic studies of US youth, e.g., Lewinsohn et al., 2001, Nock et al., 2013), those residing in urban areas, and those living in households where at least one family member had lost her/his job because of the pandemic faced increased odds of a SA. However, adolescents in families whose school-aged children continued classes online (versus not attending classes) or had to reduce their spending were less likely to attempt suicide. While evidence has long documented increases in deaths from suicide during economic downturns (Haw et al., 2015; Nordt et al., 2015), the economic impact of the pandemic on adolescent SAs is particularly relevant for countries like Mexico: in 2019, 56% of Mexican workers were engaged in the informal sector without social protection (ENOE, 2019 (Instituto Nacional de Estadística Geografía e Informática. Encuesta Nacional de Ocupación y Empleo 2021)), and government assistance during the pandemic has been significantly inferior to that of other Latin American countries and those in the G20, with the level of support being even lower than during the 2009 recession (Hannan et al., 2020). In terms of schooling, in Mexico, all instruction during the pandemic has taken place online until recently, this in a country where Internet access and computers are not universally available. It is estimated that 2.8 million, or 10% of youth in Mexico, dropped out of school during the first six months of the pandemic (https://es.statista.com/estadisticas/1196796/desercion-escolar-nivel-educativo-covid-mexico). The impact of this on the mental health of Mexican youth is likely to be substantial given that attending school has been shown to be protective of mental health Gutiérrez-García et al. (2017). Our study shows that attending online classes during the pandemic was associated with reduced odds of attempting suicide, as was reduced household spending. Both of these findings likely reflect the positive impact of enjoying a higher socio-economic status: children from more economically comfortable families were not forced to abandon school, and their families were in a position to cut spending without major adverse consequences. This is in marked contrast to poorer families whose income covered only basic expenses.

5. Strengths and limitations

This study provides unique data from two large-scale, nationally representative surveys conducted immediately prior to and during the pandemic period. To our knowledge, *ENSANUT-COVID 2020* was the only nationally representative household survey conducted in person on

the topic during the pandemic period in Latin America. However, it is important to note that, because of the 12-month recall period and the dates of fieldwork, our estimation of SAs during the pandemic period covered only the first five to eight months of the pandemic, depending on when respondents were surveyed. Therefore, if SAs truly increased during the pandemic, we would most likely have underestimated SA prevalence; this may account for the lack of statistically significant differences. On the other hand, if SAs truly decreased during the pandemic, we would most likely have overestimated SA prevalence. Additionally, our conclusions were limited by the cross-sectional survey design that yielded no evidence for establishing the causality or directionality of the associations between SAs and their correlates. Finally, measuring SAs depended on the self-reporting of a sensitive issue burdened with cultural and religious taboos. Hence, our prevalence estimates were likely to be conservative.

6. Conclusion

While there may have been no overall increase in SAs among Mexican adolescents during the first five to eight months of the pandemic, adolescents in households that lost employment and those not attending on-line classes are at risk, exacerbating the already large mental-health disparities in countries such as Mexico. Further research is needed to monitor the longer-term consequences of the pandemic and school closures for youth. Population-level policies designed to provide economic protection and allow youth to return to school would have a favorable impact on the mental health and suicidal behavior of adolescents.

Statements

Statements of ethics

The study was conducted according to the Helsinki Declaration, and was approved by the Ethics and Research Committees of the National Institute of Public Health in Mexico.

Role of the funding sources

The authors received no specific funding for this work.

CRediT authorship contribution statement

Rosario Valdez-Santiago: Conceptualization, Writing – original draft, Writing – review & editing. **Aremis Villalobos:** Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Luz Arenas-Monreal:** Writing – original draft, Writing – review & editing. **Catalina González-Forteza:** Writing – original draft, Writing – review & editing. **Alicia Edith Hermosillo-de-la-Torre:** Writing – original draft, Writing – review & editing. **Corina Benjet:** Writing – original draft, Writing – review & editing. **Fernando A. Wagner:** Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors have no conflicts of interest regarding this research study.

Acknowledgement

None.

References

Dubé, J.P., Smith, M.M., Sherry, S.B., Hewitt, P.L., Stewart, S.H., 2021. Suicide behaviors during the COVID-19 pandemic: a meta-analysis of 54 studies. Psychiatry Res. 301, 113998 https://doi.org/10.1016/j.psychres.2021.113998. Jul.

Gutiérrez, J.P., 2013. Clasificación socioeconómica de los hogares en la ENSANUT 2012. Salud Pública Mex. 55, S341–S346.

Gutiérrez-García, R.A., Benjet, C., Borges, G., Méndez Ríos, E., Medina-Mora, M.E, 2017. NEET adolescents grown up: eight-year longitudinal follow-up of education, employment and mental health from adolescence to early adulthood in Mexico city. Eur. Child Adolesc. Psychiatry 26 (12), 1459–1469. https://doi.org/10.1007/s00787-017-1004-0.

Hannan, S., Honjo, K., Raissi, M.. https://www.imf.org/en/Publications/WP/Issues/2020/10/13/Mexico-Needs-a-Fiscal-Twist-Response-to-Covid-19-and-Beyond-49817.

Haw, C., Hawton, K., Gunnell, D., Platt, S., 2015. Economic recession and suicidal behaviour: possible mechanisms and ameliorating factors. Int. J. Soc. Psychiatry 61 (1), 73–81, 36.

Hermosillo-de la Torre, A.E., González-Forteza, C., Rivera-Heredia, M.E., Méndez-Sánchez, C., González-Betanzos, F., Palacios-Salas, P., Jiménez, A., Wagner, F.A., 2020. Understanding suicidal behavior and its prevention among youth and young adults in Mexico. Prev Med 138, 1–6. ISSN e: 00917435.

Hermosillo-de la Torre, A.E., Arteaga-de Luna, S.M., Acevedo-Rojas, L.D., Juárez-Loya, A., Jiménez-Tapia, J.A., Pedroza-Cabrera, J., González-Forteza, C., Cano, M., Wagner, F.A, 2021. Psychosocial correlates of suicidal behavior among adolescents under confinement due to the COVID-19 pandemic in Aguascalientes, Mexico. Int. J. Environ. Res. Public Health. 18 (9), 4977. https://doi.org/10.3390/ijerph18094977.

Instituto Nacional de Estadística Geografía e Informática. Encuesta Nacional de Ocupación y Empleo. 2021 https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2020/trabajoNal.pdf.

Lewinsohn, P.M., Rohde, P., Seeley, J.R., Baldwin, C.L., 2001. Gender differences in suicide attempts from adolescence to young adulthood. J. Am. Acad. Child Adolesc. Psychiatry 40 (4), 427–434. https://doi.org/10.1097/00004583-200104000-00011. AprPMID: 11314568.

Nock, M.K., Green, J.G., Hwang, I., McLaughlin, K.A., Sampson, N.A., Zaslavsky, A.M., Kessler, R.C., 2013. Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: results from the national comorbidity survey replication adolescent supplement. JAMA Psychiatry 70 (3). https://doi.org/10.1001/2013.jamapsychiatry.55. Mar300-10PMID: 23303463; PMCID: PMC3886236.

Nordt, C., Warnke, I., Seifritz, E., Kawohl, W., 2015. Modelling suicide and unemployment: a longitudinal analysis covering 63 countries, 2000–11. Lancet Psychiatry 2 (3), 239–245.

Pirkis, J., John, A., Shin, S., Delpozo-Banos, M., Arya, V., Aguilar, P.A., Spittal, M.J., 2021. Suicide trends in the early months of the COVID-19 pandemic: interrupted time series analysis of preliminary data from 21 countries. Lancet Psychiatry 1–10. https://doi.org/10.1016/S2215-0366(21)00091-2.

Remus, R., 2020. Suicide in adolescence: A review of Literature. Rev. Asistenta Soc. 3, 109–120.

Rivera-Rivera, L., Fonseca-Pedrero, E., Séris-Martínez, M., 2020. Prevalencia y factores psicológicos asociados con conducta suicida en adolescentes ENSANUT 2018-19. Salud Pública Mex. 62 (6), 672–681.

Rockstroh, F., Reichl, C., Lerch, S., Fischer-Waldschmidt, G., Ghinea, D., Koenig, J., Resch, F., Kaess, M., 2021. Self-rated risk as a predictor of suicide attempts among high-risk adolescents. J. Affect. Disord. 282, 852–857. https://doi.org/10.1016/j.jad.2020.12.110. ISSN 0165-0327.

Romero-Martínez, M., Shamah-Levy, T., Vielma-Orozco, E., Heredia-Hernández, O., Mojica-Cuevas, J., Cuevas-Nasu, L., Rivera-Domarco, J., 2019. Encuesta nacional de salud y nutrición 2018–2019: metodología y perspectivas. Salud Pública Mex. 61, 917–923.

Romero-Martínez, M., Barrientos-Gutiérrez, T., Cuevas-Nasu, L., Bautista-Arredondo, S., Colchero, M.A., Gaona-Pineda, E.B., Lazcano-Ponce, E., Martínez-Barnetche, J., Alpuche-Aranda, C., Rivera-Dommarco, J., Shamah-Levy, T., 2021. Metodología de la encuesta nacional desalud y nutrición 2020 sobre Covid-19. Salud Publica Mex. 63, 444–451. https://doi.org/10.21149/12580.

Valdez-Santiago, R., Villalobos, A., Arenas-Monreal, L., González-Forteza, C., Hermosillo-de la Torre, A.E., Benjet, C., Wagner, F.A., 2021. Comparative analysis of lifetime suicide attempts among Mexican adolescents over the past 12 years. J. Environ. Public Health. Int. J. Environ. Res. Public Health 2021, 18, 5419. https://doi.org/10.3390/ijerph18105419. ISSN 1660-4601.

Xiong, J., Lipsitz, O., Nasri, F., Lui, L.M.W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., McIntyre, R.S, 2020. Impact of COVID-19 Pandemic on Mental Health in the General Population: A Systematic Review. J. Affect. Disord. 277, 55–64. https://doi.org/10.1016/j.jad.2020.08.001.

World Health Organization, 2020. Coronavirus disease2019 (Covid-19) Situation Report-51. (accesseed on 14 May 2021).

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://jfprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

Original research

Obstetric violence criminalised in Mexico: a comparative analysis of hospital complaints filed with the Medical Arbitration Commission

Omar Calvo Aguilar ,[1] Marta Torres Falcón,[2] Rosario Valdez Santiago

[1]Dr. Aurelio Valdivieso General Hospital, Oaxaca Health Services, Oaxaca, Mexico
[2]Universidad Autónoma Metropolitana Azcapotzalco, Azcapotzalco, Mexico

Correspondence to
Professor-researcher Rosario Valdez Santiago, CISS, Instituto Nacional de Salud Pública, Morelos, 62100 Cuernavaca, Mexico; rosario.valdez@insp.mx

Received 19 October 2018
Revised 9 August 2019
Accepted 15 September 2019
Published Online First 5 November 2019

Check for updates

© Author(s) (or their employer(s)) 2020. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Calvo Aguilar O, Torres Falcón M, Valdez Santiago R. *BMJ Sex Reprod Health* 2020;**46**:38–45.

ABSTRACT

Introduction Disrespect and abuse during childbirth have been reported by numerous countries around the world. One of their principal manifestations is the performance of invasive or surgical procedures without the informed consent of women. Non-dignified treatment is the second most common form of this conduct. Five Mexican states have classified obstetric violence as a crime: Aguascalientes, Chiapas, Guerrero, the State of Mexico and Veracruz. The others have not yet done so although it is provided for in their civil and administrative regulations.

Objective To analyse whether criminalising obstetric violence has been conducive to the recognition and observance of the reproductive rights of women, based on the records of poor health care complaints filed by women with the Medical Arbitration Commissions (CAMs by their Spanish initials) in two Mexican states.

Materials and methods We conducted an observational qualitative study using a phenomenological approach. Analysis included two states with similar partner demographic and maternal health indicators but different legal classifications of obstetric violence: the Chiapas has criminalized this form of violence while Oaxaca has not. We reviewed the records of obstetric care complaints filed with CAMs in both states from 2011 to 2015, all of them concluded and including full information.

Results Differences were observed regarding the contents of complaints, specifically in the categories of abuse, discrimination and neglect during childbirth. The narratives in the other complaint categories were similar between states.

Conclusion After analysing the records of malpractice complaints in Chiapas and Oaxaca, we conclude that the differentiated legal status of obstetric violence has not influenced recognition or observance of the reproductive rights of women. Criminalising obstetric violence has not improved care provided by health personnel.

Key message s

- The reproductive rights of women are far from being recognized and exercised by users who complain about maternal care services
- Doctors who provide maternal care services violate reproductive rights due to lack of knowledge and to insufficient promotion and enforcement of laws.
- Health personnel are in breach of the following obligations: providing adequate information to patients, showing respect for the decisions of women and performing only consented procedures.

INTRODUCTION

Abuse of women by health personnel during childbirth has long been described and studied with no consensual definition on its operationali s ation. [1–4] It has been distinguished from malpractice and negligence, however, in that it involves the deliberate use of different forms of abuse by health personnel during the provision of institutional birth care. Prior to its recognition as such by the WHO in 2014, this behavior had been documented by a number of studies. For instance, in 2002, d ' Oliveira *et al* had defined institutional violence according to four categories of violence: neglect; verbal violence (threats, scolding, screaming and intentional humiliation); physical violence (blows and the refusal to provide pain medication despite

Calvo-Aguilar O, Torres-Falcón M, Valdez-Santiago R. Obstetric violence criminalised in Mexico: a comparative analysis of hospital complaints filed with the Medical Arbitration Commission. BMJ Sex Reprod Health. 2020;46:38-45. https://doi.org/10.1136/bmjsrh-2018-200224

its being technically indicated); and sexual violence. The authors also specified the essential component of this type of violence: the use of professional power by health personnel to reaffirm their hierarchical position relative to the patients and ensure the obedience and submission of the women requiring their services. According to the authors, perpetration of violence in health service facilities can be considered an extension of the high levels of violence against women and their lack of power insociety.[5]

Bowser and Hill classified abuse during institutional birth care according to seven categories adopted by the WHO in 2014.[6]

The WHO has recommended the following criteria for determining the presence of disrespect and abuse during childbirth: '(A) outright physical abuse, (B) profound humiliation and verbal abuse, (C) coercive or unconsented medical procedures (including sterilization), (D) lack of confidentiality, (E) failure to obtain fully informed consent, (F) refusal to give pain medication, (G) gross violations of privacy, (H) refusal of admission to health facilities, (I) neglecting women during childbirth to suffer life-threatening, avoidable complications, and (J) detention of women and their newborns in facilities after childbirth due to an inability to pay'.[7]

Prevalence of disrespect and abuse against women ranges from 15% to 70% globally, and includes behaviours such as physical abuse, verbal abuse, undignified treatment and performance of invasive or surgical procedures without obtaining prior informed consent.[8 9]

These practices, which violate the human rights of women during medical care, have been recognized and recognized and have triggered a series of proposed solutions. Some adj adj countries of the results have been encouraging awareness training and program s aimed at reducing, Regular and elimination of esta behavior.[10 11] In Latin America, intervention strategies involved public policies that impose criminal measures for obstetric violence (disrespect and abuse during childbirth).[12] (In this document, the term 'obstetric violence' It is used as a synonym for what WHO It described 'lack of respect and abuse during childbirth').

In 2007, Mexico enacted the General Law on Women's Access to a Life Free of Violence. This law provides directives for the institutional coordination of the three powers (executive, legislative and judicial) and the three levels of government (federal, state and municipal) towards the prevention, punishment and eradication of violence against women. Obstetric violence was not specifically addressed under this law but was incorporated under the local laws of five states in the following years: Aguascalientes, Chiapas, Guerrero, Mexico and Veracruz have typified obstetric violence as a crime. Other states are in the process of including this conduct under their criminal codes.[13 14]

There is an important background for this in other Latin American countries. In 2007, Venezuela, the first to recognize obstetric violence as a specific form of gender violence, specifically a law against disrespectful and abusive treatment of women during pregnancy, childbirth and postpartum.[14] In 2013, Panama enacted Law 82, which recognizes the right of women to a life free of violence, including obstetric violence. Also in 2013, Bolivia had Law 348;Although it did not specifically focus on obstetric violence, Articles 7 and 8 of the law of this state that the right of women to a life free of violence includes respect for their reproductive rights in health bodies, finally, in 2015, Argentina enacted Law 25 929 on humanized childbirth and women's rights.[15]

Chiapas, the first Mexican state to criminalise obstetric violence, modified its penal code in 2014, incorporating the following provision under Article 183: This crime shall be ascribed to anyone who 'appropriates the body and reproductive processes of a woman through dehumanizing treatment, abuse in the provision of medication or the act of pathologizing natural processes, resulting in the loss of her autonomy and of her capacity to decide freely on matters related to her body and sexuality.' The following article explicitly defines the actions punishable under this crime: omitting timely and effective care in an obstetric emergency, obstructing early mother–child bonding without a justifiable medical reason, altering the natural process of low-risk childbirth without informed consent and performing a caesarean section unnecessarily. The corresponding penalty includes 1–3 years in prison, a fine of up to 200 days (equivalent to US$900), suspension of perpetrators from the profession for the period of the penalty and payment of comprehensive damage repair. Although published in the official journal of the State of Chiapas, this reform was not disseminated to the extent required—neither among health personnel nor among the women using obstetric services.[16 17]

By introducing regulations that sanction specific inappropriate behaviours, the Mexican Government intends to abate violations perpetrated against the rights of society. It has adopted the therapeutic justice approach proposed by David Wexler, which pursues two main objectives: first, to empower healthcare users (in the case of our study, women), and second, to reduce or abolish behaviours considered detrimental to society (in the case of our study, obstetric violence).[18 19]

The Ministry of Health (MOH) has developed interventions against obstetric violence through some of its facilities. Salient among these initiatives is the *Model of care for women during pregnancy, childbirth and puerperium: a humanised, intercultural and safe approach*. Women must always be the protagonists during the maternal care process; this implies emphasising their human rights and, hence, their dignity. In addition to eradicating obstetric violence, this model was aimed

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://jfprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

at removing cultural barriers and recovering Mexican evidence-based midwifery practices, considered a source of extensive knowledge and experience under the framework of national diversity. Finally, the *Model of care* initiative was implemented to develop and guarantee safe birth-related conditions as well as the competencies that personnel at the various levels of healthcare must display to ensure the identification of obstetric risks and the satisfactory resolution of all complications.[20] Another noteworthy MOH intervention is the *National Strategy for the Promotion of Good Treatment in Obstetric Care*.[21]

Regarding empowerment, criminalising obstetric violence involves a clear and conclusive recognition of the reproductive rights of women. The inclusion of obstetric violence under the criminal code (a catalogue of harmful and antisocial behaviours) conveys a clear message with regard to this conduct and bolsters the symbolic force of its criminal conviction.[22]

Health service users need to know and assume their rights before they can demand them through complaints and reports to the authorities.

Concurrently, health professionals need to understand the full scope of the criminal and administrative laws in force in this matter. Obstetric violence can only be corrected and eradicated if health workers recognise that disrespect and abuse of childbearing women harm women and expose offenders to enforcement measures and sanctions. The relevance of establishing criminal penalties as a pathway to resolving problems directly responsible for maternal morbidity and mortality is currently under debate.[23]

Mexico has developed legal mechanisms for resolving conflicts related to the inadequate provision of health services. For instance, women who wish to press criminal charges for obstetric violence can do so at any Public Ministry office. They can also file a complaint with a State Commission on Human Rights which, in turn, will issue a recommendation to the public hospital concerned.[24]

However, the most immediate and commonly used option for those who have been abused is to file a complaint or a disagreement appeal with a Medical Arbitration Commission (CAM by its Spanish initials); these agencies have been specifically tasked to manage conflicts concerning health service provision. As many as 50%–70% of complaints concerning maternal care are resolved by CAMs at the state level. Because these accusations refer to professional misconduct, they are dealt with via conciliation and mediation mechanisms based on the principle of alternative means for an amicable resolution of conflicts.[25 26]

The objective of this study was to analyse whether criminalising obstetric violence has been conducive to the recognition and observance of the reproductive rights of women, based on the records of poor healthcare complaints filed by women with the CAMs in two Mexican states.

MATERIALS AND METHODOLOGY

Our study followed an observational qualitative design based on a phenomenological conceptual framework.[27] We selected two states with similar maternal health indicators but different legislation on obstetric violence: Chiapas has criminalised this conduct while Oaxaca has not. Both states exhibit similar sociodemographic conditions marked by a high proportion of indigenous population, a wide educational gap, a high marginalisation index and steep maternal mortality rates (68.1 and 46.7 per 100 000 live newborns, respectively).

We examined all state-level CAM records of complaints filed by women from 2011 to 2015. Of the 61 complaints included in the study, 32 pertained to Oaxaca and 29 to Chiapas. Inclusion was determined according to the following criteria: (A) the complaint was concluded; (B) the file was fully integrated and contained a narrative of facts; and (C) the narrative of facts was formulated by either the woman who suffered abuse or her spouse/intimate partner.

Exclusion was determined according to the following criteria: (A) the narrative of facts was unrelated to either birth care or pregnancy; (B) the file was incomplete; or (C) the complaint was not filed by the woman concerned or her spouse/intimate partner.

Patient and public involvement

The patients did not participate in the process of elaboration of the question, since it was based on the WHO criteria, the data were obtained from the CAMs. The information obtained will be sent to the respective commissions and to the CONAMED for feedback.

Analysis plan

We transcribed all the narratives of facts using a Word 2016 word processor. We also designed a coding manual based on the 2014 WHO description of disrespect and abuse of women during childbirth.[7] On completing the readings of all the complaint narratives, we established seven analytic categories: abuse, discrimination, non-consented medical procedures, non-confidential care or lack of privacy, withholding information, admission rejection and neglect during childbirth.

Each narrative was coded using the Atlas.ti V.8.0 program.

RESULTS

We analysed 29 complaint narratives filed with the Chiapas and 32 with the Oaxaca CAMs from 2011 to 2015.

Abuse

This category of obstetric violence included different manifestations (physical abuse, psychological abuse and neglect) occurring during birth care. Incidents of psychological abuse and neglect were recorded in

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://fprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

both states, whereas physical abuse was only indicated in narratives from Oaxaca. Psychological abuse and neglect were most frequently reported in Chiapas; they invariably involved health professionals and other employees at health facilities such as receptionists and maintenance personnel:

> (…) those covered by public health services, affiliates and workers who have paid dues to this institution for so long expect to receive the care we deserve as Mexican citizens, workers and human beings. When we seek care [from a health facility], we are constantly trampled, hustled and mistreated by the despotic and arrogant directors, even by the people in basic services like reception, nursing and maintenance workers who have the warped idea that they own the hospital and think that they're doing us a favor, when the truth is that they're just doing their duty. (Complainant: husband of patient, Chiapas, 32a)

This fragment of one of the narratives analysed indicates that the complainant, the husband of the woman seeking care, had a clear understanding of the rights he had as a citizen and those he had earned as a worker who had contributed to the institution regularly with his fees. The likelihood of assuming a right is also influenced by gender. In this case, the question arises whether the woman seeking the services at issue had the same clarity concerning her rights as the complainant, her husband, but more specifically, whether she recognised that she had the basic right to a life free of violence.

Likewise, psychological violence was the most prominent form of abuse reported in Oaxaca, and specifically on the part of health professionals (physicians and nurses). However, unlike Chiapas, scolding and an asymmetric attitude towards information emerged as the principal manifestations of psychological violence. Also worthy of mention is the fact that the cases of physical abuse in Oaxaca revolved around rough handling during procedures, particularly during pelvic examinations. These were described by women as being performed excessively and in a flagrantly insensitive manner.

Abuse expressed as neglect was reported in narratives from both states:

> (…) My wife told me she couldn't stand it anymore; everything was blurred and she felt really bad. At that point, I told the intern to give her back to me so that I could take her to a hospital because she looked very sick, and the nurse was saying that she was just having a tantrum and needed a couple of slaps to calm her down. (Complainant: husband of patient, Oaxaca, 28a)

Once more, it was the husband of the patient who filed the complaint and related the seriousness of the situation. The nurse ridiculed the pain the patient was experiencing and did not provide the service required. Moreover, this account reflects the complete naturalisation of violence against the wife of the complainant: 'She… needed a couple of slaps.'

Discrimination

Narrations of discrimination were very specific due to its symbolic content. This form of abuse was generalised in Oaxaca and Chiapas, where complaints in this regard were similar.

In this case, the principal actors were the physicians performing surgery. According to the women, they used discriminatory and derogatory expressions regarding their physical traits.

One complainant from Oaxaca reported the following:

> (…) He [the attending gynecologist-obstetrician] commented to his colleagues that, with a normal patient, he would have already finished the operation, and said, 'I'll have to charge them extra for digging out all this fat.' And there I was, hearing everything they said without being able to defend myself. (Complainant: patient, Oaxaca, 34a)

This comment reveals sarcasm used by a physician in reference to the weight of his patient. References to women's overweight or obesity—whether or not they are true—constitute a form of gender violence rooted in stereotypes of beauty that have been deeply naturalised.

One woman from Chiapas related the following event:

> (…) They said that it would take a long time for me to recover, and with a grotesque remark, they commented that 'if her guts fall out, we'll pick them up and put them back where they were.' (Complainant: husband of patient, Chiapas, 32a)

The preceding fragment describes physicians mocking a woman and minimising her pain. They referred to her internal organs as objects, using disparaging language unacceptable in anyone providing healthcare. They displayed no empathy towards the patient or her condition.

Jokes, hurtful comments and other forms of discriminatory language are an affront to human dignity. Also related to this conduct are a lack of doctor–patient communication and notorious asymmetry in the use of information. Discriminatory events of this nature were reported in both states.

> (…) The doctor arrived five or ten minutes after my mother-in-law informed her [of the birth of my child in the bathroom]. I was on the floor. They took me on a wheelchair, but first they made me get up to get on the wheelchair. No one helped me. (Complainant: patient, Oaxaca, 33a)

The first and most alarming part of this narrative refers to the fact that delivery took place in the bathroom. Although delivery in a bathroom does not always

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://jfprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

mean abuse, as occasionally births are precipitous and unexpected, the delay in providing care clearly indicates neglect. Next, the family member accompanying the woman who had barely given birth needed to go out and seek help. Finally, the patient, lying on the floor, was required to stand up without assistance in order to place herself in a wheelchair.

Coercive or non-consented medical procedures

This analytic category referred to actions carried out by health professionals who did not comply with the obligation of obtaining informed consent from their patients prior to performing a medical procedure. Salient among these actions were requesting consent without providing full and adequate information; requesting consent in conditions of coercion or harassment; requesting a signature without explaining the content or purpose of the document being signed; and failing to request consent for a procedure from the patient or caregiver (in case of disability).

It is worth noting that differences emerged between states in this category of abuse: Oaxaca, where obstetric violence was not classified as a crime, reported more cases of requests for informed consent either under pressure or without providing adequate information.

Requests for signatures without explaining the medical procedures that were to be performed were reported in both states.

> (…) I vaguely remember that he gave me a piece of paper to sign and took my thumb to take my fingerprint which he then affixed on the paper. (Complainant: patient, Chiapas, 28a)
> (…) the bad news was that my wife was seriously ill and required surgery… they gave me a piece of paper to sign authorizing the procedure. When I saw my wife's signature on the paper, I signed too. (Complainant: husband of patient, Oaxaca, 27a)

In both situations above, the signatories were unaware of the procedures they were authorising.

Non-confidential care or lack of privacy during childbirth

This category involved actions such as divulging personal information about pregnant women, performing medical examinations without taking the necessary measures to ensure privacy and hospitalising women in common areas (eg, corridors) without robes. Although not all of these actions were specified in women's complaints, lack of privacy was highly recurrent in Oaxaca.

> (…) I came out of the delivery area in a gurney and they left me in the corridor waiting for a bed. (Complainant: patient, Oaxaca, 26a)

Lack of privacy is also a form of violence against women because it implies objectification. Personnel who leave women in the corridors, examine them without closing the door and expose their breasts or genitals ignore, among other things, the confidentiality to which all patients are entitled during their care.

Failure to provide information to pregnant women and family members

Both states fielded complaints from women who had received no information whatsoever about their health status during pregnancy and/or childbirth. Information about the conditions of patients is a key component of informed consent. Non-compliance with this obligation constitutes a violation of autonomy.

As expressed by a woman from Oaxaca:

> (…) I asked for an explanation of why my baby died… I had carried out all the control measures during my pregnancy and kept every one of my appointments, but they didn't want to explain anything to me. (Complainant: patient, Oaxaca, 23a) [The underlining is the authors'.]

Access to information is a basic right of all health service users in Mexico, including the mothers who lose their babies during birth care. Furthermore, the information provided must be true and submitted in a timely manner. (Artículo 51 Bis 1—DE LA LEY GENERAL DE SALUD, señala: 'Los usuarios tendrán derecho a recibir información suficiente, clara, oportuna, y veraz, así como la orientación que sea necesaria respecto de su salud y sobre los riesgos y alternativas de los procedimientos, diagnósticos terapéuticos y quirúrgicos que se le indiquen o apliquen.' https://www.wipo.int/edocs/lexdocs/laws/es/mx/mx218es.pdf, consultada 24 July 2019) (Under Artícle 51 Bis 1 of the General Health Law in Mexico, 'Users have the right to sufficient, clear, opportune and true information, as well as to full guidance, as required, in relation to their health and to the risks involved in the surgical and therapeutic procedures and diagnoses indicated or applied to them, and their alternatives.' (https://www.wipo.int/edocs/lexdocs/laws/es/mx/mx218es.pdf, consulted for the last time on 24 July 2019))

Admission refusal at a health centre

This category related to situations where pregnant women were not admitted to a health facility for lack of response capacity, insufficient personnel, unavailable inputs or the need for referral to another level of care.

Both states presented such cases. In Chiapas, the causes cited referred mainly to insufficient personnel or inputs, while in Oaxaca, they involved lack of response capacity and the need for referral to the next level of care. Both states demonstrated major health system shortfalls as regards coverage and the designation of medical students (interns) to deliver services of great responsibility, which they were as yet unprepared to perform. This normally causes complications in birth care:

> (…) I arrived during the indicated schedule, but they told me that the gynecologist-obstetrician

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://fprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

> wasn't there at that time so I would be attended to at the other hospital because I needed to be treated promptly in view of the discomfort I was experiencing. (Complainant: patient, Chiapas, 31a)
> (…) the intern who was on duty at the hospital sent me to Hospital XX, where they said they couldn't help me because I didn't have my referral form updated. So we returned to the health center. (Complainant: patient, Oaxaca, 21a)

The preceding narratives illustrate a lack of capacity to respond to urgent situations—in both cases, complications during childbirth. Failure to provide services in an emergency can entail fatal consequences.

Neglect during childbirth

Neglect was also generalised in the complaint narratives of both states. However, differences emerged regarding one of its manifestations, delay in care, which in Chiapas was associated predominantly with insufficient initial assessment due to lack of human resources.

> (…) the doctor who came on duty informed me that my baby was given to her in very serious condition, and that she was told he was bleeding profusely and had been given a blood transfusion. She also commented that he had air in one lung and it had been necessary to insert a watermark. At 03:30 a.m., on October 6th, my baby passed away, without my receiving an adequate explanation of everything that had happened. (Complainant: patient, Chiapas, 27a)

This was decidedly a case of neglect. The patient reported not having received an adequate explanation of her baby's condition and made it clear that care provided was not sufficient to save his life.

In Oaxaca, neglect included delay in birth care, abandonment during labour and adverse obstetric and perinatal outcomes. A number of complaints referred to procedures proscribed in obstetric practice for being harmful and causing injury (eg, Kristeller manoeuvre). Others concerned omissions during surgery or labour. These complaints were filed by either the patients themselves or their husbands.

> (…) so a doctor came in saying 'how much longer until this lady's taken care of?' and 'they're going to end up seeing her really late.' The doctor took her to the delivery room, but she didn't feel the baby anymore. Attempting to save the baby, they put her in delivery position and made her start pushing while two individuals climbed up on her abdomen and pressured. They inserted forceps to take out the baby, and that's when she felt the blood draining. I don't know what intention they had: after taking out the baby, already dead, my wife tells me they laid it on her chest instead of helping it live. (Complainant: husband of patient, Oaxaca, 28a)

Two phases of medical malpractice can be identified in this narrative: first, the patient was not treated urgently, as required; second, proscribed procedures (Kristeller manoeuvre and forceps) were used. The consequences were fatal.

DISCUSSION

In 2014, several Mexican states classified obstetric violence as a crime in an effort to move towards therapeutic justice. They included this form of violence in their catalogue of crimes as a pathway to eradicating actions perpetrated against the dignity and physical integrity of women and their offspring. In Latin America, the term 'obstetric violence' designates the violation of reproductive rights. It is important to note that, in many countries in the region, Mexico included, the struggle against violence has been a constant focus of the feminist movement. It is for this reason that violence is referred to under different forms and modalities, salient among which is the denigrating and discriminatory treatment often experienced in healthcare facilities. Comprising several acts of violence documented in the commentaries presented here, 'obstetric violence' thus proves a more appropriate term than 'disrespect and abuse during childbirth'.[25]

In public policy, implementation must always be preceded by extensive dissemination. Assessing the criminalisation of obstetric violence must rest on three fundamental components: first, recognition of the reproductive rights of women and internalisation of these rights by the women themselves; second, knowledge of these rights on the part of health professionals in order that they may provide adequate care, that is, services that comply with the principles of citizenship and of full respect for human rights; and third, respect, promotion and defence of these rights by the institutions.[26]

As health service users, women must recognise and assume their rights in order to claim them using appropriate legal channels. The criminalisation of obstetric violence must be matched by specific action programmes if its impact is to be perceived and acknowledged by all involved: women, health personnel and institutions. According to our findings, criminalising obstetric violence has not produced a substantial change in healthcare in Mexico.

The data collected during our study demonstrate that penalisation alone is insufficient to ensure the recognition of reproductive rights. The accounts presented herein indicate that health personnel often lack respect for women using obstetric services and that these women themselves are unaware of their rights.

It is therefore necessary to find a solution to this structural problem through other options involving greater participation on the part of government—the guarantor of and actor responsible for these rights. It is also necessary to implement institutional programmes aimed at promoting knowledge on reproductive rights, and an extensive awareness-raising campaign among women, such that they exercise their prerogatives and are able to report the transgressions they endure; more

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://jfprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

specifically, in order that women empower themselves and become leaders in their own reproductive process.

In and of themselves, laws do not solve the problem of violence against women during perinatal care; they do constitute, however, a first step forward: they provide a solid foundation on which to build the defence of human rights and improve the quality of maternal care with special emphasis on the dignity of the users.[14]

Those complaints filed by men (the husbands of the patients subjected to abuse) demonstrated that they had assumed these rights: they categorically affirmed that it was their financial contributions that maintained the healthcare system, that health personnel had the obligation to provide adequate service and that those who failed to do so must be held responsible. This gender-related component opens a new avenue for future research.

Another relevant point to consider is that all complaints filed in both states were directed against individuals—health personnel in specific settings—whom complainants deemed responsible for care. Not once did they contemplate the possibility of holding the government, that is, the state health authorities, accountable for the deficiencies in care, although they determine the human and material resources for service delivery to the population.

Furthermore, all the complaints described structural limitations. The narratives did describe inadequate diagnostic and operative assessment on the part of health personnel; and they pointed to deficient structural conditions such as insufficient hospital beds, unavailable basic inputs and inefficient coordination among the primary, secondary and tertiary levels of care, all of them essential to birth care. However, the criminalisation of obstetric violence covers only the individual behaviour of health personnel; it does not consider the participation of state authorities in service omissions.[27–29]

We also noted that certain social, ethnic and other minority groups bore the burden of inequity. The WHO has recognised that the following characteristics render individuals more prone to experiences of disrespect and abuse during pregnancy and childbirth: being adolescent, single, economically disadvantaged, a member of an ethnic minority group and an immigrant, as well as having an HIV diagnosis. Chiapas and Oaxaca, where marginalisation and limited access to health have reached the level of risk factors, are among the Mexican states with the highest percentage of indigenous residents.[5] Ethnicity, a characteristic shared by a large proportion of the Chiapanecan and Oaxacan populations, increases the vulnerability of women to different forms of gender violence.[30 31]

Finally, withholding information and performing coercive procedures violate the autonomy of women. Although these practices were among the principal forms of disrespect and abuse observed, they were not considered priorities in relation to dignified treatment and were mentioned only as secondary problems in the narratives of unsatisfactory treatment.[32]

The term ‘obstetric violence’ was not used in any of the narratives analysed; neither was failure to recognise or ensure the reproductive rights of women mentioned as the basis of complaint. Reference was made, however, to the rights, or employment benefits, earned as contributors to the health institution, which the husband of one patient believed legally entitled him to submit a complaint.[33]

CONCLUSIONS

Incorporating obstetric violence under the criminal code has not led to a substantive difference in how the citizenship rights of pregnant and birthing women are recognised or observed. The therapeutic justice objective of criminalisation—to produce a change in those targeted by the legal reform on obstetric violence—has not been achieved.

This is largely attributable to the fact that health personnel are not acquainted with the current regulations in this matter nor with the legal consequences of malpractice. Neither are they sensitised to the principles of citizenship rights that govern their work with childbearing women or to the experience of childbirth from the perspective of their patients. It is essential for Mexican health authorities to assume their responsibility and take all necessary measures to ensure that health institutions provide women with dignified, competent and responsible care during pregnancy, childbirth and the postnatal period.fv

Acknowledgements We are grateful to the Directors of the Medical Arbitration Commissions in Chiapas and Oaxaca for granting us access to their complaint files, and we thank the patients for their contributions.

Contributors OC conceived the idea of the study, performed the analyses and participated in the drafting of the manuscript. MTF analysed the legal and regulatory framework of obstetric violence in Mexico, and reviewed and copy-edited the manuscript. RVS contributed to the design of the study and participated in the drafting of the final manuscript.

Funding Our study was financed by the Medical Arbitration Commission (CAM by its Spanish initials) in the State of Oaxaca and by the National Council of Science and Technology in Mexico (CONACyT by its Spanish initials) through a doctoral fellowship.

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval Our study was approved by the Ethics Committee of the National Institute of Public Health in Mexico (CI: 850).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

ORCID iDs
Omar Calvo Aguilar http://orcid.org/0000-0003-2107-6787
Rosario Valdez Santiago http://orcid.org/0000-0001-8434-9805

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://fjfprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

REFERENCES

1 Sando D, Ratcliffe H, McDonald K, *et al*. The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania. *BMC Pregnancy Childbirth* 2016;16:236.
2 Naciones Unidas. Asamblea General. orientación técnica sobre la aplicación de un enfoque basado en los derechos humanos para la implementación de políticas y programas para reducir la morbilidad y mortalidad materna prevenibles. Informe anual del Alto Comisionado de las Naciones Unidas para los Derechos Humanos e informes de la oficina del Alto Comisionado y del Secretario General. 2 de julio de 2012. A / HRC / 21/22. en:, 2012. Available: http://www.un.org/en/ga/search/view_doc.asp?symbol=A/HRC/21/22
3 Bradley S, McCourt C, Rayment J, *et al*. Disrespectful intrapartum care during facility-based delivery in sub-Saharan Africa: A qualitative systematic review and thematic synthesis of women's perceptions and experiences [Internet]. Egyptian Journal of Medical Human Genetics. Elsevier. Available: https://www.sciencedirect.com/science/article/pii/S0277953616305469 [Accessed 3 Jun 2018].
4 Miller S, Lalonde A. The global epidemic of abuse and disrespect during childbirth: history, evidence, interventions, and FIGO's mother-baby friendly birthing facilities initiative. *Int J Gynaecol Obstet* 2015;131:S49–52.
5 d'Oliveira AFPL, Diniz SG, Schraiber LB. Violence against women in health-care institutions: an emerging problem. *The Lancet* 2002;359:1681–5.
6 Bowser D, Hill K. Exploring evidence for disrespect and abuse in facility-based childbirth. Report of a landscape analysis. Available: http://www.tractionproject.org/sites/default/files/Respectful_Care_at_Birth_9-20-101_Final.pdf [Accessed 14 Jul 2019].
7 OMS. La prevención y la prevención de la falta de respeto y abuso durante el parto en servidores, 2014
8 Valdez-Santiago RM, Hidalgo-Solórzano E, Mojarro-Iñiguez M. Nueva evidencia a un viejo problema: El abuso de las salas de parto. *CONAMED* 2013;18.
9 Terán P, Castellanos C, González-Blanco M. Violencia obstétrica: percepción de las usuarias - SciELO. *Rev ObstetGinecolVenez* 2013;73:171–80.
10 Ratcliffe HL, Sando D, Lyatuu GW, *et al*. Mitigating disrespect and abuse during childbirth in Tanzania: an exploratory study of the effects of two facility-based interventions in a large public hospital. *Reprod Health* 2016;13:79.
11 Galimberti D, Mazzoli P. Violencia obstétrica. Comité de violencia de género. *FASGO* 2015.
12 Williams CR, Jerez C, Klein K, *et al*. Violencia obstétrica: una respuesta legal latinoamericana al maltrato durante el parto. *BJOG: Int J Obstet Gy* 2018;125:1208–11.
13 GIRE. *Violencia Obstétrica. Un enfoque de Derechos Humanos*. . 1 edn. Editorial Grupo de información en Reproducción Elegida AC, 2015: 1. 1–102.
14 Camacaro cuevas M. PATOLOGIZANDO LO NATURAL, NATURALIZANDO LO PATOLÓGICO… IMPRONTAS DE LA PRAXIS OBSTÉTRICA. In: *Revista Venezolana de Estudios de la Mujer.Caracas*. 32. Caracas: Enero-Junio, 2009: 14. 147–62.
15 Belli LF. La violencia obstétrica: otra forma de violación a Los derechos humanos. *Revista Redbioética. UNESCO* 2013:25–34.
16 Código Penal para el Estado de Chiapas. Poder Judicial del Estado de Chiapas 2018.
17 Wexler DB. Justicia Terapéutica: Una Visión General, 2008. Available: http://justicia.gencat.cat/web/.content/home/ambits/formacio__recerca_i_docum/biblioteca_i_publicacions/publicacions/materials_de_jornades/jornades_formacio_d_acces_lliure/prospectiva_criminal_prevencio_2012pelincia_50_pepencia_50_50pelincia_50_50pelincia_50
18 Wexler DB. Dos décadas de jurisprudencia terapéutica ", revisión de Touro Ley: No.1, Artículo 4. *Touro Law review* 2014;24.
19 Modelo de atención a las mujeres durante el embarazo, parto y puerperio. Enfoque humanizado, intercultural y seguro. Secretaría de Salud, DGPLADES 2015.
20 Valdez-Santiago R, Rojas-Carmona A, Villanueva-Egan LA, *et al*. Estrategia para La promoción del buen trato en La atención obstétrica en Méxic. *Rev CONAMED* 2018;23:190–7.
21 FEMECOG. Pronunciamiento FEMECOG sobre La llamada violencia obstétrica, 2013. Available: http://www.femecog.org.mx/docs/FEMECOG%20pronunciamiento.pdf
22 GIRE. Violencia obstétrica, omisión e indiferencia, 2015. Available: http://informe.gire.org.mx/caps/cap4.pdf
23 Plascencia-Moncayo JN, García-Feregrino MC, Medina-Estrada J. Los métodos alternativos en La solución de conflictos médicos. *Cirujano General* 2013;35.
24 Secretaría de Salud. CONAMED. Informe anual de Actividades, 2015. Available: http://www.conamed.gob.mx/conocenos/pdf/Informe_Conamed_2015.pdf
25 Narro Robles J, Zepeda Tena C. La CONAMED a XV años de SU fundación. Reflexiones desde La academia. *Rev CONAMED* 2012;17:24–9.
26 Cardozo-Gómez MA, Pascual-Ayala R, Moreno-Baena GM, *et al*. Investigación cualitativa y fenomenología en salud. *Revista especializada en ciencias de la salud* 2007;10:25–32.
27 Arguedas Ramírez G. La violencia obstétrica: propuesta conceptual a partir de la experiencia costarricense. *Cuadernos Inter.cambio* 2014;11:145–69.
28 Diaz-Tello F. Invisible wounds: obstetric violence in the United States. *Reprod Health Matters* 2016;24:56–64.
29 UNESCO. Defensa y promoción activa de Los derechos humanos. Cátedra UNESCO cap 5. UNAM. Available: http://catedraunescodh.unam.mx/catedra/mujeres/menu_superior/Doc_basicos/5_biblioteca_virtual/3_d_h_mujeres/14/6.pdf
30 Solitario R, Garbus P, Stolkiner A. Derechos, ciudadanía y participación en salud: su relación con la accesibilidad simbólica a los servicios. Facultad de psicología - uba / secretaría de investigaciones / anuario de investigaciones / volumen XV. 263-269. Available: http://www.scielo.org.ar/pdf/anuinv/v15/v15a25.pdf
31 Montesanti SR, Thurston WE. Mapping the role of structural and interpersonal violence in the lives of women: implications for public health interventions and policy. *BMC Womens Health* 2015;15:100.
32 Burgard S, Castiglione DDEP, Lin KY, *et al*. Informe diferencial de experiencias discriminatorias en Brasil y Estados Unidos. *Cadernos de Saúde Pública* 2017;33:e00110516.
33 Yari A, Nedjat S, Asadi-Lari M, *et al*. Perceptions about Iranian-Kurds' ethnic-inequality in health. *BMC Int Health Hum Rights* 2017;17:24.

BMJ Sex Reprod Health: first published as 10.1136/bmjsrh-2018-200224 on 5 November 2019. Downloaded from http://jfprhc.bmj.com/ on January 19, 2022 by guest. Protected by copyright.

Accident Analysis and Prevention 159 (2021) 106227

Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

Impact of Mexican Road Safety Strategies implemented in the context of the UN's Decade of Action

Ricardo Pérez-Núñez, Elisa Hidalgo-Solórzano *, Martha Híjar

Health Systems Research Center, National Institute of Public Health, Cuernavaca, Mexico

ARTICLE INFO

Keywords:
Traffic accidents
Road Safety
Mexico
Decade of action

ABSTRACT

Objective: To evaluate advancements in the prevention of road traffic injuries (RTI) in Mexico in the context of the United Nation's Decade of Action for Road Safety.
Methods: An analysis of the trend and age-period-cohort effects of RTI mortality from 1999 to 2018 was conducted. Mortality figures were age-standardized using the direct method and population estimates of 2018 as the standard. To evaluate whether advancements might be attributed to higher levels of death misclassification, we conducted sensitive analysis using multiple imputation to redistributed deaths allocated to non-specific ICD-10 codes. Non-fatal RTI from four nationally representative health surveys (2000, 2006, 2012 and 2018) were analyzed.
Findings: Implementation of Mexico's National Road Safety Strategy 2011–2020 was associated with an average annual percentage change reduction in the age-standardized RTI mortality rate of 1.3% (95%-CI: −1.8,-0.9). Reductions are more evident in pedestrians and four + wheelers (−6.7% and −5.3%, respectively, from 2011 to 2018); mortality trend in motorcyclists increased from 1999 to 2018 an average of 12.8% annually (95%-CI: 9.9, 15.9). Potential underestimation of mortality due to death misclassification decreased from 22.7% in 1999 to 16.4% in 2018; sensitive analysis showed that reductions might not be attributed to death misclassification. Non-fatal injuries decreased in four + wheelers but increased in motorcyclists. The number of individuals suffering permanent consequences from RTI increased.
Conclusions: Results showed some potential gains of Mexico's road safety strategies: RTI in four + wheelers decreased. Efforts should be put in place urgently to prevent the growing number of RTI in motorcyclists.

1. Introduction

The United Nations General Assembly proclaimed 2011–2020 as the Decade of Action for Road Safety to effectively tackle the high burden of road traffic injuries (RTI), which particularly affect low- and middle-income countries [1]. Mexico adhered to this global plan and launched the National Road Safety Strategy 2011–2020 (ENSEVI, for its acronym in Spanish), a conjoint effort between the Ministries of Transport and Health, with the objective of reducing the forecasted level of fatal RTI by 2020 in half [2]. The Strategy is closely aligned with the five pillars of the United Nations' Global Plan for the Decade of Action for Road Safety 2011–2020 [3]. In 2015, the Mexican Government ratified its commitment to the Decade of Action by adhering to the new sustainable development agenda [4].

Before the publication of the ENSEVI, Ministry of Health in Mexico published its first national plan for road safety in 2007 [5], and started implementing the Mexican Initiative for Road Safety (IMESEVI, for its acronym in Spanish) with the support of Bloomberg Philanthropies through the offices of WHO/PAHO in 2008 [6]. IMESEVI combined several evidence-based policies into a comprehensive multi-pronged effort, initially focused on four Mexican cities. Interventions centered around improving traffic legislation and augmenting police enforcement to address common individual risk factors (including the implementation of police alcohol checkpoints), as well as social marketing and educational interventions to reduce exposure to these risk factors [6].

Prior to these efforts, most road safety interventions relied on isolated state and municipal level efforts with different degrees of success [7]. Different policies implemented in Mexico City have shown positive results, such as the introduction of the "drive without alcohol" program, improvements in road infrastructure (including the creation of cycle paths), the promotion of mass transit (i.e. Metro and Buss Rapid Transit systems), improvements in the provision of prehospital health services,

* Corresponding author at: Universidad #655, Colonia Santa María Ahuacatitlán, Cerr los Pinos y Caminera, CP. 62100 Cuernavaca, Morelos, Mexico.
E-mail address: elisa.hidalgo@insp.mx (E. Hidalgo-Solórzano).

https://doi.org/10.1016/j.aap.2021.106227
Received 31 March 2020; Received in revised form 30 January 2021; Accepted 31 May 2021
Available online 18 June 2021
0001-4575/© 2021 Published by Elsevier Ltd.

Table 1
Categories of non-specific ICD-10 codes ("garbage codes") that were redistributed using multiple imputation techniques.

"Garbage codes"			Multiple imputation	
Categories	ICD-10 codes	Reference population	Dependent variable	Independent variables
1. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00.0-R99	All deaths	"0" communicable, maternal, perinatal and nutritional deaths (A00-B99, D50-D53, D64.9, E00-E02, E40-E46, E50-E64, G00-G04, G14, H65-H66, J00-J22, N70-N73, O00-O99, P00-P96, U04); "1" Noncommunicable diseases (C00-C97, D00-D48, D55-D64 (minus D 64.9), D65-D89, E03-E07, E10-E34, E65-E88, F01-F99, G06-G98 [minus G14], *H*00-H61, H68-H93, I00-I99, J30-J98, *K*00-K92, *L*00-L98, M00-M99, N00-N64, N75-N98, Q00-Q99); and "2" injuries (V01-Y89)	Age group, sex, medical insurance, occupation, schooling, civil status, received medical attention before dying, and place where death occurred.
2. Injuries of undetermined intent	Y32-Y34, Y87.2, Y89.9	All injuries	"0" intentional injuries (X60-Y09, Y35-Y36, Y87.0-.1, Y89.0-.1), and "1" unintentional (V01-X59, Y40-Y98 [minus Y87, Y89]).	Age group, sex, medical insurance, occupation, schooling, civil status, received medical attention before dying, place where death occurred, and place where the injury occurred.
3. Unintentional exposure to "other and unspecified factors" or their sequelae	X59.0-.9, Y86.0-.9	All unintentional injuries	"0" other unintentional injuries (W00-X58, Y40-Y98 [minus Y86-Y87, Y89]) and "1" transport injuries (V01-V99, Y85.0).	Age group, sex, medical insurance, occupation, schooling, civil status, received medical attention before dying, place where death occurred, and place where the injury occurred.
4. Unspecified transport injuries	V99.0-.9, Y85.9	All transport injuries	"0" land transport injuries (V01-V89, Y85.0); and "1" water, air and other specified transport injuries (V90-V98).	Age group, sex, medical insurance, occupation, schooling, civil status, received medical attention before dying, and place where death occurred.
5. Unspecified road user	V87.0-.8, V89.2, V89.9	All road traffic injuries	"0" pedestrians: V02–V04 (.1, .9), V09 (.2, .3, .9); "1" cyclists: V12–V14 (.3–.9), V19.4–V19.6; "2" motorcyclists: V20–V28 (.3–.9), V29–V39 (.4–.9); "3" car, pick-up truck, heavy transport or bus occupants: V40–V79 (.4–.9); and "4" other specified road users: V80.3–V80.5, V81.1, V82.1, V83–V86 (.0–.3), Y85.0.	Age group, sex, medical insurance, occupation, schooling, civil status, received medical attention before dying, and place where death occurred.

amongst others [8,9]. Yet not much published evidence exists for Mexican cities and states as to what specific interventions were implemented before 2008.

Promising results from IMESEVI translated in the continued support of Bloomberg Philanthropies through the offices of WHO/PAHO and the integration of a consortium of national and international partners in what was first called the "Road Safety in 10 Countries" project (or RS-10) and later became the "Bloomberg's Global Road Safety Program". From 2010 to 2014, different interventions with evidence of being effective were implemented and evaluated in two Mexican cities: León and Guadalajara [10]. Specific evaluations of these interventions have been published elsewhere [7,11,12]. Starting in 2009, the Ministry of Health scaled up different interventions at the national level [13].

While recent reports document that fatal RTI increased to 1.35 million worldwide [14], some gains have been reported at the mid-point of the Decade of Action in Mexico [15]. Even though Mexico has been considered a country with good coverage of vital registries for some years now [14,16,17], challenges in the quality of vital registries have been highlighted in the field of RTI [18,19]. Deaths allocated to ICD-codes that are not useful for public health analysis of cause-of-death information might underestimate the mortality due to RTI in Mexico [18,19]. These nonspecific ICD-codes have been denominated generically "garbage codes" [20]. The age structure of the Mexican population has also changed over time and has not been accounted for in previous analyses. For this reason, there is uncertainty about whether advancements might be attributed to higher levels of misclassification of RTI deaths, to population changes, or to actual improvements in road safety within the country. The objective of this study is to evaluate advancements in the prevention of RTI in Mexico up to 2018, in the context of United Nation's Decade of Action for Road Safety.

2. Methods

2.1. Design and setting

This is a plausibility impact evaluation of IMESEVI and ENSEVI [21]. Using an observational study design, a secondary analysis of official vital registries in Mexico as well as four nationally representative households surveys was conducted.

2.2. Data sources and variables

2.2.1. Fatal injuries

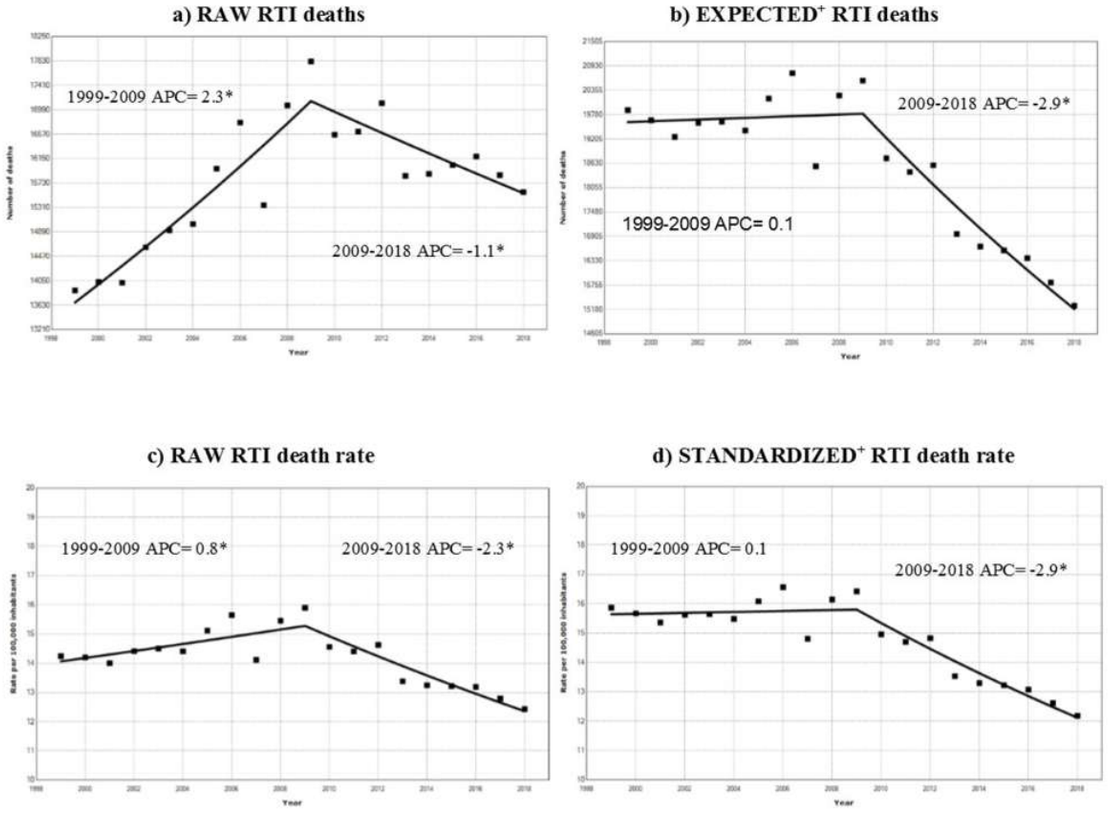
Death registries from the Mexican Death Epidemiology and Statistic Subsystem [22] were analyzed from 1999 (the year in which ICD-10 classification was first introduced in Mexico) to 2018 (the year for which the most recent information is available) to avoid comparability issues with ICD-9 [23]. Raw RTI deaths included all registries recorded in the ICD-10 codes that are considered in the current Mexican definition of RTI [13]. They were categorized in pedestrians, cyclists, motorcyclists, four + wheelers (including car, pick-up truck, heavy transport or bus occupants) and other specified or not specified road users (see appendix). To estimate mortality rates, we employed new population estimates released in 2018 from the National Population Council [24]. To facilitate comparisons across time, considering changes in the age distribution of the population, we standardized mortality rates using the direct method and population estimates of 2018 as the standard.

2.2.2. Non-fatal injuries

Changes in the prevalence of non-fatal RTI were analyzed from four nationally representative health surveys: the 2000 National Health Survey (ENSA-2000) [25], and the 2006, 2012 and 2018 National Nutrition and Health Surveys (ENSANUT-2006 [26], ENSANUT-2012 [27], and ENSANUT-2018 [28], respectively). For more detailed information see the appendix.

2.3. Data analysis

To evaluate mortality trend, we conducted a joinpoint analysis to estimate the Annual Percent Change (APC) for the total RTI figures and for each road user (both, number of deaths and mortality rates per 100,000 inhabitants), using the Joinpoint Regression Program 4.7.0.0® [29]. This analysis uses the grid-search method to fit a regression function assuming constant variance and uncorrelated errors. It finds the



Abbreviations: RTI: road traffic injuries; APC: Annual Percent Change.

Notes: Standardized and non-standardized mortality figures are not the exactly the same in year 2018 due to missing values in the variable age (N=310 individuals, 1.99% of all RTI deaths).

* Indicates that the APC is different from zero at the alpha = 0.05 level.

+ Expected number of deaths after standardizing mortality rates using the direct method and population estimates of 2018 as standard.

Fig. 1. Joinpoint analysis of road traffic injury mortality in Mexico, 1999–2018.

number of "significant" joinpoints by performing several permutation tests. To estimate P-values, this model uses a Monte Carlo permutation method [30]. We also estimated the Average Annual Percentage Change (AAPC) for the periods 2008–2018 and 2011–2018 to evaluate changes after the implementation of Mexico's road safety strategies. This approach has been employed in road safety previously [31–33].

As RTI mortality figures might be affected by deaths classified in five different categories of "garbage codes" (Table 1), we conducted a sensitive analysis to account for potential misclassification of RTI deaths. Although codes classified in the fifth category are included in the definition of RTI, and thus are not responsible for underestimating RTI, they do not allow road safety professionals to determine which road user is most affected in order to implement specific interventions. Based on the approach documented previously [18,19], we first estimated the percentage of deaths allocated to the specific "garbage code" category, using as denominator the reference population (i.e. the number of deaths divided the number of deaths allocated to "R" codes for the first category, and so on). We then redistributed "garbage codes" by year using the "uvis" module in Stata 14® for multiple imputation of missing values. Multiple imputation has shown improved performance over alternative methods and it is relatively ease to implement [34]. This approach performed univariate imputation of these deaths based on multiple regression of a dependent variable on a set of independent covariables, resulting in 10 regression coefficients sets that were then combined with random draws from the conditional distribution of missing observations, given the observed data and covariates [35]. Dependent variables presented in Table 1 were imputed using either logistic or multinomial regression functions depending on their specific distribution. More detailed information is presented in the appendix. Estimated data will subsequently be referred to as the "imputed" figures.

We also fitted an age-period-cohort model with raw data to estimate age-period-cohort effects using the "apcfit" program in Stata 14.2® [36]. This approach was useful to analyze the interaction effect of sex over age-period-cohort effects [36]. Decision on the number of degrees of freedom for the age-period-cohort effects was based on the Akaike's Information Criterion (AIC).

Cumulative incidence of non-fatal injuries with confident intervals was estimated from the four household health surveys to evaluate whether prevalence and number of non-fatal RTI changed over time. We also compared self-reported use of safety restraint devices (seatbelt or child restraints) and helmet from ENSANut-2012 and ENSANut-2018.

Table 2
Joinpoint analysis for RAW road traffic injury mortality by road user, Mexico 1999–2018.

	Trend 1		Trend 2		Trend 3	
	Years	APC (95% CI)	Years	APC (95% CI)	Years	APC (95% CI)
Pedestrian						
Number of deaths	1999–2015	−0.9* (−1.3, −0.6)	2015–2018	−8.9* (−12.7, −4.7)		
Death rate	1999–2015	−2.3* (−2.6, −2.0)	2015–2018	−9.8* (−13.5, −5.9)		
Standardized death rate+	1999–2015	−3.2* (−3.5, −2.9)	2015–2018	−11.1* (−14.6, −7.4)		
Cyclists						
Number of deaths	1999–2004	15.7* (8.4, 23.6)	2004–2018	0.2 (−1.2, 1.6)		
Death rate	1999–2004	14.1* (6.9, 21.8)	2004–2018	−1.1 (−2.5, 0.2)		
Standardized death rate+	1999–2004	14.7* (7.4, 22.6)	2004–2018	−2.0* (−3.3, −0.6)		
Motorcyclists						
Number of deaths	1999–2002	9.7 (−1.9, 22.6)	2002–2007	21.8* (13.5, 30.7)	2007–2018	13.1* (11.4, 14.8)
Death rate	1999–2007	16.6* (13.7, 19.7)	2007–2018	12.2* (10.4, 13.9)		
Standardized death rate+	1999–2016	14.3* (13.3, 15.4)	2016–2018	0.7 (−22.6, 30.9)		
Four + wheelers						
Number of deaths	1999–2009	2.2* (1.1, 3.5)	2009–2018	−3.8* (−5.1, −2.5)		
Death rate	1999–2009	0.9 (−0.3, 2.1)	2009–2018	−5.0* (−6.3, −3.7)		
Standardized death rate+	1999–2009	0.3 (−0.9, 1.4)	2009–2018	−5.3* (−6.6, −4.0)		
Other and NS						
Number of deaths	1999–2008	4.6* (3.1, 6.1)	2008–2018	−0.8 (−2.0, 0.4)		
Death rate	1999–2008	3.1* (1.6, 4.6)	2008–2018	−2.1* (−3.3, −0.9)		
Standardized death rate+	1999–2008	2.5* (1.0, 3.9)	2008–2018	−2.6* (−3.8, −1.4)		

Notes:
* Indicates that the APC is different from zero at the alpha = 0.05 level.
+ Using the direct method and population estimates of 2018 as standard.
Abbreviations: APC: Annual Percentage Change; 95% CI: 95% Confident Interval; RTI: road traffic injuries; Four + wheelers: includes car, pick-up truck, heavy transport or bus occupants; NS: not specified.

3. Results

3.1. Fatal RTI

3.1.1. Raw data

From 1999 to 2018, 315,151 individuals died from RTI in Mexico. Trend analysis evidenced that the number of RTI deaths showed two clear trends. From 1999 to 2009 the trend increased (Fig. 1a). However, this increment is attributed to population changes, as it was not different from zero in the expected number of deaths estimated after age-standardization (Fig. 1b). Something similar occurs when we analyze death rates from 1999 to 2009. While non-standardized death rate seems to be increasing in Fig. 1c, no changes were observed in standardized figures (Fig. 1d). In all cases, number of deaths and mortality rates due to RTI consistently decreased from 2009 onwards.

While mortality in pedestrian showed two decreasing trends, the second (2015–2018) of greater magnitude; trends observed in cyclists were first positive and then from 2004 on, they were negative for age-standardized data (Table 2). In four + wheelers the APC consistently decreased starting in 2009. Mortality in motorcyclists showed a different pattern: both number of deaths and mortality rates increased during the period.

Analyzing the AAPC of the age-standardized mortality rate, both IMESEVI and ENSEVI were associated with a decrement in the trend of all RTI and for pedestrians, cyclists, four + wheelers and other and not-specified (Fig. 2). However, the risk of dying from RTI increased in motorcyclists 11.5 and 10.3 per year after IMESEVI and ENSEVI, respectively.

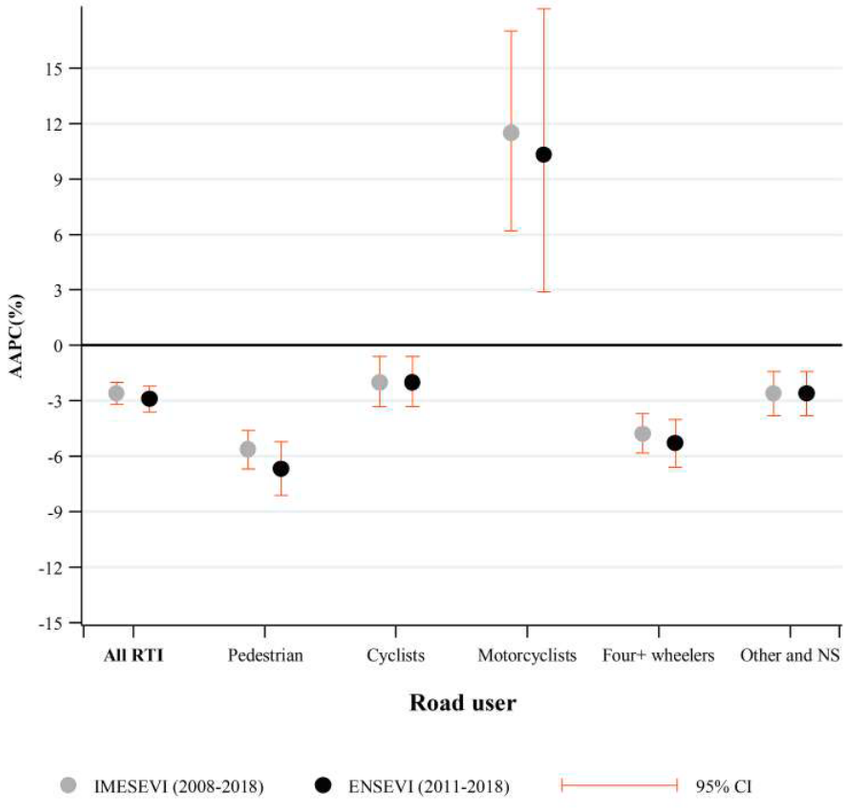
Analysis from the age-period-cohort model showed that the risk of dying from RTI in both sexes decreased from ages 0 to 10 and then increased importantly peaking at age 20. From that age, the mortality rate decreased up to age 93 and then increased again. Analysis by cohort showed that risk of dying decreased importantly from the 1900 to the 2018 cohort. Compared to the 1975 birth cohort, the cohorts before 1938 had more than four-time greater risk of dying from RTI. On the contrary, after 1998, this risk is less than 50% that of the 1975 birth cohort. Risk of dying was 19%, 29%, 22%, 24% and 23% lower in 2014, 2015, 2016, 2017 and 2018 respectively, than in 2009 (see Fig. 3a). Finally, Fig. 3b and 3c show that in both sexes the rate ratio is lower in recent years as compared to 2009. Differences between men and women, particularly in the age effect, are evident. A greater risk in males could be best appreciated in Fig. 4 that presents the incidence rate ratio (IRR) for the age-by-sex interactions after fitting two different models with reduced set of splines.

3.1.2. Sensitive analysis: imputed data

Fig. 5 presents the percentage of deaths allocated to specific categories of garbage codes from 1999 to 2018. As can be seen, in approximately 40% of people dying from RTI, the type of road user is unknown (fifth category of garbage codes). Deaths allocated to the third category seem to mostly explain the potential underestimation of RTI. The percentage of deaths allocated to this category in most years varied from 20 to 24%; in 2007, this percentage increased to almost 30%. No major improvements were observed on these two categories during the period analyzed. However, the potential underestimation of RTI deaths due to "garbage coding" was 22.7% in 1999, peaked at 25.7% in 2007, decreased to 12.8% in 2013 (the lowest figure in the period) and was 16.4% in 2018.

According to this data, 384,616 individuals might have died in Mexico due to RTI. Trend in RTI deaths showed a different pattern than in raw data (Table 3). Increment observed from 2003 to 2009 was greater that observed in the raw number of RTI deaths (Fig. 1a); and the decreasing trend from 2009-2013 was almost triple. Non-standardized death rate showed four different trends, with a clear decreasing trend observed starting in 2009 of a greater magnitude than that observed in both standardized and non-standardized raw rates. The standardized death rate first decreased from 1999 to 2003, then increased from 2003 to 2009, and finally decreased an average of 5.9 percent annually from 2009 to 2013 (95% CI: −8.0, −3.6) and 2.1% from 2013 to 2018 (95% CI: −3.1, −1.1). Table 3 also shows different trends in pedestrians, cyclists, four + wheelers and other and not-specified road users. However, trends observed in motorcyclists were similar as in raw data. They point out the important increment observed during this period in both the number of deaths and the mortality rate.

Fig. 6 shows the AAPC of the age-standardized imputed mortality rate. As observed in raw data, both IMESEVI and ENSEVI were



Notes: Results from joinpoint analysis of RAW data.
*Using direct method and population estimates of 2018 as standard.

Abbreviations: AAPC: Average Annual Percentage Change; RTI: road traffic injuries; NS (not specified); IMESEVI: Mexican Initiative for Road Safety; ENSEVI: Mexico's National Road Safety Strategy; 95% CI: 95% Confident Interval; Four+ wheelers: includes car, pick-up truck, heavy transport or bus occupants).

Fig. 2. Average Annual Percentage Change in age-standardized RAW mortality rate*after the implementation of Mexico's road safety strategies.

associated with a decrement in the trend for all RTI and for pedestrians, cyclists and four + wheelers. However, the risk of dying from RTI increased in motorcyclists 10.3% per year after IMESEVI and ENSEVI. Of note, no changes were observed in other and not-specified road users.

3.1.3. Non-Fatal RTI

The rising trend in the prevalence of non-fatal RTI observed from 2000 to 2012 was reversed in 2018 (Fig. 7). This was more evident in males aged 20–34 and in females aged 10–59 (Fig. 8). However, both the total number (226,591 in 2012 and 283,135 in 2018) and the percentage of them reporting permanent consequences increased. By road user, prevalence of non-fatal RTI decreased in four + wheelers, increased in motorcyclists, and remained the same in pedestrian and cyclists (Fig. 9). Although point estimates of safety devices use increased from 2012 to 2018, differences were not statistically significant (Fig. 10).

4. Discussion

While no improvements have been seen worldwide [12], Mexico has shown some potential gains in the RTI prevention agenda by reducing the number of fatal and non-fatal RTI in four + wheelers. It is important to highlight that Mexico has received international financial and technical support mostly for interventions to car occupants, which might have played an important role in the continuous reduction in the RTI mortality rate observed in recent years. This could be key to advance road safety efforts in other low- and middle-income countries. The extent to which this has translated in increased capacity to address the national epidemic of RTI in a sustainable fashion remains to be seen and should be documented via future studies.

As documented in the present study, the country managed to modify the increasing trend of RTI before the Decade of Action, observing an important reduction afterwards. This reduction coincides with the implementation of Mexican Road Safety Strategies in the context of the UN's Decade of Action. However, as non-fatal RTIs (particularly those with permanent consequences) have not declined, we can argue that this might be due, at least in part, to improvements observed in the fifth pillar during this period (some of them presented in Table 3 of the appendix). Of note, prevalence of using safety devices has remained the same, and the overall goal of reducing "the number of deaths" and "severe injuries" by 50% has not been accomplished as well. We believe this was an ambitious goal unrealistically established without considering the actual resources Mexico was planning to allocate to road

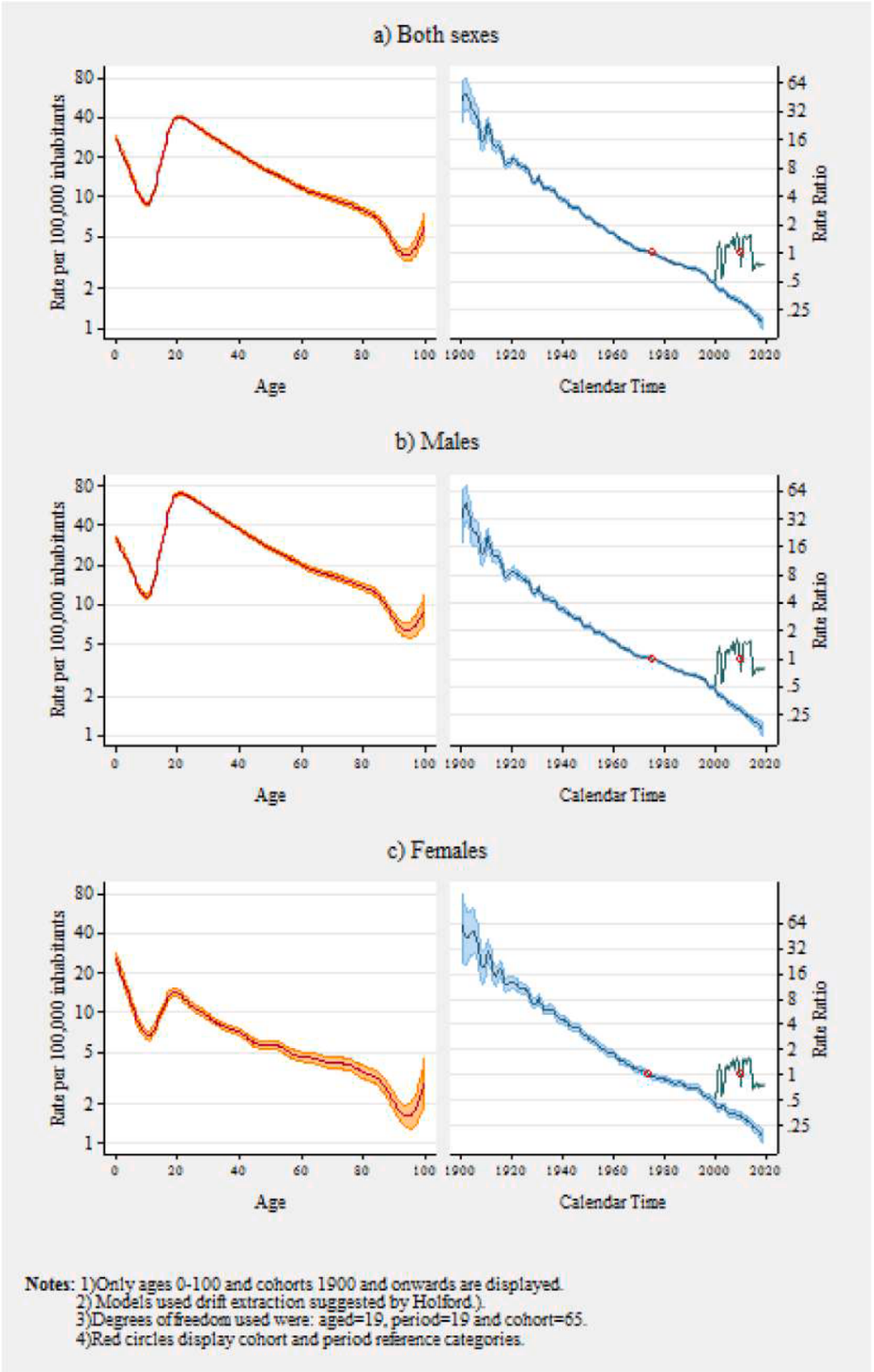


Fig. 3. Age-cohort-period effects of road traffic injury mortality by sex, Mexico 1999–2018.

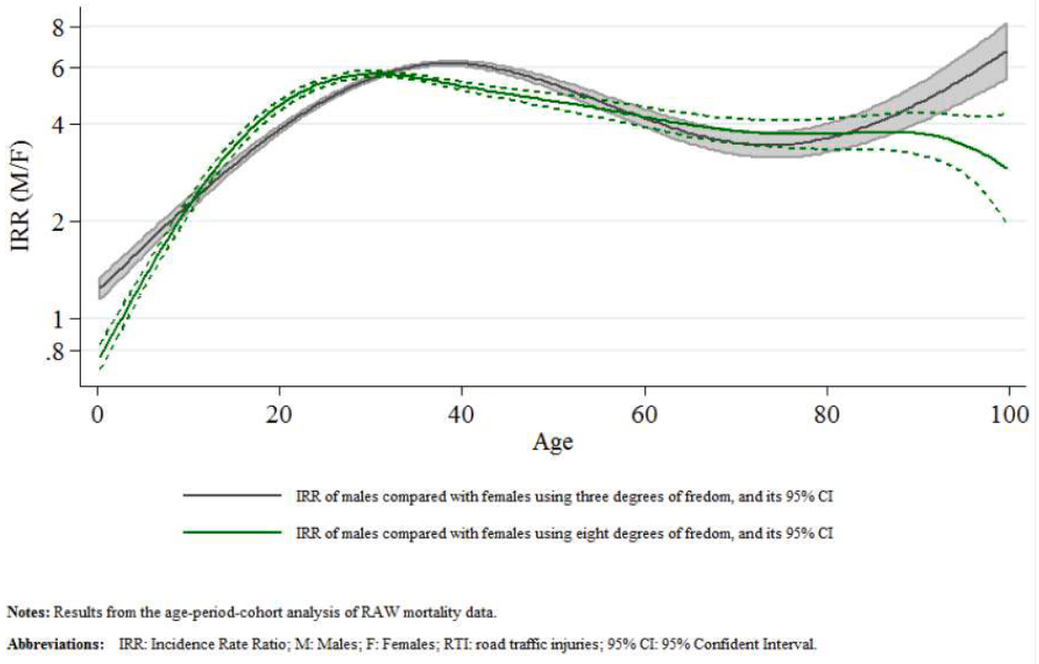
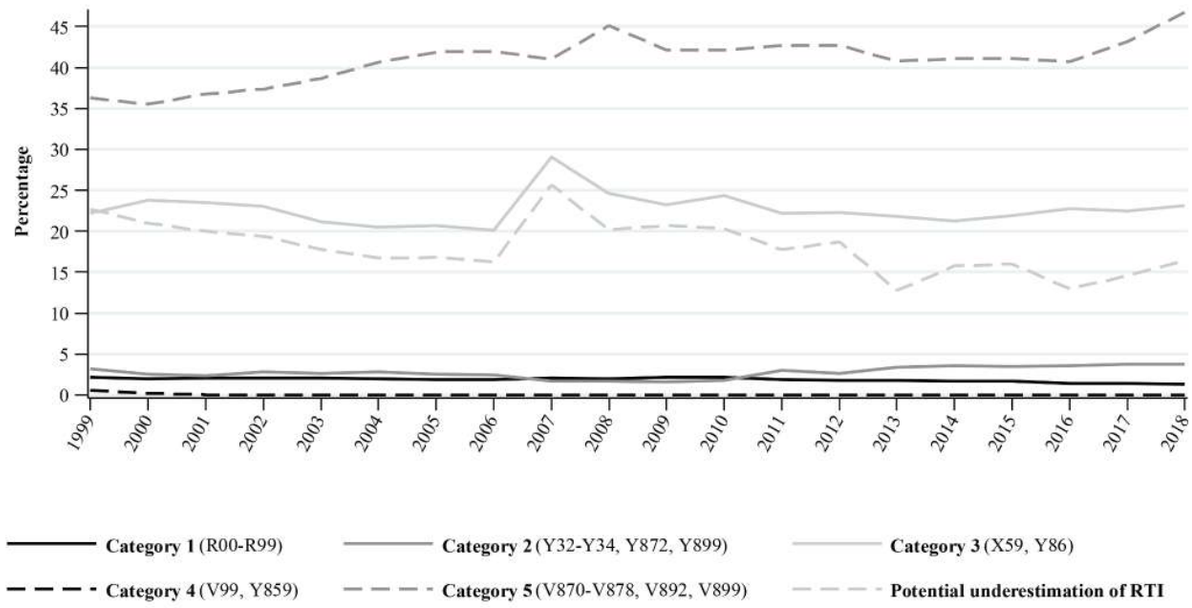


Fig. 4. The estimated time-dependent IRR of dying from RTI for males compared with females for the age component.



Notes: Percentage was constructed using numerators and denominators presented in Table 1, for each category of garbage codes (ICD-10 codes that are not useful for public health analysis of cause-of-death information), reference 20.

Abbreviations: RTI (number of deaths due to road traffic injuries).

Fig. 5. Percentage of deaths allocated to different categories of garbage codes in Mexico, 1999–2018.

Table 3
Joinpoint analysis for IMPUTED road traffic injury mortality by road user, Mexico 1999–2018.

	Trend 1		Trend 2		Trend 3		Trend 4	
	Years	APC (95% CI)	Years	APC (95% CI)	Years	APC (95% CI)	Years	APC (95% CI)
All RTI								
Number of deaths	1999–2003	0.0 (−1.5, 1.6)	2003–2009	3.9* (2.8, 5.1)	2009–2013	−3.9* (−6.2, −1.5)	2013–2018	−0.4 (−1.5, 0.7)
Death rate	1999–2003	−1.3 (−2.8, 0.3)	2003–2009	2.4* (1.3, 3.6)	2009–2013	−5.2* (−7.5, −2.9)	2013–2018	−1.5* (−2.6, −0.4)
Standardized death rate+	1999–2003	−2.1* (−3.5, −0.6)	2003–2009	1.6* (0.6, 2.7)	2009–2013	−5.9* (−8.0, −3.6)	2013–2018	−2.1* (−3.1, −1.1)
Pedestrian								
Number of deaths	1999–2012	−0.0 (−0.5, 0.4)	2012–2018	−4.6* (−6.1, −3.2)				
Death rate	1999–2012	−1.4* (−1.9, −1.0)	2012–2018	−5.8* (−7.2, −4.3)				
Standardized death rate+	1999–2012	−2.4* (−2.8, −1.9)	2012–2018	−6.8* (−8.2, −5.3)				
Cyclists								
Number of deaths	1999–2004	15.2* (8.5, 22.3)	2004–2018	0.6 (−0.7, 1.9)				
Death rate	1999–2004	13.6* (7.0, 20.5)	2004–2018	−0.8 (−2.0, 0.5)				
Standardized death rate+	1999–2004	13.7* (6.9, 20.83)	2004–2018	−1.6* (−2.8, −0.3)				
Motorcyclists								
Number of deaths	1999–2008	16.9* (14.1, 19.7)	2008–2018	12.4* (10.2, 14.7)				
Death rate	1999–2004	10.8* (6.3, 15.5)	2004–2007	22.7* (2.0, 47.8)	2007–2018	10.5* (9.1, 11.9)		
Standardized death rate+	1999–2004	9.7* (5.2, 14.3)	2004–2007	23.7* (2.9, 48.7)	2007–2018	10.3* (9.0, 11.7)		
Four + wheelers								
Number of deaths	1999–2003	1.5 (−2.4, 5.5)	2003–2009	5.9* (3.0, 8.9)	2009–2014	−8.7* (−12.1, −5.0)	2014–2018	−0.0 (−3.9, 3.9)
Death rate	1999–2009	3.0* (1.9, 4.0)	2009–2014	−9.3* (−12.9, −5.5)	2014–2018	−1.4 (−5.3, 2.7)		
Standardized death rate+	1999–2001	−3.8 (−13.9, 7.4)	2001–2009	3.2* (1.7, 4.7)	2009–2014	−10.0* (−13.0, −6.8)	2014–2018	−1.5 (−4.9, 2.0)
Other and NS								
Number of deaths	1999–2018	2.4* (0.6, 4.1)						
Death rate	1999–2018	1.0 (−0.7, 2.7)						
Standardized death rate+	1999–2018	0.4 (−1.4, 2.2)						

Notes: * Indicates that the APC is different from zero at the alpha = 0.05 level.
+ Using the direct method and population estimates of 2018 as standard.
Abbreviations: APC: Annual Percentage Change; 95% CI: 95% Confident Interval; RTI: road traffic injuries; Four + wheelers: includes car, pick-up truck, heavy transport or bus occupants; NS: not specified.

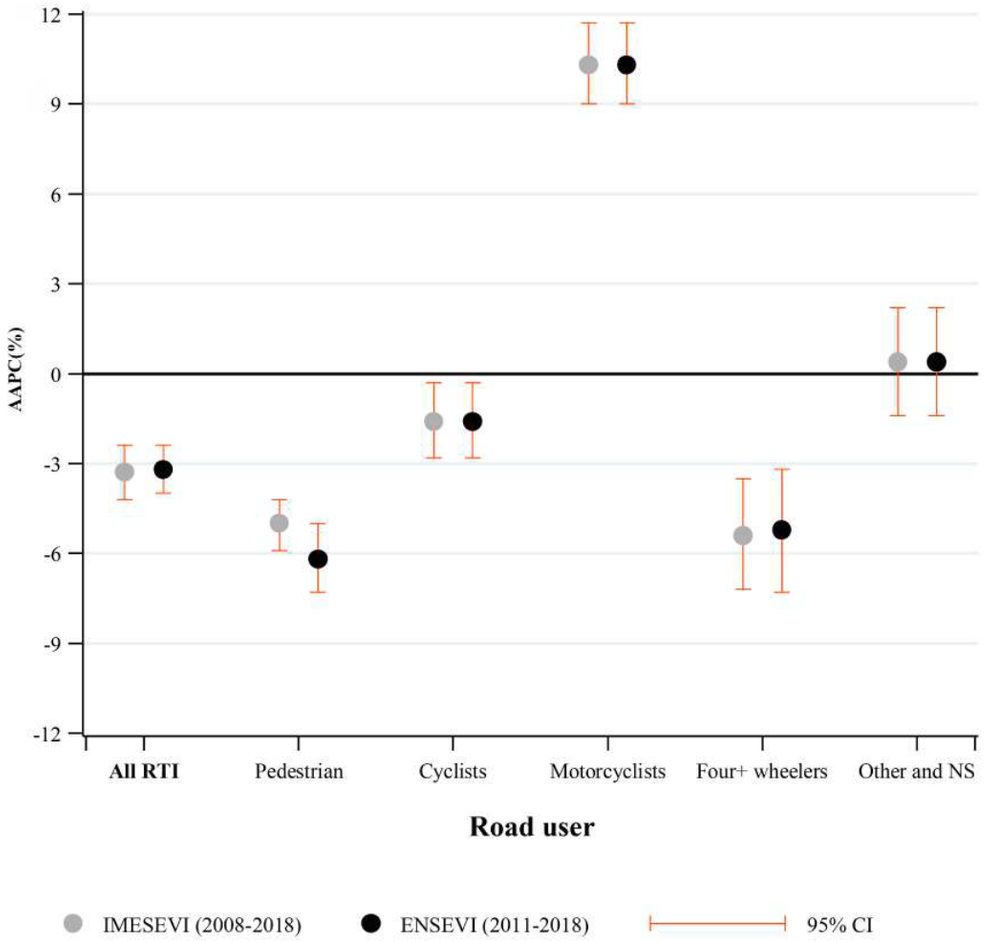
safety, as recommended [37].

Sensitive analysis conducted supports our conclusion that gains might not be attributed to lower quality of death registration. While multiple imputation models have proven to be a good way of doing this in the short run [34], some authors have highlighted the potential pitfalls of this and other approaches to handle missing data [38]. For this reason, it is always better to have reliable information to evaluate advancements. More effort should be placed on improving the quality of death registration for these specific causes of deaths as the great majority of them (≈80%) are routinely autopsied and more than 90% of RTI death certificates are filled out by medical specialists (i.e. forensic medical doctors) [19]. Training these professionals could improve Mexican death statistics.

Given that joinpoint analysis does not allow the inclusion of all variables that might explain the burden of RTI, we discuss some of them here. Evidence shows that increase of motorization rates is associated with higher mortality rates. Once reaching a certain threshold, this relationship is inverted: mortality figures tend to decrease as the motorization rates keep increasing. The growth of vehicle ownership goes together with economic growth and improvements in vehicle and infrastructure safety [39].) While Fig. 11 shows the steady increment of motorization in Mexico, Fig. 12 evidences a different relationship between motorization and death rates as compared with the averaged findings of 26 countries [39]. On one hand, death rate was always lower in Mexico at different motorization rates; on the other, while death rate started decreasing after motorization rate of 0.18 in those countries, the inflection point observed in Mexico was significantly higher (0.28). Road infrastructure has grown during this period, mostly at the expense of more paved roads (which tend to be safer, Fig. 13). Ratio of paved roads per total road infrastructure went from 0.34 in 1999 to 0.44 in 2017. The total number of registered vehicles in circulation per km of road infrastructure increased from 45.14 in 1999 to 115.17 in 2017 (see appendix). This might have affected speed of vehicles and thus impact on decreasing mortality in four + wheelers while GDP per capita at current prices increased linearly during the period understudy (increasing purchasing power, see Fig. 14), the flat trend observed in deflated cost per litter of gasoline from 1999 to 2009, starts increasing significantly up to 2016.

This seems to coincide with the rapid increment observed in the registered motorcycles per 1,000 inhabitants shown in Fig. 11. In México as in most highly urbanized countries in the world, congestion increasingly impedes the mobility and progressively many of those who must travel from one point to another in the large urban centers, have chosen to replace their traditional means of mobility to travel in motorcycles (which tends to avoid traffic efficiently). A more in-depth analysis should be conducted on this regard, including information on urban growth, road infrastructure and mobility patterns.

As per our results, reductions might also not be attributed to changes in the age structure of the population. However, potential gains should be put in the context of a still unacceptably high number of people dying or being seriously injured due to RTI [14]. An important number of countries have proposed goals aimed at reducing deaths and severe injuries but not all intend for (or propose) a 50% reduction. Just as there are different goals, efforts and criteria to measure the number of deaths are different, (i.e. Japan's goal is to reduce the number of RTI deaths within 24 h to less than 2,500 per year). Thus, evaluating progress



Notes: Results from joinpoint analysis of IMPUTED data.
*Using direct method and population estimates of 2018 as standard.

Abbreviations: AAPC: Average Annual Percentage Change; RTI: road traffic injuries; NS (not specified); IMESEVI: Mexican Initiative for Road Safety; ENSEVI: Mexico's National Road Safety Strategy; 95% CI: 95% Confident Interval; Four+ wheelers: includes car, pick-up truck, heavy transport or bus occupants).

Fig. 6. Average Annual Percentage Change in age-standardized IMPUTED mortality rate*after the implementation of Mexico's road safety strategies.

between countries, taking into account efforts invested by each country, their realities and needs, is challenging. While Brazil has higher mortality rate due to RTI with a flat line observed from 2006 to 2015, Argentina has slightly lower rates but have increased from 2011 to 2016 [14]. Of note, none of these figures are age-standardized and thus WHO's global status reports on road safety could improve in data reporting to facilitate international comparisons.

Current efforts in Mexico have focused on individual behaviors and monitoring advances in this regard [15,40]. To improve road safety at desirable levels in a sustainable way, more attention should be paid to priority components and interventions recommended by WHO (using a Safe Systems Approach) [41]. Sufficient governmental funding to develop and fund a road safety strategy, establish and enforce appropriate vehicle safety standards and regulations (a recent study documents the preventive potential for Mexico) [42], improving and enforcing road safety legislations, improving road infrastructure design, amongst others, have all been recognized as key interventions that improve road safety. In this sense, land use policies and urban design for harmonious spaces that facilitate access on foot, bicycle and public transport could reduce the adverse effects on health and the environmental impact of fully motorized transportation, transforming them into benefits for the entire population [43]. This has the potential of benefiting vulnerable road users the most, something which makes sense as they account for the larger proportion of RTI deaths in Mexico. Providing access to safe non-motorized mobility is promoted by the SDG target 11.2 and thus should be emphasized in the near future [4].

Further efforts aimed at identifying specifically what sort of activities/interventions have greater gains are needed. This is challenging since more than one activity is being conducted at the same time, by different sectors and stakeholders, with different levels of coverage

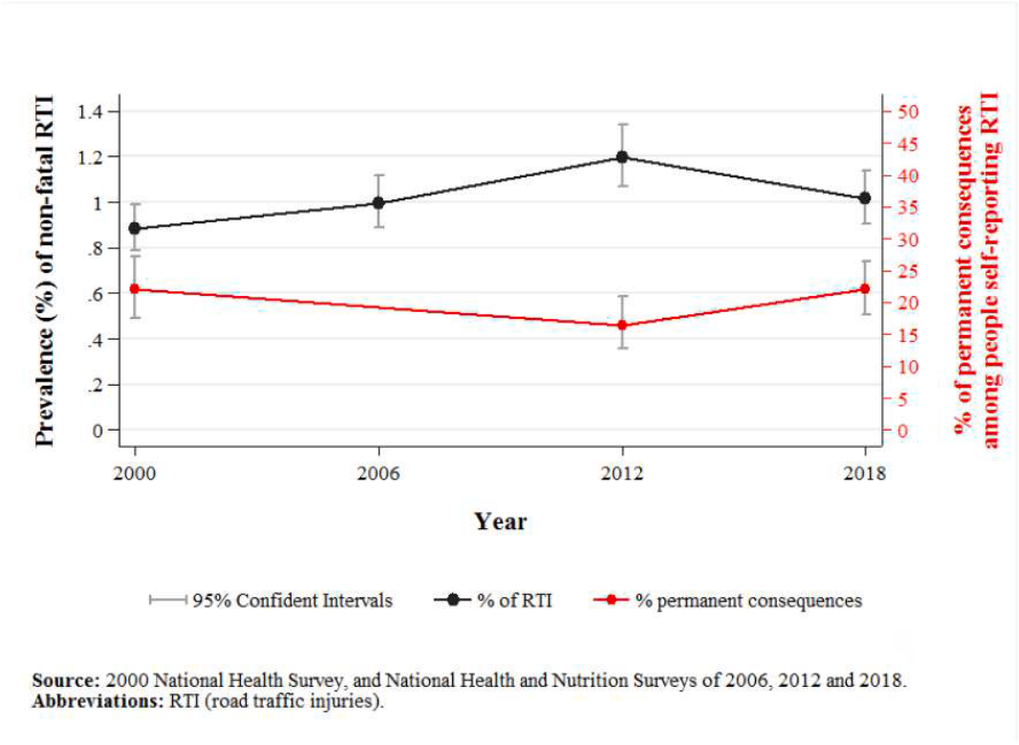


Fig. 7. Prevalence of non-fatal road traffic injuries in Mexico, 2000–2018.

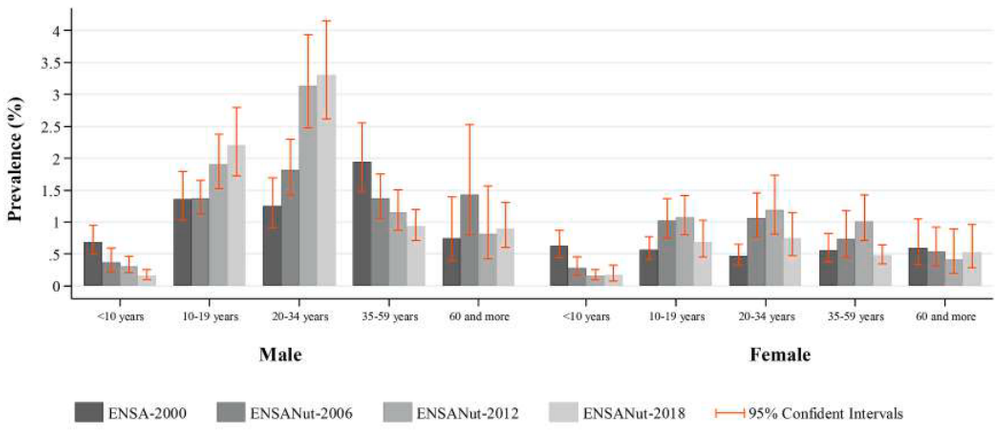
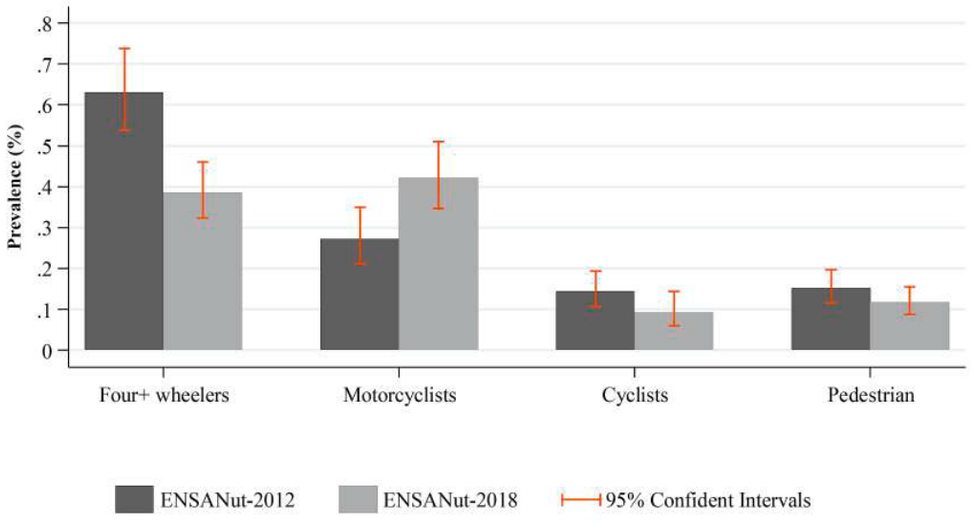


Fig. 8. Prevalence of non-fatal road traffic injuries in Mexico by sex and age group, 2000–2018.

within the country (see appendix). In any case, gains documented as part of this effort could be attributed to multi-sectorial efforts being implemented in the country, which is key to successfully implement and sustain road safety strategies [44]. Important aspects such as change in mobility patterns within cities, urbanization and recent increments in the number of metropolitan areas (from 59 in 2010 to 74 in 2015) [45], aggressive marketing campaigns to incentivize consumption of cars and motorcycles, among others, should be considered in future analysis of the problem.

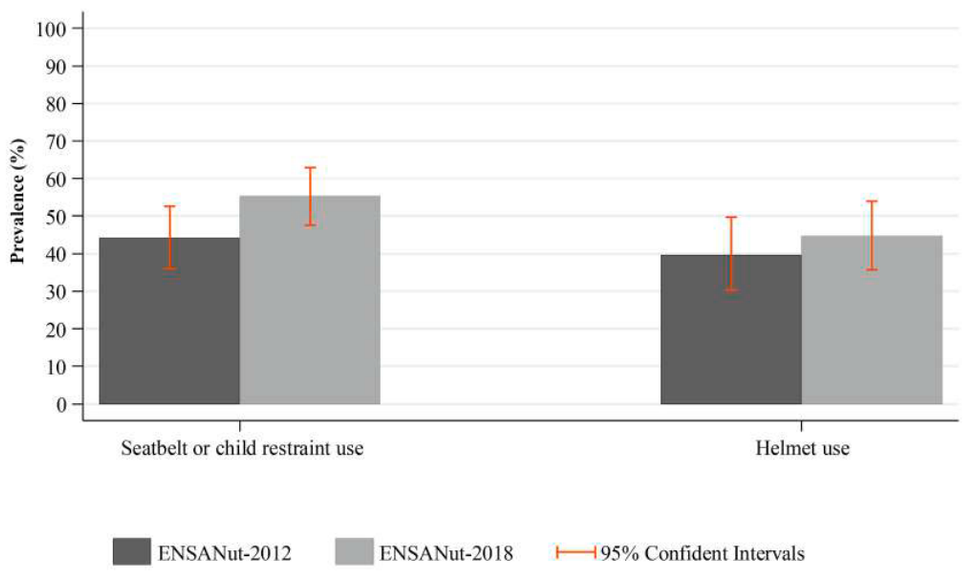
5. Data limitations

As we pointed out previously, quality of death registration can be improved, particularly in terms of type of unintentional injury and type of road user specification. Relying on nationally representative surveys is not the best approach to monitor advances in non-fatal RTI. Among other limitations, these sources of information tend to present recall bias underestimating less severe injuries [46]. If a nationally routinely data collection system of non-fatal RTI had existed, it would have improved



Source: 2012 and 2018 National Health and Nutrition Surveys (ENSANut).
Note: Four+ wheelers includes car, pick-up truck, heavy transport or bus occupants.

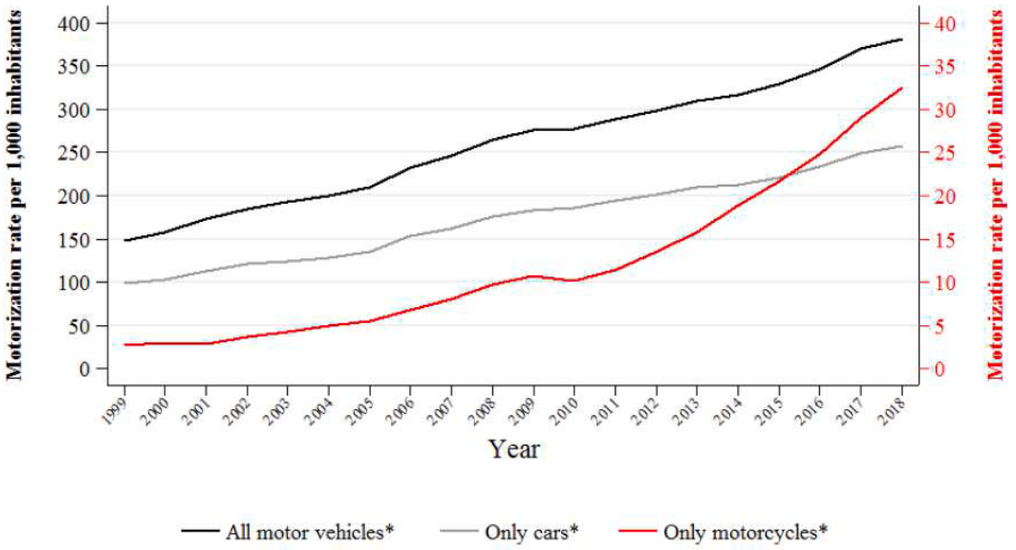
Fig. 9. Prevalence of road traffic injuries by type of road user, Mexico 2000–2018.



Source: 2012 and 2018 National Health and Nutrition Surveys (ENSANut).

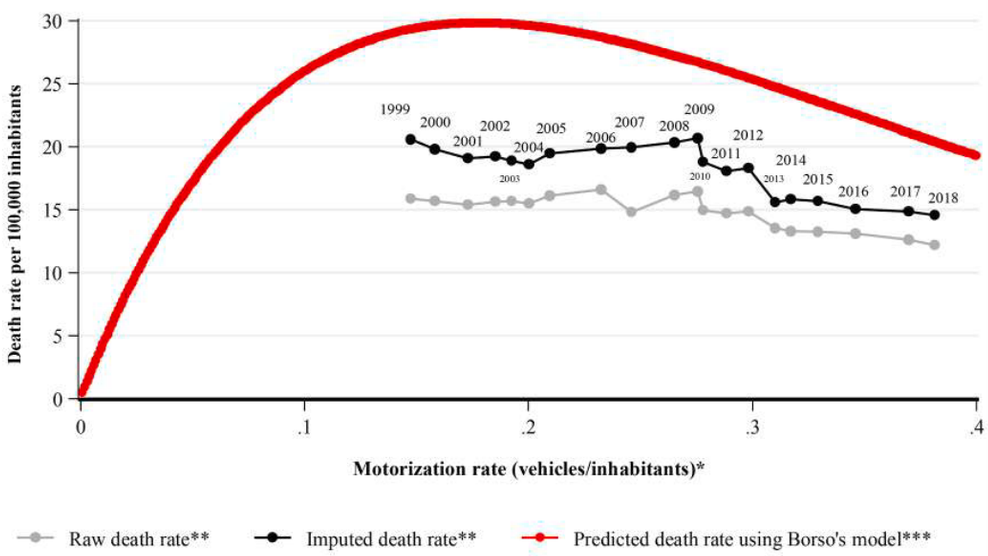
Fig. 10. Prevalence of use of safety devices in Mexico, 2012–2018.

our understanding of both, the epidemiology of the problem and the country's progress in achieving its medium/long term goals. It would also allow us to better understand the level of permanent consequences of RTI (i.e. disabilities), identifying key factors influencing its occurrence. Information on mobility patterns of Mexican population was not available for this analysis. This would have allowed us to best appreciate whether increments on motorcycle use was given by a reduction in private car use or by a reduction in public-transport use. Urban road infrastructure is not analyzed in this paper, as this indicator was not reported annually during the period understudy. The last limitation in our data is not having a precise description of which interventions have been implemented, where and by whom. Future efforts could address all



Sources: * Registered Motor Vehicles in Circulation. In: Administrative Statistical Registries [Databases online]. Aguascalientes, Mexico: National Institute of Statistics and Geography; 2020. http://en.www.inegi.org.mx/programas/vehiculosmotor/. Accessed February 10, 2020.
- Population estimates from the National Population Council, reference 24

Fig. 11. Motorization rates in Mexico, 1999–2018.



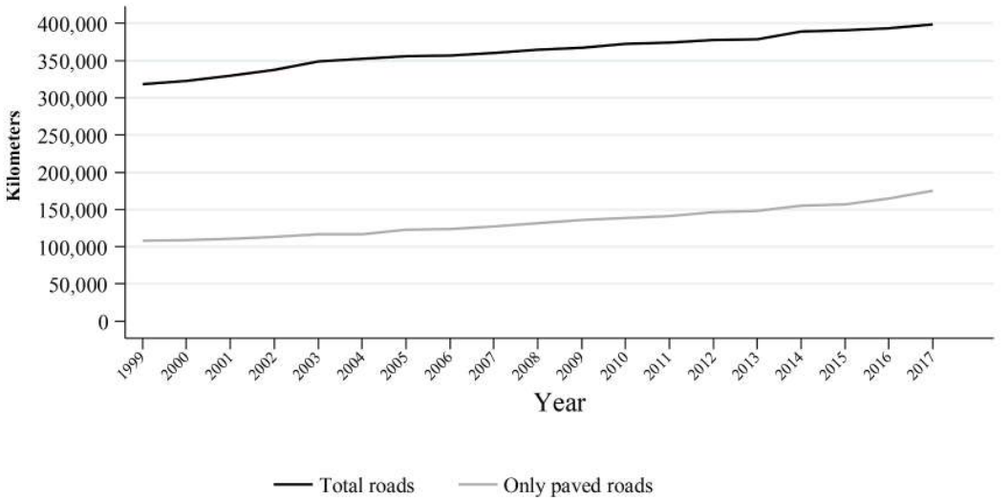
Notes: * Taken from: Registered Motor Vehicles in Circulation. In: Administrative Statistical Registries [Databases online]. Aguascalientes, Mexico: National Institute of Statistics and Geography; 2020. http://en.www.inegi.org.mx/programas/vehiculosmotor/. Accessed February 10, 2020.
** Age-standardized figures using direct method and population estimates of 2018 as standard.
*** Using the average coefficients 'a' and 'b' of the 26 countries analyzed in Reference 39.

Fig. 12. Relation between death rate versus motorization rate, Mexico 1999–2018.

these data limitations.

6. Conclusions

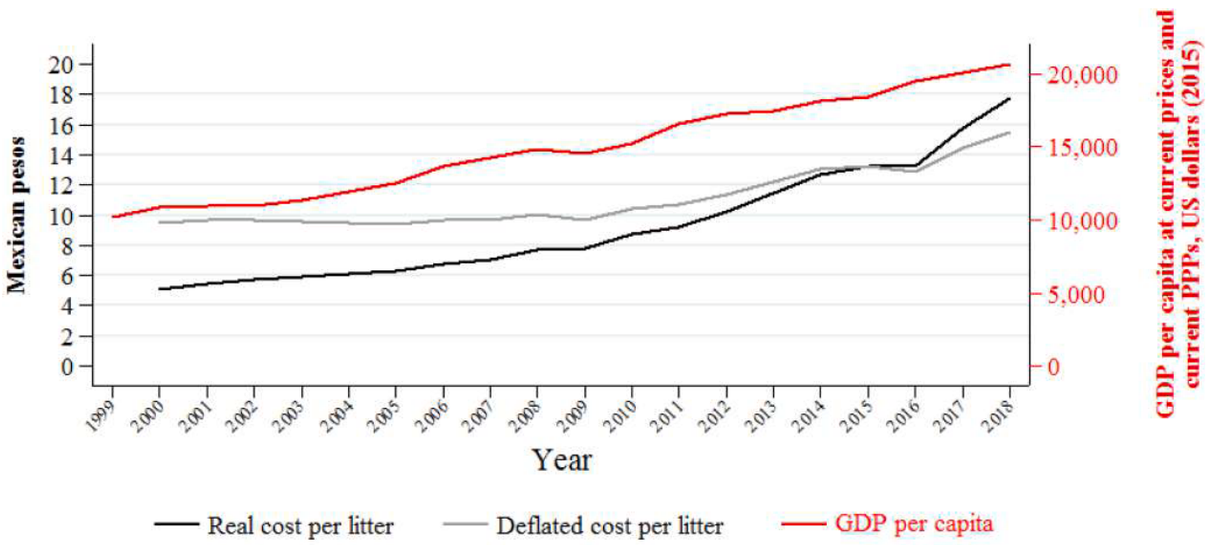
Our findings show some potential gains from the Mexican response to RTI prevention as part of Road Safety Strategies. However, they tend to concentrate on four + wheelers, neglecting vulnerable road users' needs. Our results also highlight the urgent need to strengthen efforts directed to prevent the growing number of RTI in motorcyclists. Coordinated multi-sectoral action is key to boost scarce resources being



Sources: Statistical Yearbooks. In: Administrative Statistical Registries of the Ministry of Transport. Mexico City: Ministry of Transport, 2020. http://www.sct.gob.mx/planeacion/estadistica/anuario-estadistico-sct/. Accessed February 12, 2020.

***Note:** This figure does not include urban road infrastructure (information not available for the complete period). In 2019, urban road infrastructure was 75,305km, 121% more than 2014, according to the Mexican Institute of Transportation (https://www.gob.mx/imt/acciones-y-programas/red-nacional-de-caminos).

Fig. 13. Kilometers of road infrastructure,* Mexico 1999–2017.



Sources: *Data for 2000-2010 was taken from: Islas-Rivera VM, Moctezuma-Navarro E, Lelis-Zaragoza M, Ruvalcaba-Martínez JI. Urbanización y motorización en México. Instituto Mexicano del Transporte / Secretaría de Comunicaciones y Transportes; Querétaro, México 2011. [cited 2020 February 14]. Available from: https://imt.mx/archivos/Publicaciones/PublicacionTecnica/pt362.pdf. Data for 2011-2018 was taken from: Average Price Inquiry. In: Administrative Statistical Registries [Databases online]. Aguascalientes, Mexico: National Institute of Statistics and Geography; 2020. https://inegi.org.mx/app/preciospromedio/. Accessed February 10, 2020.
** Gross domestic product (GDP) per capita (indicator). In: OECD.Stat [Databases online]. Paris, France: Organization for Economic Co-Operation and Development (OECD); 2020. https://data.oecd.org/gdp/gross-domestic-product-gdp.htm#indicator-chart. Accessed February 6, 2020.

Notes: Average cost of gasoline was deflated to 2015 Mexican pesos using the Mexican Consumer Price Index taken from the OECD.Stat [Databases online]. Paris, France: Organization for Economic Co-Operation and Development (OECD); 2020. https://stats.oecd.org/viewhtml.aspx?datasetcode=PRICES_CPI&lang=en#. Accessed February 7, 2020.

Fig. 14. Average cost per liter of gasoline* and Gross Domestic Product ** per capita, Mexico 1999–2018.

allocated to road safety [12]. Even though there is still potential for improvement in the death registry system in Mexico, recent improvements in road safety are not attributed to "garbage coding". Finally, there is an urgent need of collecting systematically non-fatal information to better assess shifts between deaths and serious non-fatal RTIs as part of improvements in post-crash response.

CRediT authorship contribution statement

Ricardo Pérez-Núñez: Conceptualization, Methodology, Formal analysis, Data curation, Writing - original draft. **Elisa Hidalgo-Solórzano:** Conceptualization, Methodology, Formal analysis, Writing - review & editing, Writing - original draft. **Martha Híjar:** Conceptualization, Formal analysis, Writing - review & editing, Writing - original draft.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

No specific funding was received for this analysis. Authors would like to thank Luisa Torres-Sánchez, Ruth Argelia Vázquez-Salas, and Mark J. Rutherford for their technical support and advice during the analysis of our data. We thank Jeffrey C. Lunnen for his assistance in editing the English version of the manuscript. Finally, we would like to thank anonymous peer-reviewers as their comments and suggestions allowed us to improve our analysis.

Disclaimer

MH and RPN worked in the leading agency for accident prevention of the Mexican Ministry of Health from 2014 to 2017/2018.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.aap.2021.106227.

References

[1] United Nations General Assembly. Resolution adopted by the General Assembly: 64/255. Improving global road safety. New York: United Nations General Assembly; 2010. [cited 2017 Jun 26]. Available from: http://www.who.int/violence_injury_prevention/publications/road_traffic/UN_GA_resolution-54-255-en.pdf.
[2] Secretaria de Comunicaciones y Transportes (MX); Secretaria de Salud (MX). Acuerdo por el que se da a conocer la Estrategia Nacional de Seguridad Vial 2011-2020. Diario Oficial Fed. 6 jun 2011 [cited 2017 Apr 24]; Seccion 1. Available from: http://dof.gob.mx/nota_detalle.php?codigo=5193284&fecha=06/06/2011.
[3] UNRSC. Global Plan for the Decade of Action for Road Safety 2011-2020, Geneva: World Health Organization; 2010. [cited 2019 Apr 12] Available from: https://www.who.int/roadsafety/decade_of_action/plan/plan_english.pdf?ua=1.
[4] United Nations General Assembly. Resolution adopted by the General Assembly: 70/1. Transforming our world: the 2030 Agenda for Sustainable Development. New York: United Nations General Assembly; 2015 [cited 2018 Dec 06]. Available from: http://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf.
[5] Programa de Acción Específico 2007-2012: Seguridad Vial. Secretaría de Salud. México, D.F. 2008. [cited 2020 February 17]. Available from: https://www.paho.org/mex/index.php?option=com_docman&view=download&alias=590-programa-de-accion-especifico-2007-2012-seguridad-vial&category_slug=programas-y-proyectos&Itemid=493.
[6] Centro Nacional para la Prevención de Accidentes. La memoria de IMESEVI: esto no es un accidente. 2a Ed. México (DF); 2011 [cited 2019 April 12]. Available from: http://conapra.salud.gob.mx/Interior/Documentos/Libros/Esto_no_Accidente.pdf.
[7] Chandran A, Pérez-Núñez R, Bachani AM, Híjar M, Salinas-Rodríguez A, Hyder AA. Early impact of a national multi-faceted road safety intervention program in Mexico: results of a time-series analysis. PLoS ONE 9(1): e87482.
[8] Rodríguez-Hernández, J.M., Campuzano-Rincón, J.C., Híjar, M., 2011. Comparing pedestrian injury mortality in Mexico City: ¿have changes occurred over a decade? Salud Publica Mex. 53, 320–328.
[9] Gobierno de la Ciudad de México. Metrobús: décimo aniversario. México (DF); 2016. [cited 2017 April 24]. Available from: http://data.metrobus.cdmx.gob.mx/libroMB10.html.
[10] Hyder, A.A., Allen, K.A., Di Pietro, G., et al., 2012. Addressing the implementation gap in global road safety: exploring features of an effective response and introducing a 10-country program. Am. J. Public Health 102 (6), 1061–1067.
[11] Pérez-Núñez, R., Chandran, A., Hijar, M., et al., 2013. The use of seatbelts and child restraints in three Mexican cities. Int J Inj Contr Saf Promot. 20 (4), 385–393.
[12] Gómez-García, L., Pérez-Núñez, R., Hidalgo-Solórzano, E., 2014. Short-term impact of changes in drinkin-and-driving legislation in Guadalajara and Zapopan, Jalisco, Mexico. Cad. Saude Pública 30 (6), 1281–1292.
[13] Informe sobre la situación de la seguridad vial, México 2016. Secretaría de Salud/STCONAPRA. México, Ciudad de México, 2017. [cited 2019 April 12]. Available from: https://www.gob.mx/salud/acciones-y-programas/informe-sobre-la-situacion-de-la-seguridad-vial-mexico-2016?state=published.
[14] World Health Organization (WHO). Global status report on road safety 2018. Geneva: WHO; 2018. Licence: CC BYNC-SA 3.0 IGO [cited 2018 December 07]. Available from: https://www.who.int/violence_injury_prevention/road_safety_status/2018/en/.
[15] Híjar, M., Pérez-Núñez, R., Salinas-Rodriguez, A., 2018. Advances in Mexico in the middle of the Decade of Action for Road Safety 2011–2020. Rev. Saude Publica 52, 67.
[16] Bhalla, K., Harrison, J.E., Shahraz, S., Fingerhut, L.A., 2010. Availability and quality of cause-of-death data for estimating the global burden of injuries. Bull World Health Org. 88, 831–838C.
[17] Lozano-Ascencio, R., 2008. Is it posible to improve the death registries in Mexico? Gac Méd Méx 144 (6), 525–533.
[18] Híjar, M., Chandran, A., Pérez-Núñez, R., Lunnen, J., Rodríguez-Hernández, J.M., Hyder, A.A., 2012. Quantifying the underestimated burden of road traffic mortality in Mexico: a comparison of three approaches. Traffic Inj. Prev. 13 (supp 1), 5–10.
[19] Pérez-Núñez, R., Mojarro-Íñiguez, M.G., Mendoza-García, M.E., Rosas-Osuna, S.R., Híjar, M., 2016. Análisis subnacional de la subestimación de la mortalidad asociada a lesiones causadas por el tránsito en México. Salud Pública Mex 58 (4), 412–420.
[20] Naghavi, M., Makela, S., Foreman, K., O'Brien, J., Pourmalek, F., Lozano, R., 2010. Algorithms for enhancing public health utility of national causes-of-death data. Popul Health Metr. 8, 1–14.
[21] Habicht, J.P., Victora, C.G., Vaughan, J.P., 1999. Evaluation designs for adequacy, plausibility and probability of public health programme performance and impact. Int. J. Epidemiol. 28, 10–18.
[22] Mortality. In: Administrative Statistical Registries [Databases online]. Aguascalientes, Mexico: National Institute of Statistics and Geography; 2019. http://en.www.inegi.org.mx/proyectos/registros/vitales/mortalidad/?ps=microdata. Updated on November 7, 2018. Accessed March 29, 2019.
[23] Lozano-Ascencio R, Torres LM, Lara J, Santillán A, González-Vilchis JJ. Accidentes de Tráfico de Vehículo de Motor. Cambios Derivados de la Implantación de la 10 Revisión de la CIE. Vol 6. Ciudad de México, México: Secretaría de Salud; 2003 [cited 2018 December 06]. Available from: http://www.dgis.salud.gob.mx/descargas/pdf/SE13_AccidentesTrafico.pdf.
[24] Projections of the Population of Mexico and its States, 2016-2015. In: Administrative Statistical Registries [Databases online]. Mexico City: National Population Council; 2018. https://datos.gob.mx/busca/dataset/proyecciones-de-la-poblacion-de-mexico-y-de-las-entidades-federativas-2016-2050. Updated on September 17, 2018. Accessed November 15, 2018.
[25] Olaiz G, Rojas R, Barquera S, Shamah T, Aguilar C, Cravioto P, et al. Encuesta Nacional de Salud (ENSA) 2000. Tomo 2. La salud de los adultos. Cuernavaca: Instituto Nacional de Salud Pública, 2003 [cited 2019 March 7]. Available from: https://www.insp.mx/encuestoteca/Encuestas/ENSA2000/ OTROS/ensa_tomo2.pdf.
[26] Olaiz-Fernández G, Rivera-Dommarco J, Shamah-Levy T, Rojas R, Villalpando-Hernández S, Hernández-Ávila M, et al. Encuesta Nacional de Salud y Nutrición (ENSANUT) 2006. Cuernavaca: Instituto Nacional de Salud Pública, 2006 [cited 2019 March 7]. Available from: https://ensanut.insp.mx/ informes/ensanut2006.pdf.
[27] Gutiérrez JP, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L, et al. Encuesta Nacional de Salud y Nutrición (ENSANUT) 2012. Resultados Nacionales. Cuernavaca: Instituto Nacional de Salud Pública, 2012 [cited 2019 March 7]. Available from: http://ensanut.insp. mx/informes/ENSANUT2012ResultadosNacionales.pdf.
[28] National Survey on Health and Nutrition (ENSANUT) 2018. . In: Administrative Statistical Registries [Databases online]. Aguascalientes, Mexico: National Institute of Statistics and Geography; 2020. https://www.inegi.org.mx/programas/ensanut/2018/default.html#Microdatos. Accessed January 9, 2020.
[29] Joinpoint Regression Program, Version 4.6.0.0 - April 2018; Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute. Available at: http://surveillance.cancer.gov/joinpoint/ [accessed June 4, 2019].
[30] Kim, H., Fay, M., Feuer, E., Midthune, D., 2000. Permutation tests for joinpoint regression with applications to cancer rates. Stat Med 2000; 19:335–351. (correction: 2001;20:655).

[31] Barrio, G., Pulido, J., Bravo, M.J., Lardelli-Claret, P., Jiménez-Mejías, E., de la Fuente, L., 2015. An example of the usefulness of joinpoint trend analysis for assessing changes in traffic safety policies. Accid. Anal. Prev. 75, 292–297.
[32] Dharmaratne, S.D., Jayatilleke, A.U., Jayatilleke, A.C., 2015. Road traffic crashes, injury and fatalitiy trends in Sri Lanka: 1938–2013. Bull. World Health Organ. 93, 640–647.
[33] Bandi, P., Silver, D., Mijanovich, T., Macinko, J., 2015. Temporal trends in motor vehicle fatalities in the United States, 1968 to 2010 – a jointpoint regression analysis. Inj Epidemiol 2 (1), 4.
[34] Chen, Q., Williams, S.Z., Liu, Y., Chihuri, S.T., Li, G., 2018. Multiple imputation of missing marijuana data in the Fatality Analysis Reporting System using a Bayesian multilevel model. Accid. Anal. Prev. 120, 262–269.
[35] Royston, P., 2004. Multiple imputation of missing values. Stata J. 4, 227–241.
[36] Rutherford, M.J., Lambert, P.C., Thompson, J.R., 2010. Age-period-cohort modeling. Stata J 10 (4), 606–627. https://doi.org/10.1177/1536867X1101000405.
[37] Nazif, J.I., Guía práctica para el diseño e implementación de políticas de seguridad vial integrales, considerando el rol de la infraestructura. Santiago de Chile: CEPAL; 2011. [cited 2017 June 26]. Available from: http://repositorio.cepal.org/bitstream/handle/11362/35266/S1100934_es.pdf?sequence=1&isAllowed=y.
[38] Sterne, J.A.C., White, I.R., Carlin, J.B., et al., 2009. Multiple imputation for missing data in epidemiological and clinical research: potential and pitfalls. BMJ 338, b2393.
[39] Borsos, A., Koren, C.S., Ivan, J.N., et al., 2012. Long-term safety trends related to vehicle ownership in 26 countries. Paper presented at: Annual Meeting of the Transportation Research Board; Washington, DC, USA, January 22–26, 2012.
[40] Pérez-Núñez, R., Híjar, M., Celis, A., Hidalgo-Solórzano, E., 2014. Road traffic injuries in Mexico: evidences to strenghthen the Mexican road safety strategy. Cad. Saude Pública 30 (5), 911–925.
[41] Save LIVES – A road safety technical package. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO. [cited 2019 April 12]. Available from: https://apps.who.int/iris/bitstream/handle/10665/255199/9789241511704-eng.pdf;jsessionid=2542B7DE9333D35412F5ECB23FBB91C5?sequence=1.
[42] Wallbank, C., Kent, J., Ellis, C., Seidl, M., Carroll, J., 2019. The potential for vehicle safety standards to prevent deaths and injuries in Argentina, Brazil, Chile and Mexico: a 2018 update. TRL Limited, England, 2019. [cited 2020 February 17]. Available from: https://trl.co.uk/reports/potential-vehicle-safety-standards-prevent-deaths-and-injuries-argentina-brazil-chile-and.
[43] Givoni, M., Morgan, A.S., 2013. Health impact modelling of active travel visions for england and wales using an integrated transport and health impact modelling tool (ITHIM). PLoS ONE 8 (1), e51462.
[44] Hyder, A.A., Paichadze, N., Toroyan, T., Peden, M.M., 2017. Monitoring the decade of action for global road safety 2011–2020: an update. J Global Public Health 12, 1492–1505.
[45] Delimitación de las zonas metropolitanas de México 2015. Secretaría de Desarrollo Agrario, Territorial y Urbano/Consejo Nacional de Población/Instituto Nacional de Estadística y Geografía; México, Ciudad de México, 2018. [cited 2019 April 15]. Available from: https://www.gob.mx/cms/uploads/attachment/file/344506/1_Preliminares_hasta_V_correcciones_11_de_julio.pdf.
[46] Mock, C., Acheampong, F., Adjei, S., Koepsell, T., 1999. The effect of recall on estimation of incidence rates for injury in Ghana. Int. J. Epididemiol. 28, 750–755.

ARTÍCULO ORIGINAL

Adherencia terapéutica a programas de reeducación para mujeres y hombres en relaciones de pareja violentas

Rosario Valdez-Santiago, PhD,[1,2] Jorge Martín-Rodríguez, PhD,[3] Luz Arenas-Monreal, PhD,[1] Martha Híjar-Medina, PhD.[4]

Valdez-Santiago R, Martín-Rodríguez J, Arenas-Monreal L, Hijar-Medina M. Adherencia terapéutica a programas de reeducación para mujeres y hombres en relaciones de pareja violentas. Salud Publica Mex 2015;57:537-546.

Resumen

Objetivo. Analizar la adherencia terapéutica en participantes de un programa de reeducación operado por los servicios estatales de salud en ocho estados de México en 2010. **Material y métodos.** Estudio transversal y descriptivo que evaluó la adherencia terapéutica de un programa de reeducación para hombres agresores y mujeres víctimas de violencia de pareja. La intervención fue coordinada por un equipo de profesionales previamente capacitados. La selección de los participantes se realizó con el cumplimiento estricto de criterios de inclusión/exclusión evaluados por una prueba de tamizaje. Con base en la asistencia, se clasificó en adherencia baja (1 a 12), media-alta (13 y más). Se realizó una prueba de *t* student, un análisis bivariado y un modelo de regresión logística para identificar la posibilidad de adherencia en cada programa. **Resultados.** Se aplicaron 5 539 tamizajes, 88.3% (n=4 891) fueron positivos; 85%(n=4 151) aceptó participar, 75% de los potenciales participantes asistió al menos a una sesión (n=3 699), siendo ésta la muestra del presente estudio. En el programa para mujeres hubo diferencias significativas por estado civil, religión y grupos de edad ($p<0.05$). En el programa para hombres hubo diferencias significativas por religión y grupos de edad ($p<0.05$). **Conclusiones.** En México son inexistentes los estudios que evalúan la adherencia a los programas de atención a la violencia; este estudio es una primera aproximación que abre la posibilidad de profundizar

Valdez-Santiago R, Martín-Rodríguez J, Arenas-Monreal L, Hijar-Medina M. Therapeutic adherence to retraining programs for women and men involved in abusive relationships in Mexico. Salud Publica Mex 2015;57:537-546.

Abstract

Objective. To analyze the therapeutic adherence among participants in the retraining program operated by the Ministry of Health of Mexico, in eight states in 2010. **Materials and methods.** This is a cross-sectional and descriptive study that assesses therapeutic adherence in a retraining intervention program for male perpetrators and female victims of intimate partner violence. The intervention was coordinated by a team of previously trained professionals. The selection of participants was made by means of a specific screening test. Overall performance for both groups was analyzed, and based on the attendance they were classified in low adhesion (1-12) medium to high (13 and>). To determine the possibility of adhesion, Student's t tests, a bivariate analysis, and a logistic regression model were performed for each program. **Results.** 5 539 screenings were applied, of which 88.3% (n = 4 891) were positive. 85% agreed to participate (n = 4 151), but only 75% of potential participants attended at least one session (n = 3 022). 78.5% attended between 1-12 sessions. In the women's program, significant differences in marital status, religion and age groups ($p<0.05$) were found. In the program for men, significant differences in religion and age groups ($p<0.05$) were found. **Conclusions.** In the Mexican context there are few studies that assess adherence to programs of care and retraining for partner violence. This study is a first approach that opens the possibility to enhance

(1) Centro Colaborador OMS/OPS para la Investigación en Lesiones y Violencia. México.
(2) Instituto Nacional de Salud Pública. México.
(3) Centro de Proyectos para el Desarrollo, Pontificia Universidad Javeriana. Bogotá, Colombia.
(4) Fundación Entornos, AC. Cuernavaca, Morelos, México.

Fecha de recibido: 13 de marzo de 2015 • **Fecha de aceptado:** 20 de agosto de 2015
Autor de correspondencia: Dr. Jorge Martín Rodríguez Hernández. Pontificia Universidad Javeriana, Cendex. Carrera 7 No. 40-90. Piso 5. Bogotá, Colombia.
Correo electrónico: jrodriguez.h@javeriana.edu.co

Valdez-Santiago R, Martín-Rodríguez J, Arenas-Monreal L, Híjar-Medina M. Adherencia terapéutica a programas de reeducación para mujeres y hombres en relaciones de pareja violentas. Salud Publica Mex. 2015;57(6):537-546. https://doi.org/10.21149/spm.v57i6.7643

en el diseño y evaluación de este tipo de intervenciones, cruciales para desarticular la violencia contra las mujeres.

Palabras clave: uso terapéutico; maltrato conyugal; México

the design and evaluation of such interventions, which are crucial to dismantle violence against women.

Keywords: therapeutic use; spouse abuse; Mexico

La violencia de pareja ha sido reconocida como un problema social y de salud de gran impacto en la sociedad desde la década de los setenta en países de ingresos medios y altos,[1] sin embargo, este reconocimiento llegó con veinte años de retraso en países de América Latina,[2] lo que ha impactado en el desarrollo de políticas públicas para su atención y, sobre todo, para el desarrollo de estrategias de prevención.[3]

La intervención con mujeres y hombres inmersos en relaciones de pareja violentas ha sido motivo de estudio a nivel internacional;[4-6] en América Latina son escasos los estudios que documenten intervenciones en ambas poblaciones,[7,8] sobre todo con un enfoque de evaluación sobre su eficacia, impacto y reproducibilidad. En México hay pocos estudios evaluados, a pesar de existir experiencias de intervención.[9]

A pesar de los diferentes retos y características de las intervenciones para ambas poblaciones, un desafío en común es detener la violencia y garantizar la seguridad de las mujeres y los menores.[3,10]

La evidencia generada hasta el momento pone de manifiesto algunas coincidencias y diferencias en ambos grupos: a) la baja adherencia terapéutica a los programas de intervención; b) la dificultad para incidir en la modificación de conocimientos, actitudes y creencias con respecto a la violencia de pareja y su relación con la transformación del comportamiento; c) la disminución sostenida de la perpetración de actos de violencia de pareja; este aspecto implica que los hombres que ejercen violencia dejen de hacerlo y, sobre todo, que los cambios perduren;[11] d) en el caso de las mujeres, un objetivo central es la disminución de la posibilidad de ser víctima de violencia por parte de la pareja, lo cual implica garantizar sus derechos básicos y acceso oportuno al sistema de justicia, un desafío enorme en los sistemas de impartición de justicia en países de América Latina.[10,12]

El concepto de adherencia aplicado en el marco de los programas de tratamiento o intervención para hombres agresores adquiere especial relevancia ya que uno de los objetivos fundamentales en la aplicación del tratamiento es lograr la adherencia de cada sujeto al programa, lo que implica asistir a las sesiones, continuar y realizar las tareas asignadas.[6,13]

En los países de ingresos altos, los programas para hombres agresores han sido evaluados con base en la adherencia al programa, la tasa de aquellos que completan el tratamiento y los cambios que se producen en relación con la reducción o desaparición de la violencia.[13-15] Otros estudios presentan la tasa de abandono del programa o las reincidencias.[16] En una revisión de 40 programas, E. Gondolf reporta un efecto mínimo o nulo sobre los cambios mencionados en los hombres agresores, señalando que la efectividad del programa depende de las características de la intervención del mismo.[17] Otros autores presentan revisiones sistemáticas, bibliográficas o metaanalíticas sobre la efectividad de las intervenciones efectuadas con perpetradores y mujeres víctimas de violencia. En relación con los programas dirigidos a perpetradores se menciona que los resultados son contradictorios y, en algunos casos, no eficaces, lo cual puede deberse a deficiencias metodológicas. En el caso de los programas con víctimas, se señala que los programas estructurados en consejería parecen reducir la revictimización y las intervenciones breves no muestran resultados claros.[18-20]

Caracterización del programa de reeducación en México

El programa de reeducación para mujeres víctimas y hombres agresores de pareja fue diseñado por un equipo multidisciplinario* y surge a partir de lo señalado en la Ley General de Acceso de las Mujeres a una Vida Libre de Violencia (LGAMVLV, 2007), la cual estipula que deberá "brindar servicios reeducativos integrales a las

* El equipo estuvo conformado por Roberto Garda, de Hombres por la Equidad, A.C, y Mauro Vargas, de GENDES, A.C. Por otra parte, el equipo responsable de diseñar el Programa de Mujeres Víctimas de Violencia de Pareja estuvo a cargo de Pilar Lomelín (consultora independiente), Claudia Gómez Lule (ENIFAC) y Luz Arenas Monreal. Ambos procesos se enriquecieron con el acompañamiento de Marta Torres Falcón (aspectos legales), Cristina Herrera (evaluación cualitativa) y Jorge Martín Rodríguez (evaluación cuantitativa), y coordinado por Martha Híjar Medina y Rosario Valdez-Santiago, lo cual permitió generar un modelo de intervención único e innovador.

víctimas y a los agresores, a fin de que logren estar en condiciones de participar plenamente en la vida pública, social y privada".[21] Esta ley indica que la Secretaría de Salud Federal tiene la responsabilidad de operar el nivel nacional.* Las premisas teórico-metodológicas del programa de reeducación fueron a) la perspectiva de género; b) la conceptualización de la violencia contra las mujeres;‡ c) el modelo ecológico como elemento articulador de la *responsabilización* de los hombres del ejercicio de su violencia y d) la Educación para la Paz y la Terapia de Reencuentro.§,[22,23]

Con estos ejes, se articuló un objetivo general para cada grupo blanco; en el caso de los hombres agresores se consideró "iniciar un proceso de reeducación a hombres que ejercen violencia para que la detengan y aprendan nuevas formas de relacionarse en diversos ámbitos (institucionales, comunitarios, familiares y personales), que les permita participar plenamente en la vida pública, social y privada".

En el caso de las mujeres víctimas, se propuso como objetivo "proporcionar servicios de reeducación a mujeres que han vivido violencia de pareja para que puedan identificar y utilizar los recursos (institucionales, familiares, comunitarios, familiares y personales) que les permitan participar plenamente en la vida pública y privada".

El encuadre metodológico se centró en un mínimo y un máximo de participantes (de 2 a 15 personas), que acudieran a una sesión de dos horas y media por semana, con posibilidad de completar las sesiones en grupos abiertos con enfoque modular, a nivel urbano.[22]

En este contexto, el presente estudio tiene como objetivo analizar la adherencia al programa de reeducación entre participantes del programa en ocho estados de la República mexicana: Campeche, Querétaro, Tabasco, Veracruz, Colima, Sonora, Yucatán y Zacatecas, durante 2010.

Material y métodos

El presente análisis es parte de un estudio más amplio que se desarrolló en tres etapas. La primera fue el diseño de una intervención reeducativa para hombres y mujeres en relaciones de pareja violentas; la segunda fue la prueba piloto en cuatro estados; la tercera, la implantación a otros cuatro estados más, y la evaluación cuantitativa y cualitativa del proceso. El presente análisis corresponde a la tercera etapa y al análisis cuantitativo, el cual es un diseño transversal analítico en el que se examina la adherencia terapéutica de ambos grupos. Los estados fueron seleccionados por conveniencia según criterios de apoyo y colaboración establecidos por la responsable nacional del Programa de Atención a la Violencia Familiar, del Centro Nacional de Equidad de Género y Salud Reproductiva de la Secretaría de Salud, institución responsable de la implantación del programa a nivel nacional.*

La primera etapa consistió en la selección de los facilitadores y facilitadoras de cada entidad federativa, además de una responsable estatal del programa, la cual fue entrenada para operar y supervisar ambos programas.‡ En la segunda etapa se llevó a cabo una capacitación teórica-vivencial con duración de 50 horas. En la tercera etapa, cada equipo estatal hizo una amplia convocatoria a participar en los programas; se utilizaron varios medios de difusión disponibles a nivel local (radio, tv, folletos, promotoras de salud y otras instituciones gubernamentales abocadas a la atención de mujeres maltratadas). Por último, se seleccionó a las y los participantes en los programas a través de tamizaje (el cuestionario había sido piloteado y validado con anterioridad), que tuvo como objetivo identificar, con base en los criterios de inclusión establecidos, a las personas a quienes va dirigido el programa; en el caso de mujeres, que no estuvieran viviendo violencia severa

* La Secretaría de Salud Federal, a través del Centro Nacional de Equidad de Género y Salud Reproductiva, es la responsable de la operación del Programa, el cual ha sido implantado por etapas desde 2009. De entonces a la fecha, todos los estados del país que se han incorporado operan el Programa con recursos financieros etiquetados a nivel federal, con lo que se ofrecen servicios de reeducación a mujeres y hombres. Desde 2013, todos los estados del país tienen la responsabilidad de operar el programa.

‡ El programa de reeducación partió del supuesto de que la violencia que ejercen las parejas masculinas contra las mujeres no es por trastornos psicopatológicos ni cuestiones biológicas, sino que son actos de control y poder, para lo cual se tomó esta definición de violencia: "Cualquier acto u omisión, basada en su género, que les cause daño o sufrimiento psicológico, físico, patrimonial, económico, sexual o la muerte en el ámbito privado como en el público."[21]

§ La educación para la paz representa una forma de resolver los conflictos de una manera pacífica. Se prioriza la igualdad, la equidad, la libertad y la transformación de las personas y las realidades mediante la construcción de capacidades y competencias individuales y grupales. La Terapia de Reencuentro es una metodología cuyo objetivo amplio es construir relaciones de paz, fortaleciendo los procesos de vinculación afectiva con la propia persona y con los demás.[23]

* Por razones de carácter institucional, el programa se llama Estrategias de Reeducación para víctimas y Agresores de Violencia de Pareja. La coordinación está a cargo del Centro Nacional de Equidad de Género y Salud Reproductiva de la Secretaría de Salud y cuenta con fondos propios y está sujeto a evaluaciones anuales.

‡ Se trataba de profesionales en psicología, con experiencia en atención a casos de violencia de pareja y con perspectiva de género; de ser posible, que contaran con experiencia en manejo de técnicas grupales. Cabe señalar que en algunas entidades fue imposible cubrir este perfil, por lo que el equipo revisó los currículos de las y los postulantes, se realizaron entrevistas y se seleccionó a quien tuviera un perfil que se aproximara al establecido.

con su pareja y, en el caso de hombres, que no hubieran ejercido violencia severa en la última semana. Si cumplían con alguna de estas condiciones, se les invitaba a participar voluntariamente en los programas.

Instrumentos

Cuestionario

Una vez que mujeres y hombres aceptaban participar en alguno de los programas, se les aplicó un cuestionario estandarizado que exploraba aspectos sociodemográficos como edad, escolaridad, religión, derechohabiencia, actividad laboral, estado civil, número de parejas con convivencia, tiempo de la última unión, número de hijos e hijas, y personas que viven en el hogar. También incluyó preguntas acerca de la forma en que los participantes se enteraron del programa, sobre la motivación personal y se registró la fecha de inicio de las sesiones.

Diario de campo

Al final de las sesiones el equipo facilitador realizaba un registro etnográfico individual, en el que se anotaban comentarios y observaciones acerca de percepciones vividas durante el desarrollo de la sesión, y número de asistentes (primera vez y subsecuentes). También se llevaba un registro individual para identificar el número de sesiones a las que había acudido cada participante.

Características de los programas

Ambos programas consistieron en sesiones modulares; en el de mujeres eran 25 y en el de hombres, 24. Cada sesión se diseñó a partir de una carta descriptiva que contenía objetivos, temas, materiales y registro de duración. La sesión era coordinada por dos profesionales, uno en el papel de facilitador y otro en el papel de cofacilitador. Esta información se capturó a través de una plataforma informática que concentró la información de cada uno de los estados participantes en el programa.*

Análisis de la información

En primer lugar, se analizó el comportamiento global de los programas en sus dos componentes (hombres agresores y mujeres víctimas). En segundo lugar, el análisis se orientó a caracterizar a los participantes. Para el análisis global se obtuvo la distribución de tamizajes aplicados a los participantes potenciales: aquellos que dieron positivos y aquellos quienes efectivamente asistieron a los programas (al menos a una sesión), todo esto, por entidad federativa. Se describen algunos indicadores del funcionamiento del programa, como proporción de tamizajes positivos (usuarios potenciales del programa entre el total de tamizajes aplicados) y proporción de participantes (participantes reales entre aquellos con tamizaje positivo), por estado, para hombres y mujeres. Los participantes reales se calcularon al incluir en el numerador a las personas que asistieron al menos a una sesión y en el denominador a aquellos que tenían tamizajes positivos (usuarios potenciales del programa).

También se identificó el promedio de asistentes por sexo y por entidad federativa. Para todos los participantes se obtuvieron medidas descriptivas para edad, tiempo de convivencia con la pareja, número de personas que habitaban el hogar y número de hijos e hijas de los participantes. Se obtuvieron medias y desviaciones estándar, y se realizaron pruebas t de Student para identificar diferencias estadísticamente significativas entre los programas de víctimas y agresores.

Para el análisis bivariado y múltiple se construyó una variable dependiente basada en el número de sesiones a las que asistían los participantes: aquéllos que asistieron de 1 a 12 sesiones se clasificaron como nivel de adherencia baja (0) y quienes asistieron 13 o más sesiones se clasificaron como nivel de adherencia media-alta (1). Este punto de corte se basó en el uso del percentil 75, de forma similar a como lo han recomendado y usado autores en investigaciones que han requerido convertir indicadores cuantitativos en cualitativos, como en el presente caso.[24,25]

Se realizó análisis bivariado por escolaridad, religión, estado civil, convivencia, número de uniones y actividad laboral; para identificar diferencias significativas, en ambos casos se emplearon valores $p < 0.05$.

Se realizó un modelo de regresión logística paso a paso o anterógrado, para intentar determinar la posibilidad de adherencia (adherencia baja y media-alta) para cada programa (víctimas y agresores). Las variables independientes incluidas en el modelo para ajustar correspondieron a grupos de edad (menor, 15 a 36 años y 37 o más), escolaridad (0=básica/primaria, 1=intermedia/universitaria), religión (0=católica, 1=otra), estado civil (0=soltero/separado, 1=casado/unión libre) y actividad laboral (0=hogar/desempleado, 1=empleado/ estudiante).

Consideraciones éticas. La presente investigación fue aprobada por los comités de ética e investigación del

* La plataforma se diseñó en 2010, con el objetivo que fuera una herramienta que permitiera realizar el registro de los participantes, facilitar la evaluación de procesos y resultados de cada uno de los Programas. Se tiene evidencias de su uso activo para los años 2010 y 2011. Se encuentra alojada dentro de la plataforma y servidor del INSP.

Instituto Nacional de Salud Pública de México y por las autoridades sanitarias de cada entidad federativa.

Resultados

Durante 2010 se aplicaron 5 539 tamizajes, de los cuales 88.3% (n=4 891) resultó positivo; de este volumen, 85% aceptó participar (n=4 151), pero al final sólo 75% de los potenciales participantes (con tamizajes positivos) asistió al menos a una sesión (n=3 699); ésta es la muestra para el presente estudio. Se obtuvo registro por entidad federativa de la distribución de tamizajes aplicados, del volumen de quienes resultaron positivos, de quienes aceptaron participar y de quienes efectivamente acudieron a las sesiones de los programas.

Los estados donde hubo mayor participación de mujeres fueron Yucatán (72.2%) y Sonora (71.8%). Zacatecas fue el estado donde la participación de hombres (45.0%) y mujeres (55.0%) fue similar (figura 1).

En la figura 1 se observa la positividad porcentual de tamizajes aplicados por estados y por programa, donde Sonora (98.3%) y Yucatán (99.6%) tuvieron proporciones de positividad superiores a 97%, tanto a nivel general como por programas. En cambio, Querétaro tuvo proporciones globales cercanas a 75%, e inferiores a 70% en el programa para mujeres.

En la figura 2 se observa la proporción de asistentes entre usuarios potenciales, el cual se construyó al incluir en el numerador a las personas que asistieron al menos a una sesión de los programas y en el denominador a aquéllas que tenían pruebas de tamizajes positivos; Yucatán (95.2%) y Sonora (86.2%) tuvieron los porcentajes más altos, mientras Querétaro (70.0%) y Campeche (51.4%) los más bajos.

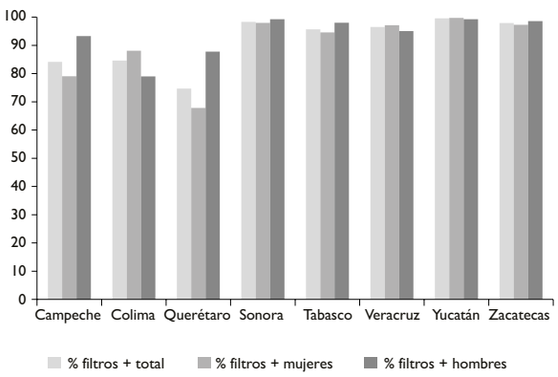


Figura 1. Positividad porcentual de tamizajes aplicados por estados y programas para mujeres y hombres inmersos en relaciones de pareja violentas. México, 2010

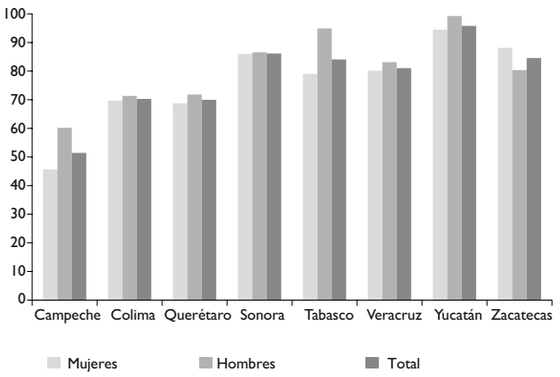


Figura 2. Porcentaje de asistentes entre usuarios potenciales por estados y programas para mujeres y hombres inmersos en relaciones de pareja violentas. México, 2010

En cuanto al promedio de asistentes a los diferentes programas, se observó que para el de mujeres Colima tuvo el promedio de asistencia más alto (8.9), seguido de Campeche (8.6); aquéllos con los promedios de asistencia más bajos fueron Querétaro (4.6) y Yucatán (5.7). En el programa de hombres, los promedios de asistentes más altos fueron en Colima (7.2) y Veracruz (6.6), y los promedios más bajos fueron en Zacatecas (3.7) y Querétaro (3.3).

Respecto a la proporción de participantes por grupos de sesiones, se obtuvo que el mayor porcentaje de personas fue de aquéllas que asistieron de entre 1 a 12 sesiones (78.5%); aquéllas que participaron en 13 o más sesiones fueron 21.5% del total. Estos resultados sirvieron para generar el punto de corte de la variable dependiente: nivel de adherencia. Se observó que en las primeras sesiones los hombres tuvieron mayor participación respecto de las mujeres, situación que se invirtió en las sesiones finales. La proporción de mujeres participantes fue mayor respecto de los hombres ($p<0.05$).

El cuadro I muestra algunas características de los participantes. Hubo diferencias significativas en el promedio de edad por programas, el cual es mayor en mujeres respecto de hombres (P<0.05). En el cuadro II se observa el análisis bivariado por programas, en el cual se analizó el nivel de adherencia (baja, media-alta) con algunas características de los participantes (escolaridad, religión, estado civil, convivencia, número de veces de unión, actividad laboral).

Cuadro I
CARACTERÍSTICAS DE LOS PARTICIPANTES EN LOS PROGRAMAS DE REEDUCACIÓN

Características/Participantes	*Agresores*	*X*	*Víctimas*	*X*	*Valor P*
Edad (años)	1352	35.4	2347	38.0	0.0001
Tiempo de convivencia (años)	763	2.1	1625	2.4	0.06
Número de personas	1339	4.5	2346	4.6	0.22
Total hijos	1298	0.8	2345	1.1	0.0001
Total hijas	1297	0.66	2346	0.95	0.0001

X: Valores promedio

CuadroII
ADHERENCIA A LOS PROGRAMAS DE REEDUCACIÓN SEGÚN CARACTERÍSTICAS SOCIODEMOGRÁFICAS DE LOS PARTICIPANTES

Características/ Participantes	*Víctimas*				*Valor P*	*Agresores*				*Valor P*
Adherencia	*Baja*		*Media/alta*			*Baja*		*Media/alta*		
Escolaridad		%	*n*	%		*n*	%	*n*	%	
Sin escolaridad	169	9.5	44	7.65		144	12.73	33	14.93	
Primaria/secundaria	602	33.97	251	43.65		309	27.32	54	24.25	
Preparatoria/normal	784	44.24	216	37.57		596	52.70	122	55.2	
Universitaria	217	12.25	64	11.13	0.0001	82	7.25	12	5.43	0.502
Religión										
Católica	1,464	82.62	441	76.7		841	74.36	150	67.87	
Otra religión	308	17.38	134	23.3	0.002	290	25.64	71	32.13	0.046
Estado Civil										
Soltero/separado	1,186	66.97	438	76.31		638	59.07	127	57.73	
Casado/Unión libre	585	33.03	136	23.69	0.0001	442	40.93	93	42.27	0.711
Convivencia										
Viven juntos	1,049	88.37	399	91.1		570	89.34	117	92.13	
Esporádicamente	138	11.63	39	8.9	0.118	68	10.66	10	7.87	0.334
Veces de casado										
Una vez	1,006	84.75	375	85.62		538	84.33	106	83.46	
Dos o más veces	181	15.25	63	14.38	0.665	100	15.67	21	16.54	0.808
Actividad laboral										
Hogar/desempleado	823	46.44	239	41.57		942	83.29	179	81.0	
Empleado/estudiante	949	53.56	336	58.43	0.041	189	16.71	42	19.0	0.407

Respecto a los motivos por los que las personas participaban en los diferentes programas, la mayoría de las mujeres dijeron querer mejorar las relaciones familiares; 15% reportó que vivía situaciones de violencia y una proporción similar reportó que necesitaban con quién platicar; al menos 2% refirió que deseaba separarse de su pareja. El principal motivo reportado por los hombres fue querer mejorar las relaciones familiares;

12% reconoció que quería dejar de ejercer violencia, es decir, identificaba esta situación como un problema al interior de su hogar. Al menos 5% reportó que asistía por obligación a participar de parte de jefes, superiores o directores de establecimientos, quienes los enviaban al programa de reeducación a agresores (figura 3).

En el cuadro III se presentan los resultados de los modelos de regresión logística. Se pretendió identificar la posibilidad de participación y adherencia en alguno de los programas de reeducación, ajustado por estado civil, escolaridad, actividad laboral, religión y edad agrupada. Se excluyeron de estos modelos las variables convivencia, número de veces de unión y número de hijos, dado que tanto en el análisis bivariado como en el multivariado no se generaron resultados estadísticamente significativos (p>0.2).

En el programa de mujeres se encontraron diferencias significativas con estado civil, religión y grupos de edad (p<0.05); para el primer caso, la posibilidad de participación de las mujeres solteras o separadas fue 1.54 veces más baja respecto a las casadas o en unión libre; también la posibilidad de participación fue 1.44 veces más alta en aquellas mujeres practicantes de una religión diferente a la católica respecto de aquellas que se declaraban católicas; finalmente, la posibilidad de participación fue casi dos veces más alta en las mujeres de 37 o más años respecto de aquéllas de entre 15 a 36. No hubo diferencias por nivel de escolaridad o actividad laboral (p>0.05).

En el programa de hombres se encontraron diferencias significativas con religión y grupos de edad (p<0.05); en cuanto a religión, la posibilidad de participación de hombres no católicos fue cerca de 1.5 veces más alta respecto de los católicos; también la posibilidad de participación fue 1.47 veces más alta en hombres de 37 o más años respecto de aquellos entre 15 a 36 años. No existieron diferencias estadísticamente significativas por estado civil, escolaridad o antecedentes laborales (p>0.05).

Discusión

A nivel mundial existen iniciativas documentadas donde se han incorporado intervenciones psicoterapéuticas para detectar procesos de adherencia a los servicios que éstas brindan; algunos ejemplos se observan en estudios para controlar y prevenir las adicciones o desordenes de abuso de sustancias psicoactivas, tanto en población adulta como en adolescentes.[26-28] No obstante, son escasos los estudios que evalúan la adherencia a programas de atención, control o prevención de la violencia de pareja.

Por lo anterior, es necesario resaltar la relevancia de contar por primera vez con la evaluación de un pro-

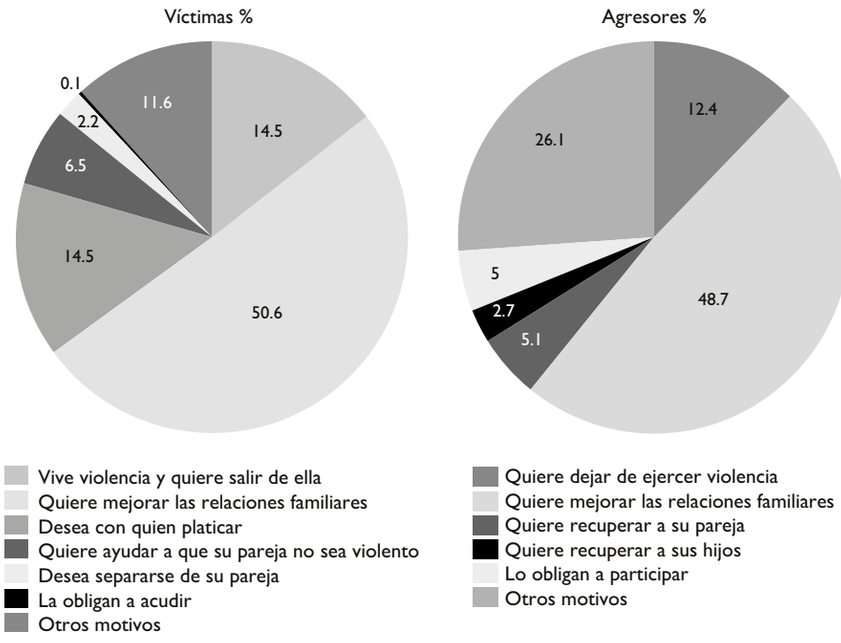


FIGURA 3. MOTIVACIONES PARA PARTICIPAR EN LOS PROGRAMAS DE REEDUCACIÓN PARA MUJERES Y HOMBRES INMERSOS EN RELACIONES DE PAREJA VIOLENTAS. MÉXICO, 2010

Cuadro III
Adherencia en los programas de reeducación para víctimas y agresores. México, 2010

	Victimas (n = 2 345)				*Agresores (n = 1300)*			
	OR	*ES*	*P*	*IC95%*	*OR*	*ES*	*P*	*IC95%*
Estado civil								
Casado/Unión libre	1				1			
Soltero/Separado	0.65	0.075	0.000	0.522 - 0.820	1.04	0.167	0.79	0.76 - 1.43
Escolaridad								
Básica/Primaria	1				1			
Preparatoria/Universidad	0.83	0.084	0.079	0.69 - 1.021	1.02	0.159	0.87	0.76 - 1.39
Actividad laboral								
Empleado/Estudiante	1				1			
Hogar/discapacitado	1.04	0.106	0.687	0.85 – 1.272	1.41	0.284	0.085	0.95 - 2.09
Religión								
Católica	1				1			
Otras	1.44	0.171	0.002	1.14 - 1.82	1.50	0.252	0.015	1.08 - 2.09
Grupo de edad								
15 a 36	1				1			
37 o más	1.96	0.199	0.000	1.60 - 2.39	1.47	0.229	0.013	1.09 - 1.99

OR: odds ratio o razón de momios. ES: error estándar P: valor P. IC95%: intervalo de confianza al 95%

grama gubernamental de atención a mujeres y hombres inmersos en relaciones de violencia en México, ya que si bien se han implementado diversas intervenciones en nuestro país desde hace tres décadas, hasta el momento no se han realizado evaluaciones sistemáticas que permitan conocer más sobre la respuesta de la población beneficiaria de los servicios gubernamentales, los cuales son financiados con recursos federales.

La evaluación de la adherencia de hombres y mujeres a un programa de reeducación ofrece la oportunidad de conocer, por un lado, a quienes participan y se mantienen en el programa y, por el otro, a quienes lo abandonan, lo cual permitirá focalizar más los esfuerzos en ambos grupos para lograr mayor penetración del programa, que actualmente tiene presencia nacional.

En relación con la adherencia entre mujeres y hombres, es necesario resaltar dos variables que favorecen la adherencia media-alta al programa de reeducación: una de ellas fue la religión, en relación con que las y los participantes que reportaron tener una religión diferente a la católica. Estos resultados refuerzan lo que se ha documentado sobre las dificultades a las que se enfrentan los practicantes de la religión católica, la cual, en algunas ocasiones, promueve valores discriminatorios contra la mujer, refuerza la desigualdad entre hombres y mujeres, y es una promotora activa de la unión familiar por encima de los derechos humanos de las mujeres y de los menores. En este estudio, adscribirse a la religión católica fue un obstáculo para que mujeres y hombres participen en programas que motivan el cese de la violencia de pareja.[29]

A pesar de los pocos estudios que exploran la relación entre violencia contra la mujer y religión, algunas autoras sugieren que las comunidades religiosas pueden ser un apoyo importante para las mujeres que sufren violencia, siempre y cuando promuevan la equidad entre los géneros y un sentido más amplio de la espiritualidad.[30,31]

Una variable que favoreció la adherencia media-alta tanto para mujeres como para hombres fue ser mayor de 37 años en relación con la población más joven, lo cual puede interpretarse en dos sentidos: por un lado, muestra una mayor disposición al cambio de la población que ha estado expuesta más tiempo a la violencia de pareja, ya sea como víctima o agresor, y su necesidad de resolver la situación; pero, por otro lado, se plantea el desafío de diseñar programas más atractivos para la población joven, o bien, que los programas se dirijan tanto a la mujer como a su pareja, ya que, como señala

Straus MA, proporcionar servicios tanto a mujeres como a sus parejas puede contribuir en una mayor eficacia de los programas.[32]

Este estudio tiene varias limitantes. No identifica variables predictoras de rechazo, abandono o fracaso terapéutico como lo planteó Echeberúa;[33] tampoco permite determinar la prevalencia de recaídas de estos eventos en la población intervenida. No incluyó de forma específica otras variables/conductas, como lo señala Zaldívar,[34] para evaluar la adherencia terapéutica. Finalmente, las técnicas de selección de los participantes y de autoexclusión de algunas personas aptas para participar (que cumplían los criterios de inclusión) podrían generar un potencial sesgo de selección. Para subsanar las potenciales limitantes anteriores se sugiere diseñar e implementar estudios observacionales con diseños longitudinales prospectivos que permitan detectar cambios de comportamiento o mantenimiento de conductas en el mediano o largo plazo.

Agradecimientos

En primer lugar, a todas las mujeres y hombres que participaron en el Programa de Reeducación en su etapa inicial, pues gracias a su participación y respuesta hoy es una Estrategia para la Reeducación que opera a nivel nacional. A todo el personal de los estados participantes en esta primera etapa, por su entusiasmo y confianza en el equipo responsable que estuvo a cargo de esta iniciativa. Al Centro Nacional de Equidad de Género y Salud Reproductiva, con quien se mantuvo una estrecha y crítica relación; y a la LXII Legislatura del H. Congreso de la Unión, especialmente a la Comisión de Equidad de Género de la Cámara de Diputados, quien financió durante tres años este proceso.

Declaración de conflicto de intereses. Los autores declararon no tener conflicto de intereses.

Referencias

1. Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. Geneva: World Health Organization, 2002.
2. Valdez-Santiago R, Ruiz-Rodríguez M. Violencia doméstica contra las mujeres: ¿cuándo y cómo surge como problema de salud pública? Salud Publica Mex 2009;51:505-511.
3. Heise L. What Works to Prevent Partner Violence? An Evidence Overview. Centre for Gender Violence and Health. London UK: London School of Hygiene and Tropical Medicine, 2011
4. Wathen CN, MacMillan HL. Intervention for violence against women: scientific review. J Am Med Assoc 2003;289(5):589-600.
5. Carrasco-Portiño M, Vives-Cases C, Gil-González D, Álvarez-Dardet C. ¿Qué sabemos sobre los hombres que maltratan a su pareja? Una revisión sistemática. Rev Panam Salud Publica 2007;22(1):55-63.
6. Whitaker DJ, Baker CK, Arias I. Interventions to prevent intimate partner violence. In: Doll LS, Bonzo SE, Sleet DA, Mercy JA, eds. Handbook of injury and violence prevention. New York: Springer, 2006:203-221.
7. Valdez-Santiago R. Del silencio privado a las agendas públicas el devenir de la lucha contra la violencia doméstica en México. En: Torres M, comp. Violencia contra las mujeres en contextos urbanos y rurales. México: El Colegio de México, 2004:417-447.
8. Híjar M, Valdez-Santiago R. Programa de intervención con mujeres víctimas de violencia de pareja y con agresores: experiencia internacional y mexicana. Cuernavaca: Instituto Nacional de Salud Pública, 2009.
9. Garda R. Caminando Hacia la Equidad: Aprendizajes de la Intervención con hombres que ejercen violencia en México, 2001 [consultado el 22 de junio de 2015]. Disponible en: http://caminandohacialaequidad.blogspot.mx/
10. Mojarro M, Valdez-Santiago R, Pérez-Nuñez R, Salinas A. «No More! Women Reporting Intimate Partner Violence in Mexico. J Fam Violence 2014;29(5):527-537.
11. Echeburúa E. Adherencia al tratamiento en hombres maltratadores contra la pareja en un entorno comunitario: realidad actual y retos de futuro. Psychosocial Intervention 2013;22(2):87-93.
12. Jubb N, Camacho G, DÁngelo A, Hernández K, Macassi I, Melendez L, et al. Comisarías de la mujer en América Latina. Una puerta para detener la violencia y acceder a la justicia. Quito-Ecuador: CEPLAES- Centro de Planificación y Estudios Sociales, 2010.
13. Subirana-Malaret M, Andrés-Pueyo A. Retención proactiva y adherencia terapéutica en programas formativos para hombres maltratadores de la pareja. Psychosocial Intervention 2013;22:95-104.
14. Echeburúa E, Fernández-Montalvo J. Evaluación de un programa de tratamiento en prisión de hombres condenados por violencia grave contra la pareja. Int J Clin Health Psychol 2009;9(1):5-20.
15. Pérez-Ramírez M, Giménez-Salinas A, Framís A, Espinosa MJ. Evaluación de la eficacia del programa de tratamiento con agresores de pareja (PRIA) en la comunidad. Psychosocial Intervention 2013;22:105-114.
16. Carbajosa P, Boira S. Estado actual y retos futuros de los programas para hombres condenados por violencia de género en España. Psychosocial Intervention 2013;22:145-152.
17. Gondolf EW. Evaluating batterer counseling programs: A difficult task showing some effects and implications. Aggress Violent Behav 2004;9:605-631.
18. Eckhardt CI, Murphy CM, Whitaker DJ, Sprunger J, Dykstra R, Woodard K. The effectiveness of intervention programs for perpetrators and victims of intimate partner violence. Partner abuse 2013;4(2):196-226.
19. Whitaker DJ, Murphy CM, Eckhardt CI, Hodges AE, Cowart M. Effectiveness of primary prevention efforts for intimate partner violence. Partner abuse 2013:4(2):175-195.
20. Arias E, Arce R, Vilariño M. Batter intervention programs: A meta-analytic review of effectiveness. Psychosocial intervention 2013;22:153-160.
21. Ley General de Acceso de las Mujeres a una Vida Libre de Violencia. México: Diario Oficial de la Federación, 2013.
22. Híjar M, Valdez-Santiago R (eds). Programa de Re-educación para víctimas y agresores de violencia de pareja. Manual para responsables de programa. Cuernavaca: Instituto Nacional de Salud Pública, 2010.
23. Valdez-Santiago R, Vargas-Urías Mauro A, González-Focke M. Bases conceptuales del Programa de Re-educación para agresores de violencia de pareja. En: Ramírez JC, Cervantes-Ríos JC(coord). Los hombres en México. Veredas recorridas y por andar. Guadalajara: Universidad de Guadalajara, CUCEA-AMEGH, 2013:111-132.
24. Kaufer-Horwitz M, Toussaint G. Indicadores antropométricos para evaluar sobrepeso y obesidad en pediatría. Bol Med Hosp Infant Mex 2008;65(56):502-518.
25. Molinero L. Elección de los puntos de corte para convertir una variable cuantitativa en cualitativa. Madrid, España: Sociedad Española de la Hipertensión, 2003.

26. Carroll K, Nich C, Sifry R, Nuro R, Frankforter T, Ball S, *et al.* A general system for evaluating therapist adherence and competence in psychotherapy research in the addictions. Drug Alcohol Depend 2000;57(3):225-238.
27.Hogue A, Dauber S, Stambaugh LF, Cecero JJ, Liddle HA. Early therapeutic alliance and treatment outcome in individual and family therapy for adolescent behavior problems. J Consult Clin Psychol 2006;74:121-129.
28. Hogue A, Henderson C, Dauber S, Barajas P, Fried A, Liddle H. Treatment adherence, competence, and outcome in individual and family therapy for adolescent behavior problems. J Consult Clin Psychol 2008;76(4):544-555.
29. Morales R, Serrano-García J, Miranda-Garcia D. Discriminación de género y cultura. Obstáculos estucturales para la atención de los derechos humanos de las mujeres. Psicología Nueva Época 2013;2(4):51-62.
30. Ospina-Muñoz D, Jaramillo-Vélez D, Cabarcas I, Humphreys JR. Espiritualidad, aflicción y tácticas de resolución de conflictos en mujeres maltratadas. Salud Pública 2005;7(3):281-292.
31. López J. Violencia doméstica y religión: implicaciones en la consejería. Cuadernos de Investigación en la Educación 2007;22:77-106.
32. Straus Murray A. Addressing Violence by female partners is vital to prevent or stop violence against women: Evidence from the multisite batterer intervention evaluation. Violence Against Women 2014;20(7):889-899.
33. Echeburúa E, Sarasua B, Zubizarreta I. Variables predictoras del rechazo, abandono y fracaso terapéutico en hombres violentos contra su pareja tratados psicológicamente en un marco comunitario. Int J Clin Health Psychol 2010;10(3):403-420.
34. Zaldívar D. Adherencia terapéutica y modelos explicativos. Salud para la vida. 2003 [consultado el 4 abril de 2013]. Disponible en: www.info - med.sld.cu

REVISÃO REVIEW 911

El estado de las lesiones causadas por el tránsito en México: evidencias para fortalecer la estrategia mexicana de seguridad vial

Road traffic injuries in Mexico: evidences to strengthen the Mexican road safety strategy

Lesões por acidentes de trânsito no México: evidências para fortalecer a estratégia de segurança rodoviária mexicana

Ricardo Pérez-Núñez [1]
Martha Híjar [1,2]
Alfredo Celis [3]
Elisa Hidalgo-Solórzano [1]

[1] *Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública, Cuernavaca, México.*
[2] *Fundación Entornos A.C., Cuernavaca, México.*
[3] *Centro Universitario de Ciencias de la Salud, Universidad de Guadalajara,Guadalajara, México.*

Correspondencia
R. Pérez-Núñez
Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública. Universidad No. 655, Col. Santa María Ahuacatitlán, Cerrada, Cuernavaca / Morelos – 62100, México.
ricardo.perez@insp.mx

Abstract

Based on a review of secondary data and the scientific literature and an analysis of the ENSANut-2012 database, the current study provides a comprehensive overview of the current burden of road traffic injuries (RTI) in Mexico and analyzes the country's social response to RTI. The high collision, injury, mortality, and disability rates associated with this public health problem represent a high cost for Mexican society, especially for families. The paper argues that the Mexican response has focused on vehicle occupants while overlooking vulnerable road users and has prioritized strategies with limited effectiveness. Although the country's existing legislation addresses the main risk factors, enforcement has been limited. Finally, the paper makes some recommendations for strengthening the Mexican strategy to prevent RTI, such as safe, equitable, healthy, and sustainable mobility for all types of road users. Despite some strides in RTI prevention, there are still challenges and opportunities to be addressed in the future.

Traffic Accidents; Health Public Policy; Health Surveys

Resumen

Mediante la revisión de información secundaria oficial, publicaciones científicas y el análisis de la ENSANut-2012, este trabajo busca proveer una visión integral de la magnitud actual de las lesiones causadas por el tránsito (LCT) en México y analizar críticamente la respuesta social organizada. Las altas tasas de choques, lesiones, muertes y discapacidad atribuidas a este problema de salud pública, representan un elevado costo para la sociedad mexicana, en especial para los hogares. Se discute cómo la respuesta mexicana se ha enfocado a los automovilistas, dejando fuera a usuarios vulnerables de la vía pública y se ha privilegiado la implementación de estrategias poco efectivas. A pesar de que se dispone de legislación para los principales factores de riesgo, se ha descuidado su correcta aplicación. La estrategia mexicana podría fortalecerse implementando estrategias de movilidad seguras, equitativas, saludables y sostenibles para los diferentes actores de la vía pública. A pesar de los avances que se han dado en términos de prevención de LCT, existen aún retos y oportunidades para el país.

Accidentes de Tránsito; Políticas Públicas de Salud; Encuestas Epidemiológicas

http://dx.doi.org/10.1590/0102-311X00026113

Pérez-Núñez R, Híjar M, Celis A, Hidalgo-Solórzano E. El estado de las lesiones causadas por el tránsito en México: evidencias para fortalecer la estrategia mexicana de seguridad vial. Cad Saude Publica. 2014;30(5):911-925. https://doi.org/10.1590/0102-311X00026113

Introducción

El reciente estudio de la carga de la enfermedad muestra cómo de 1990 a 2010 las lesiones causadas por el tránsito (LCT) en el mundo se incrementaron un 46,3% para llegar a 1,3 millones de muertes por año. Esto implicó un incremento en la tasa de mortalidad de 6,2%, pasando de 18,4 a 19,5 por 100 mil habitantes. Este incremento fue mayor en peatones (62,3% en las muertes y 17,6% en la tasa), motociclistas (56,7% en muertes y 14,4% en la tasa) y ciclistas (51,7% muertes, 7,8% en la tasa de mortalidad). Así de ser la décima causa de muerte en 1990 pasó a ser la octava en 2010 [1]. Estimaciones de la Organización Mundial de la Salud (OMS) proyectan que de seguir la tendencia actual, se constituirá como la quinta causa de muerte en 2030 [2].

Las LCT son un fenómeno complejo y de causas múltiples [3]. La OMS ha puesto gran énfasis en cinco factores de riesgo sobre los cuales considera es imperativo trabajar, en aras de lograr la seguridad vial: consumo de alcohol y conducción, no uso de cinturón de seguridad y sistemas de retención infantil (SRI), no uso de casco en motociclistas y velocidad inadecuada [4]. Hay, sin embargo, otros factores de riesgo que han recibido poca atención.

Pocas evidencias han sido publicadas en México que analicen desde una perspectiva integral el problema de las LCT. Conscientes de que un enfoque, basado en evidencias, para la prevención y atención de las lesiones puede y debe adoptarse [5], el objetivo del presente estudio fue utilizar las evidencias disponibles para hacer un diagnóstico de la situación actual de las LCT en el país y analizar la respuesta social a este problema. A partir de este diagnóstico, se establecen recomendaciones de política pública orientadas a reforzar la estrategia mexicana de seguridad vial. Consideramos que el análisis del caso mexicano podría servir de insumo para la reflexión y discusión de investigadores y tomadores de decisiones en otros contextos.

Metodología

Mediante una revisión narrativa, se analiza tanto información primaria como secundaria. La información primaria proviene de la *Encuesta Nacional de Salud y Nutrición 2012* (ENSANut-2012) que es representativa para el ámbito nacional y estatal y constituye la información a escala nacional más reciente en el tema. Detalles sobre su diseño han sido publicados previamente [6,7]. Algunos resultados aquí presentados se publicaron en una ficha técnica como estrategia de difusión rápida [8]. De igual manera, se analizó información secundaria proveniente de tres tipos de fuentes:

- Sistemas de información oficiales disponibles para el ámbito nacional sobre: mortalidad, egresos hospitalarios, adicciones, urgencias y servicio médico-forense;
- Documentos oficiales de las dependencias públicas encargadas de dar respuesta al problema de las LCT;
- Artículos publicados en MEDLINE/PubMed, publicados de 1990 a enero de 2013, que reportan información sobre la epidemiología de las LCT en México, sus determinantes y consecuencias asociadas; intervenciones, programas, políticas y respuesta social organizada a este problema de salud pública. Esta revisión fue realizada por dos investigadores de forma independiente y luego se reunieron para integrar ambos abordajes. Se identificaron inicialmente 93 publicaciones, 37 (40%) fueron eliminadas por no coincidir con los objetivos de este estudio (temas distintos a las LCT, realizados en otro país, trabajos clínicos o biomédicos). De los 56 seleccionados, se eliminaron 9 artículos de revisión, comentarios, reporte de casos y editoriales –a partir de la revisión del resumen– y 15 tras leer el trabajo completo y observar que no aportaban información adicional. Cuando formaban parte del mismo estudio o abordaban el mismo tema se incluyó sólo el más reciente. Finalmente, se incluyeron 32 publicaciones de relevancia para este estudio.

El análisis se contextualizó a la luz de la evidencia internacional.

Resultados

Primero se presenta el análisis sobre la epidemiología de las LCT en México, a continuación se aborda la exposición a los principales factores de riesgo documentados; posteriormente, se analizan las consecuencias económicas y sociales documentadas; finalmente se presenta la respuesta social al problema de las LCT.

Epidemiología de las LCT en México

De 1999 a 2010 fallecieron casi 185 mil personas por LCT. De 1999 a 2009 la tasa de mortalidad presentó un incremento de 1,5% por año [9] hasta llegar a una tasa de 16,6 por 100 mil habitantes lo que implica que, en ese año, 17.851 personas perdieron la vida por esta causa. Para 2010 el número de muertos se redujo 7% para un total de 16.595 y una tasa de 15,3 por 100 mil habitantes (Dirección de Información en Salud, Secretaría de Salud. *Sistema Nacional de Información en Salud*. http://www.sinais.salud.gob.mx/estadis

ticasportema.html, accedido el 17/May/2012). Sin embargo, estas altas cifras podrían estar subestimadas en alrededor de un 30%, si se considera el número de personas cuya causa de muerte no es bien registrada o es clasificada en códigos inespecíficos [9,10,11].

Las LCT constituyen la séptima posición entre las causas de mortalidad específica en México. De igual forma, representan la primera causa de muerte en el grupo de 5-15 años y la cuarta causa de muerte en población de 15-64 años de edad. En los hombres, las muertes en eventos de tránsito ocupan el quinto lugar (Dirección de Información en Salud, Secretaría de Salud. *Sistema Nacional de Información en Salud*. http://www.sinais.salud.gob.mx/estadisticasportema.html, accedido el 17/May/2012). Cerca del 65% de estas muertes ocurren entre los 20 y 59 años de edad. Sin embargo, el grupo de edad con la mayor tasa de mortalidad es el de las personas de 60 y más años (~40 por cada 100 mil personas de 60 y más) [9,11]. Las LCT son el tipo de lesiones no intencionales que generan el mayor número de víctimas mortales [12] y son las de mayor gravedad [13,14].

Entre los usuarios de la vía pública que más fallecen por esta causa se encuentran los peatones que representan entre 45-48% del total, y los ocupantes de vehículo automotor con un 37-48%. Es de resaltar que la tasa de mortalidad de motociclistas se incrementó un 332,2% entre 1999 y 2009 [9,11]. En este mismo periodo el número de motocicletas en México aumentó un 312% para llegar a una tasa de 1.114 motocicletas por 100 mil habitantes (Instituto Nacional de Estadística y Geografía. *Estadística de Vehículos de Motor Registrados en Circulación. Anual, 1999-2009*. http://www.inegi.org.mx/sistemas/olap/proyectos/bd/consulta.asp?p=14745&c=23717&s=est&cl=4, accedido el 15/Ene/2013). Es posible que en el futuro los motociclistas se conviertan en un grupo de mayor peso relativo en términos de morbi-mortalidad. De ahí que la OMS ha llamado la atención sobre las necesidades particulares de los usuarios de la vía pública más vulnerables: peatones, ciclistas, motociclistas; pues representan en el ámbito mundial 50% de todas las personas que fallecen por el tránsito en el mundo. En México, cerca de 60% de los fallecidos podrían pertenecer a estos usuarios vulnerables [9].

El problema de las LCT no sólo lo constituye el alto número de personas que fallecen por esta causa. Para 2006, prácticamente 1,03 millones de personas reportaron haber sufrido LCT [15]. Esto implica, que alrededor de 65 personas se lesionaron durante 2006 por cada persona que fallece. Datos de la ENSANut-2012, muestran que el número de personas que reportaron haber sufrido LCT ascendió a 1,4 millones para 2012 [7]. El incremento fue más evidente en hombres quienes tuvieron una prevalencia de un 1,6%, mayor a la reportada en 2006 y 2000 de un 1,3% y un 1,2%, respectivamente. Los hombres entre 20-34 años presentaron la mayor prevalencia.

Hasta antes de la ENSANut-2012 poco se sabía sobre la prevalencia de LCT no-fatales, según tipo de usuario. Del total de LCT, un 47% fueron usuarios vulnerables: un 23% motociclistas, un 13% peatones y 12% ciclistas. Es importante mencionar que los atropellamientos fueron el tipo de LCT más prevalente en adultos mayores (37%) y en menores de 9 años (38%).

A partir de la ENSANut-2012 se estimó que 320.496 personas fueron hospitalizadas por LCT durante el año previo a la encuesta, 7,2% del total de hospitalizaciones –cifra mayor a los 71-77 mil egresos estimados previamente [16]. En promedio, cada lesionado dura entre 5 y 6 días hospitalizado [17], pierde 26 días [18] y 43% de los lesionados tarda en promedio un año para reincorporarse a su actividad laboral [15]. Además, 382.113 personas utilizaron los servicios ambulatorios durante los 15 días previos a la encuesta, presumiblemente por LCT, constituyendo el 4,1% del total de usuarios [7].

Exposición a los principales factores de riesgo

A continuación se presenta la evidencia documentada para el contexto nacional sobre algunos de los principales factores de riesgo (la Figura 1 hace un recuento de la evidencia internacional).

- **Alcohol**

En cuanto a la prevalencia de uso de alcohol y conducción, alrededor de un 20% de los conductores a quienes se les realizó una alcoholimetría dieron positivo, 3% estuvieron por arriba de los límites permitidos [19]. También el alcohol está presente en los eventos de tránsito: 10% de los conductores responsables de choques registrados en vías urbanas y suburbanas de 1999 a 2010 fue reportado con aliento alcohólico (Instituto Nacional de Estadística y Geografía. *Accidentes de Tránsito Terrestre en Zonas Urbanas y Suburbanas (ATUS). Anual, 1999-2012*. http://www.inegi.org.mx/sistemas/olap/proyectos/bd/consulta.asp?p=14744&c=23705&s=est&cl=4, accedido el 15/Nov./2013). Esta proporción disminuyó de 13,7% en 1999 a 7,8% durante 2010. Alrededor de un 1,6% de los eventos de tránsito reportados en carreteras federales fueron causados por estado de ebriedad del conductor [20].

Figura 1

¿Qué sabemos de...

...la conducción bajo la influencia del alcohol?

- Las concentraciones de alcohol en sangre por encima de 0,04g/dL incrementan el riesgo de que un conductor se vea involucrado en un siniestro vial [4].

...del uso de dispositivos de retención?

- Existen evidencias que muestran que los cinturones de seguridad reducen en un 40-50% el riesgo de fallecer tras una colisión para los pasajeros de adelante y un 25-75% para los de atrás [75,76];
- Los sistemas de retención infantil, cuando son instalados, y utilizados de forma correcta, pueden reducir las muertes de tránsito en un 70% en menores de un año y en 54-80% en menores de 1-4 años [77].

...del uso de casco?

- Los cascos reducen en un 69% las lesiones de cabeza en motociclistas que colisionan y la muerte en un 42% [78] y sufren menos lesión cervical que aquéllos que no lo utilizan [79];
- El uso de casco reduce el riesgo de traumatismos craneoencefálicos en ciclistas entre un 63% y 88% [4];
- Utilizar un casco no certificado está asociado a una mayor prevalencia y severidad de lesiones de cráneo cuando se compara con personas que usan casco certificado e incluso con aquéllas que no utilizan casco [80].

...de la velocidad excesiva o inadecuada?

- A mayor velocidad aumenta la probabilidad de ocurrencia de colisiones, así como la severidad de las lesiones causadas por este tipo de eventos [4];
- La reducción de los límites de velocidad reduce la frecuencia y severidad de las lesiones de tránsito en usuarios vulnerables como peatones, ciclistas y motociclistas [32,64].

...del uso de celular?

- Diversos estudios han revelado que el uso de telefonía móvil al conducir incrementa el riesgo de choques hasta en cuatro veces [81] y que el riesgo no disminuye con el uso de "dispositivos de manos libres" [81,82];
- En Estados Unidos se ha documentado que las muertes causadas por este y otro tipo de distracciones al conducir ha incrementado un 28% de 2005 a 2008, pasando de 4.572 a 5.870 [83];
- También se ha documentado cómo el uso de celular al deambular afecta la seguridad de los peatones [84].

...del diseño de la estructura vial y del medio ambiente?

- La creación y modificaciones de la estructura vial tienen consecuencias directas sobre la salud de la población [32];
- Una estrategia efectiva para lograr una movilidad segura es la correcta separación de espacios entre los diferentes usuarios de la vía pública [85];
- Algunos factores ambientales identificados como de riesgo para el atropellamiento en niños son: el volumen vehicular, el número de vehículos estacionados en las calles, límites de velocidad mayores, así como cuando hay mayor número de peatones o densidad poblacional de niños. Sitios con mayor flujo vehicular, densidad habitacional y casas multifamiliares, o con la presencia de hacinamiento y ausencia de áreas de juegos para niños, así como sitios con menores ingresos y altas tasas de desempleo, están asociados con mayores prevalencias de atropellamientos [57,58,86]. Por el contrario, cuando el porcentaje de hogares con ingresos superiores es mayor, la prevalencia de atropellamientos es menor [86].

El Sistema de Vigilancia Epidemiológica de las Adicciones reporta que un 9% de los lesionados que utilizaron servicios de urgencias y un 20% de las personas que fallecieron en México por esta causa, de 1994 a 2010, habían consumido alcohol (Dirección General de Epidemiología. *Sistema de Vigilancia Epidemiológica de las Adicciones (SISVEA), 1994-2011*. http:///www.epidemiologia.salud.org.gob.mx/dgae/infoepid/inf_sisvea.html, accedido el 11/Feb./2014). Un estudio realizado en Nuevo León encontró que un 49% de los conductores y un 32% del total de fallecidos en el tránsito tenían alcohol en sangre [21]. Resultados similares fueron obtenidos en otro estudio realizado en la carretera México-Cuernavaca [22], en donde además se documentó que el alcohol también está asociado a una mayor severidad [23]. También en peatones se ha observado que un alto porcentaje refiere haber ingerido bebidas alcohólicas antes de ser atropellado [24].

En la ENSANut-2006, de 264.823 adolescentes (10-19 años de edad) que presentaron LCT, entre 1-7% reportaron estar bajo el influjo del alcohol en el momento del siniestro vial [25]. En la ENSANut-2012, un 5,9% de los adolescentes (IC95%: 3,2-10,5%) y un 9,2% (IC95%: 5,3-15,7%) de los adultos con LCT reportaron estar bajo el influjo del alcohol. Al analizar esto por tipo de usuario vial, el uso de alcohol fue más frecuente en ocupantes de vehículos automotores (10,16%;

IC95%: 5,29-18,62%), seguido de ciclistas (7,62%; IC95%: 2,26-22,78%), motociclistas (6,46%; IC95%: 3,02-13,28%) y peatones (2,67%; IC95%: 0,58-11,51%).

- **No uso de cinturón y SRI**

A pesar de ser una estrategia costo efectiva, en México existe poca información que documente el uso de estos dispositivos de retención. Sólo un 25% de los conductores que colisionaron durante 2010 en zonas urbanas y suburbanas utilizaban el cinturón de seguridad en el momento del siniestro. El uso de cinturón de seguridad se ha estimado en un 45% en varios municipios del país [19,26] y el porcentaje es aún menor (31%) entre lesionados usuarios de los servicios de salud [26]. El uso de SRI se ha estimado en alrededor de un 6,8% en menores de 10 años y de entre 7,9 a 17,4% en menores de 5 años [26] y se ha visto que su uso tiende a ser menor en estratos socioeconómicos bajos [27].

La ENSANut-2012 muestra que un 44,9% (IC95%: 36,6-53,5%) de las personas de 10 y más años reportó utilizar cinturón de seguridad en el momento de la colisión. Por otro lado, un 12,3% (IC95%: 3,6-34,7%) de los lesionados menores de 10 años utilizaban SRI.

- **No uso de casco**

El uso de casco reportado en el país oscila entre 68 y 99% [19] y se ha observado que los conductores lo utilizan más que los pasajeros [28]. Sin embargo, un estudio realizado en Cuernavaca muestra que un 65% de los cascos utilizados no están certificados [29]. A partir de la ENSANut-2012 podemos observar que el uso de casco en motociclistas lesionados en México fue de un 55,3% (IC95%: 43,3-66,7%). El uso de casco por ciclistas es menor: un 9,8% (IC95%: 3,4-25,2%) de lesionados reportaron su uso en el momento del evento.

- **Velocidad excesiva o inadecuada**

Pocas evidencias existen en México, en relación a la exposición a este importante factor de riesgo. Un estudio realizado en una autopista del país documentó que entre un 14,7 y 20,1% de los vehículos que colisionaron sobrepasaba el límite de velocidad [22]. Reportes oficiales atribuyen un 44,3% de las colisiones en carreteras federales a la velocidad excesiva [20]; sin embargo, esta cifra podría no estar sustentada en evidencias.

- **Uso de celular**

Estudios recientes estiman que, durante 2011-2012, un 10,78% y un 0,64% de un total de 7.940 automovilistas [30] y 4.244 motociclistas [31], respectivamente, que fueron observados aleatoriamente en tres ciudades del país, utilizaban el teléfono móvil al conducir.

- **Diseño y adecuación de la estructura vial e invasión de espacios**

Las políticas públicas, derivadas del crecimiento de las grandes ciudades en nuestro país, han promovido el traslado de personas en vehículos privados [32]. Así, se ha observado cómo el diseño de la estructura vial se ha convertido en un espacio de mayor peligro para los peatones, que son los usuarios más numerosos y vulnerables [24]. De entre los peatones, la inadecuación de la estructura vial pone en mayor riesgo a los menores de 1-14 años [33], a los adultos mayores y a las personas con algún tipo de discapacidad. La estructura vial es igualmente insegura para el creciente número de ciclistas y motociclistas que circulan en el país.

En nuestro país se ha documentado la invasión de espacios peatonales por vehículos de motor. Los automovilistas, y el transporte público, se detienen en lugares no permitidos y no respetan las señales de tránsito. Los vendedores ambulantes se apropian de las banquetas para ejercer su actividad, desplazando y poniendo en más riesgo a los peatones que se ven forzados a deambular por las calles [34]. Los vendedores ambulantes están también en riesgo por su autoexposición a la invasión de espacios, que cuando fueron diseñados no se consideró la presencia de esa actividad comercial [24].

También los peatones invaden los espacios destinados para otros usuarios cuando cruzan, de forma insegura, una vía o cuando abordan o descienden del transporte público en sitios inadecuados [24]. Poco más de un 50% de los peatones no utilizan los puentes peatonales [35]. Entre las razones de no uso está la imposibilidad de algunos actores de utilizarlos (adultos mayores y personas con discapacidad). Además, los adultos mayores, presentan limitaciones visuales y motoras que les impide desplazarse con seguridad [24]. Las personas con discapacidad tienen un riesgo mayor de sufrir LCT como peatones, ciclistas o usuarios de sillas de ruedas, lo que se ha llamado el doble riesgo de las personas que viven con discapacidad [36].

Un sistema que privilegia el uso de la vía pública para el transporte privado, no favorece que los diferentes usuarios reconozcan este espacio

común. Esto, aunado a un bajo nivel de compromiso cívico y escasez de recursos sociales, disminuye la posibilidad de lograr la participación social en el control de los espacios y de las LCT [37].

Consecuencias económicas y sociales de las LCT

Las LCT imponen una fuerte carga económica para la sociedad [25]. Un alto número de personas utilizan servicios de salud ambulatorios o son hospitalizados por esta causa. Esto, junto con la pérdida de productividad, asociada al tiempo que tardan los lesionados para reincorporarse a su actividad laboral, genera altos costos directos e indirectos. Así, el costo económico de las LCT para el Sistema de Salud fue de US$ 7,598 millones durante 2007, lo que representa el 1% del PIB nacional de ese mismo año [38]. Paralelamente, el costo económico total de los eventos de tránsito ocurridos sólo en carreteras federales durante 2009 se estimó oficialmente en US$ 2,440 millones, lo que incluye el costo asociado a daños a la propiedad [20].

En el interior de los hogares las repercusiones son graves: un 8% de los lesionados atendidos en urgencias, y 80% de los hospitalizados, incurre en gastos catastróficos por su atención médica [39]. Esto repercute directamente en la economía familiar, pues con frecuencia se deja de percibir el más importante –y comúnmente el único– ingreso del hogar, traduciéndose en problemas de abandono escolar y perpetuación de los círculos de pobreza [40]. Las consecuencias económicas de estos eventos sumergen a algunos hogares a un estrés constante, pues las deudas comúnmente se prolongan al mediano y largo plazo. En algunos casos, generan dependencia económica de los hogares, afectando su sostenibilidad [41]. De ahí que no todo el costo asociado a este problema puede traducirse fácilmente a un valor monetario. Se sabe que las muertes causadas por el tránsito constituyen la segunda causa de orfandad en México [42] y que estas experiencias suelen cambiar el estado de salud de las personas, afectando las relaciones intrafamiliares y en casos extremosos destruyendo núcleos familiares previamente consolidados [41].

Según la ENSANut-2012 de los ~10 millones de personas que viven con discapacidad en México, 12,3% (11,1-13,6%) fue causada por una lesión de tránsito. Asimismo, un 16,4% (2,8-20,9%) de los lesionados en el tránsito reportó consecuencias permanentes en su estado de salud, lo que se traduce en un total de 226.591 nuevas personas al año con algún grado de discapacidad. El porcentaje de lesionados menores de 10 años que fueron reportados con consecuencias permanentes se incrementó de un 3,5% (1,4-8,2%) en la *Encuesta Nacional de Salud* de 2000 (ENSA-2000) [18] a un 16,8% (12,8-20,9%) en la ENSANut-2012.

Esto proporciona argumentos sólidos para que los tomadores de decisiones gestionen la asignación de mayores recursos destinados a la implementación de estrategias de prevención o limitación del daño. Actualmente, el alto costo económico de este problema contrasta con la baja inversión que el Estado Mexicano emplea para su prevención. En 2008, el gobierno asignó 96 millones de pesos para financiar la estrategia mexicana para la seguridad vial [32]. Esto representa el 0,12% del costo económico de las LCT para 2007. Además de asignar mayores recursos financieros, se debe privilegiar la implementación de estrategias costo-efectivas y la generación de información útil para retroalimentar la toma de decisiones.

La respuesta social a las LCT en México

Diversas estrategias han sido implementadas en el país para responder a este problema de salud pública (Figuras 2 y 3). A continuación planteamos algunas de ellas.

- **Informar, capacitar, educar**

Dado que la mayor parte de los abordajes para el estudio de las LCT se ha centrado en los individuos y sus características, se han logrado identificar distintos factores que los ponen en mayor riesgo de chocar, lesionarse y morir. Gran parte de ellos ha concluido que es el error humano la causa de la mayoría de ellos [43]. De ahí que un número importante de intervenciones y programas de salud se focalicen en grupos considerados de mayor riesgo [44,45]. La mayor parte buscan el cambio de conductas de riesgo, brindando información a la población sobre los efectos negativos de dichas conductas o sobre los beneficios de utilizar los dispositivos de seguridad existentes. Este tipo de intervenciones asume que las personas con información se conducirán racionalmente.

El problema es que aquellos en riesgo no perciben en su conducta un problema, por lo que resulta ingenuo intentar cambiar su forma de actuar, pues la gente actúa por recompensas personales inmediatas [46]. Gran parte de los estilos de vida son dictados por normas sociales, de ahí que es difícil lograr que la gente se comporte diferente de sus pares [47]. La conducta humana no está solamente gobernada por el conocimiento y las habilidades individuales, sino por el ambiente en el cual la conducta toma lugar [48,49]. La utilización de la información y la publicidad por sí solas son generalmente insuficientes en la reducción

Figura 2

La Iniciativa Mexicana de Seguridad Vial (IMESEVI).

La IMESEVI representa un esfuerzo de la Secretaría de Salud Federal que busca reducir las lesiones, discapacidad y muertes causadas por el tránsito en el país. Este programa, que recibió financiamiento de la Filantropía de Bloomberg, se inició durante 2008 en 4 municipios y actualmente se enfoca en 6 ciudades prioritarias y se ha extendido a diferentes ciudades y estados de la república mexicana. La IMESEVI se cimentó en un diagnóstico que evidenciaba los esfuerzos aislados de diferentes instituciones y sectores para un problema multicausal y multifactorial que supone coordinar esfuerzos para el objetivo conjunto de prevenir las lesiones causadas por el tránsito.

La IMESEVI promueve acciones para disminuir la conducción bajo influencia del alcohol e incrementar el uso de dispositivos de seguridad, entre otras. Para ello, se llevan a cabo estrategias de comunicación social, foros y talleres sobre seguridad vial para la población en general –especialmente para grupos prioritarios como los jóvenes–, promoción de modificaciones a los marcos legales vigentes, capacitación de responsables de la seguridad vial, auditorías de seguridad vial y elaboración y distribución de material gráfico informativo y de promoción de seguridad vial [19].

Los resultados positivos que se documentaron para esta primera etapa motivaron a la Fundación Bloomberg a continuar con una segunda etapa en la que se incluyeron otros países de bajos y medianos ingresos para el periodo 2010-2014. Así es como nace el proyecto RS-10 (*Road Safety in 10 Countries*). El RS-10 en México incluyó inicialmente dos ciudades (Guadalajara y León) y consiste en la realización de puestos de control para la realización de alcoholimetrías, campañas de comunicación social y actividades educativas en jóvenes. En Guadalajara la intervención incluye la reducción en la legislación de los niveles tolerados de alcohol al conducir a 0,05g/dL, así como un incremento en las multas correspondientes. Pese a que en ambas ciudades los componentes específicos pueden variar, en las dos se enfocan a los factores de riesgo de conducir bajo los efectos del alcohol y el no-uso de cinturón de seguridad y dispositivos de retención infantil. Estas intervenciones se centran principalmente en automovilistas, aunque la estrategia de alcohol y conducción pudiera tener externalidades positivas para la seguridad de otros usuarios que comparten la vía.

Figura 3

El Decenio de Acción por la seguridad vial y la Estrategia Mexicana de Seguridad Vial.

La ONU, a través de la OMS, ha hecho un llamamiento a los países para reforzar globalmente las acciones por la seguridad vial. Así, durante 2011 se proclamó el periodo 2011-2020 como el Decenio de Acción para la seguridad vial. La estrategia del decenio de acción se sustenta sobre cinco pilares: gestión de la seguridad vial, vías de tránsito y movilidad más seguras, vehículos más seguros, usuarios de vías de tránsito más seguros, respuesta adecuada y oportuna cuando estos eventos se presenten.

México, al igual que gran parte de los países del mundo, se sumó a esta iniciativa. En la Estrategia Nacional por la Seguridad Vial [87], el país se comprometió a reducir 50% las muertes, así como reducir al máximo posible las lesiones y discapacidades secundarias a eventos de tránsito. La Estrategia Nacional de Seguridad Vial establece la participación de los tres niveles de gobierno y su rendición de cuentas, lo que constituye un paso importante para el país. Este acuerdo fue firmado por la Secretaría de Comunicaciones y Transporte y la Secretaría de Salud. La Estrategia Nacional de Seguridad Vial plantea implementar una serie de acciones, entre las que se encuentran:

1. Coadyuvar al fortalecimiento de la capacidad de gestión de la seguridad vial;
2. Participar en la revisión de la modernización de la infraestructura vial y de transporte más segura;
3. Fomentar el uso de vehículos más seguros;
4. Mejorar el comportamiento de los usuarios de las vialidades, incidiendo en los factores de riesgo que propician la ocurrencia de eventos de tránsito;
5. Fortalecer la atención del trauma y de los padecimientos agudos, mediante la mejora de los servicios de atención pre-hospitalaria y hospitalaria.

OMS: Organización Mundial de la Salud; ONU: Organización de las Naciones Unidas.

de eventos de tránsito [3], observando, incluso, que este tipo de intervenciones suelen generar inequidad en términos de los beneficios potenciales que ofrecen [50]. Las campañas televisivas que promueven conductas saludables en automovilistas cada periodo vacacional siguen siendo parte fundamental de la estrategia nacional, sin que quede claro cuál es el impacto qué tienen en prevenir LCT o cambiar conductas de riesgo [3].

Tampoco existe evidencia concluyente de que los programas educativos focalizados sean efectivos [51]. Esta estrategia podría ser el primer paso para el establecimiento de un vínculo con los incentivos y la coerción de los actores viales [15]. Una de las cosas que la salud pública ha aprendido es que la educación para la salud, a nivel individual, es una pérdida de tiempo cuando es de una sola ocasión. Para tener resultados se requiere una inversión considerable de tiempo de consejería con refuerzos constantes, lo que además de ser costoso [47], suele tener poco alcance en la población general. De ahí que los cambios, cuando se presentan, suelen verse en los recambios generacionales [52].

- **Fabricación de autos más seguros**

En un escenario ideal, el "error humano" no tendría que traducirse en lesiones y muerte. Los cinturones de seguridad, los SRI, las bolsas de aire, el dispositivo de absorción de energía en colisiones de vehículos de motor, los muros de contención ergonómicos, las rampas de frenado, los amortiguadores de impacto, los pretiles, han sido creados con el fin de ofrecer protección pasiva a los distintos usuarios de la vía pública. Otras tecnologías de seguridad activa como sistemas de frenado antibloqueo, sistemas de control de la estabilidad, sistema de dirección y suspensión de los vehículos automotores, la iluminación, la tecnología de los neumáticos e incluso los recordatorios para el uso de cinturón de seguridad contribuyen a evitar o reducir la magnitud de los choques.

La introducción de estos dispositivos de seguridad en México ha sido principalmente por iniciativa de la industria automotriz. De ahí que la disponibilidad de estos dispositivos incrementa los precios de mercado, lo que hace que el intervalo de tiempo entre que los vehículos disponen de esta tecnología y cuando terminan reemplazando a aquéllos que no la tienen sea bastante amplio.

Salvo en el caso de cinturones de seguridad, México poco había hecho para establecer requisitos mínimos de seguridad en automóviles. Es hasta la estrategia mexicana de seguridad vial que este tema es abordado. Por otro lado, el diseño de las motocicletas ha evolucionado sin tener en cuenta la seguridad de sus ocupantes, por lo que es imperativo regular estándares de seguridad óptimos que redunden en una mayor seguridad de estos usuarios vulnerables [53].

- **Construcción de vialidades más seguras**

La identificación de factores de riesgo ambientales ha sido de gran utilidad para diferentes programas de prevención. El uso del análisis geoespacial ha identificado zonas específicas en donde se concentra una mayor proporción de eventos de tránsito, como es el caso de zonas dedicadas a actividades comerciales y servicios [54], o en las que diferentes usuarios de la vía pública, como los peatones [55], tienen mayor riesgo de lesionarse [56]. Estas zonas son potencialmente modificables a través de intervenciones concretas [57,58]. Las auditorías viales tienen como propósito verificar que el diseño de las vialidades sea consistente con los principios de seguridad vial o la necesidad de cambios en su diseño para prevenir la siniestralidad [4]. La evidencia sugiere cómo, sin modificar las conductas de riesgo, la severidad de las lesiones puede disminuir significativamente al readecuar la estructura vial [52] incluso con estrategias de bajo costo [43].

En México, la respuesta al problema de los atropellamientos ha sido la construcción masiva de puentes peatonales [35]. Es sabido que los puentes peatonales buscan favorecer la circulación de vehículos de motor y no ofrecer mayor seguridad a los peatones, de ahí que poco tomen en cuenta sus necesidades particulares. Así, los adultos mayores, las mujeres con niños y las personas con ciertos niveles de discapacidad, tienen dificultad para subir una escalera [34] o, en el mejor de los casos, las rampas construidas para tal efecto. Los peatones que sí podrían utilizar esos puentes no lo hacen, porque la misma estructura les permite cruzar las vialidades por abajo, lo que desincentiva esta conducta de seguridad vial. Se han documentado problemas relacionados con la inseguridad, lo que en conjunto motiva a los peatones a intercambiar el riesgo de utilizar un puente peatonal por el de cruzar a mitad de calle [35,59].

- **Promoción de transporte sostenible**

Según la OMS, un sistema de tránsito seguro es aquél que "se adapta y contrarresta la vulnerabilidad y falibilidad humanas" [4]. Para ello recomienda fomentar el uso de medios de transporte más seguros, sostenibles y accesibles [4]. Esto incluye la promoción de medidas que estimulen el desplazamiento a pie o en bicicleta y el uso

de transporte público masivo [32]. El éxito reciente que ha tenido la promoción de la bicicleta, como medio de transporte en ciertas ciudades del país, debe ser acompañado de cambios a la estructura que ofrezcan protección a este usuario. La construcción de ciclovías en la Ciudad de México, Guadalajara y León, así como la inversión en transporte público masivo en autobuses es un paso importante en materia de seguridad vial y promoción de transporte sostenible.

El sistema de transporte público masivo representa una opción de transporte rápida y eficiente que además tiene beneficios ambientales y sociales. Se han documentado mejoras en cuanto a tiempo y costo de viaje y emisiones de gases de efecto invernadero y contaminantes del aire [60]. De igual forma, se ha documentado una disminución en el número de LCT, a raíz de la puesta en marcha de sistemas de transporte público masivo en autobuses [61]. Entre las ciudades Mexicanas que cuentan con estos sistemas se encuentran la Ciudad de México (Metrobús), la ciudad de León (Optibus) y la ciudad de Guadalajara (Macrobús).

- **Legislación y seguridad vial**

La OMS ha llamado la atención sobre la importancia de legislar acerca de los principales factores de riesgo para controlar y limitar el problema de las LCT [62]. México cuenta con legislación que prohíbe el consumo de alcohol al conducir, pero con excepción del estado de Jalisco, en la mayoría de las ciudades y entidades federativas del país, el nivel permitido de alcohol en sangre al conducir es de 0,08g/dL y es igual para adolescentes y adultos, en contra de las recomendaciones internacionales. Esto implica que no se basa en evidencia y suele ser más tolerante de lo ideal [32]. En este sentido, la aplicación de la legislación, ha sido calificada como reprobatoria [63]. De hecho, un estudio mostró que sólo un 36% de los conductores piensa que serán arrestados mientras manejan bajo la influencia del alcohol [23]. Una de las limitaciones que impiden su correcta aplicación es que la propia legislación no habilita a las autoridades realizar detecciones aleatorias, componente fundamental para el éxito de estas estrategias [64], aunque existen algunas excepciones exitosas (Figura 4).

México también cuenta con legislación que obliga el uso de cinturón de seguridad y SRI en todos los pasajeros, aunque su aplicación ha sido calificada como muy baja [32]. El uso de casco en motociclistas es obligatorio [32]; sin embargo, la aplicación de la legislación también es baja y no existe regulación sobre la importancia de que el casco utilizado sea certificado [65]. Esto cuestiona la protección potencial que estos dispositivos pueden ofrecer. Dado que es muy probable que este actor vial incremente su peso relativo en el futuro, las estrategias nacionales deberían anticiparse a estos cambios.

Existe legislación que establece los límites de velocidad, tanto del ámbito federal, como local. Sin embargo, en el país, como en la región de las Américas, es un factor de riesgo al que poca atención se le presta [63]. Su aplicación es reprobatoria y pocas intervenciones se han implementado sistemáticamente para prevenir la exposición a velocidades inadecuadas. Una de ellas es la instalación de radares para la foto-infracción en Guadalajara que ha mostrado buenos resultados (Celis A. Comunicación personal; 2011). A pesar de ello, el uso de esta tecnología ha sido poco diseminado en el país.

Figura 4

Caso exitoso: el programa *Conduce Sin Alcohol* de la Ciudad de México, México.

Luego de un diagnóstico que evidenciaba un alto índice de colisiones fatales atribuibles al consumo de alcohol, especialmente en jóvenes y durante los fines de semana, el Gobierno de la Ciudad de México puso en marcha el programa *Conduce Sin Alcohol*, iniciándolo el 19 de septiembre de 2003. Este programa consiste en la implementación de operativos permanentes de alcoholimetría y, en caso de mostrar un resultado positivo, se procede a un arresto administrativo inconmutable de 20 a 36 horas. Según las autoridades del Gobierno de la Ciudad de México, ha logrado reducir 30% el número de muertes en eventos de tránsito relacionadas con la conducción bajo el influjo del alcohol. Tan sólo en el año previo, se implementaron 81 jornadas nocturnas y se evaluó a 244.883 conductores. En 31.699 de los casos se realizaron pruebas de alcoholimetría, un 27% de las cuales dieron resultados positivos [88]. El establecimiento de un marco jurídico previo a la implementación del programa que permitiera las detecciones aleatorias fue clave y facilitó la aplicación de la legislación, a cargo de la Secretaría de Seguridad Pública del Gobierno del Distrito Federal.

Discusión

El elevado número de lesiones y muertes causadas por el tránsito posiciona al país, según algunos reportes, por encima del promedio en las Américas, sólo por debajo de Venezuela [32]. La coyuntura que ofrece el Decenio de Acción por la seguridad vial, representa una oportunidad inigualable de trabajar en aras de lograr controlar y abatir este importante problema de salud pública. La Estrategia Nacional de Seguridad Vial es un gran paso hacia la reducción de LCT. Sin embargo, esta estrategia debe ir acompañada de recursos financieros que permitan su realización. Para ello se requiere de un plan nacional, con estrategias claras y metas que puedan ser medibles en su evolución y establezca compromisos concretos para las distintas instituciones y para los tres niveles de gobierno.

Aunque México cuenta con legislación sobre los principales factores de riesgo, es evidente que no es integral. Una legislación, para ser integral, debe existir, ser adecuada y debe aplicarse estrictamente [63]. La legislación mexicana es aún perfectible pues se aplica poco [32] y aún no alcanza a algunos usuarios menos visibles, como los ciclistas. Un reto para el país es implementar una estrategia contra la conducción bajo el efecto del alcohol y otras drogas que implique la reducción de los niveles permitidos de alcohol, al menos a 0,04g/dL para adultos [4] y tolerancia cero en menores de 21 años y conductores inexpertos [66]. Esta legislación deberá proveer un marco jurídico adecuado para que las autoridades correspondientes puedan aplicar detecciones aleatorias de alcohol en el país, estrategia que ha mostrado ser altamente costo-efectiva [32]. Esta estrategia deberá generar sinergias con políticas públicas que busquen reducir el consumo de alcohol, pues tienen externalidades positivas en seguridad vial [32,66]. Esta estrategia debe incluir a ciclistas y motociclistas pues también ellos están expuestos según muestra la ENSANut-2012. Por otro lado, se deben actualizar las normas que regulan la fabricación, importación y comercialización de cascos con estándares de protección adecuados, procurando que sean financieramente accesibles [67]. De igual forma, se debe unificar y mejorar el entrenamiento, la capacitación y el proceso para el otorgamiento de licencias para conducir. Esto podría incluir estrategias de licenciamiento gradual, especialmente en adolescentes [68].

Para que la estrategia en seguridad vial sea efectiva, es necesario contar con información de calidad y oportuna. Un aspecto clave es establecer un sistema de vigilancia epidemiológica de las LCT, que incluya la atención pre-hospitalaria, hospitalaria y rehabilitación, y hallazgos de servicio médico-forense, involucrando a todas las instituciones del país. Idealmente, esta información debería integrarse por individuo y debería poder ligarse a información obtenida por la policía de tránsito. Esto permitiría conocer, caso por caso, datos históricos y la evolución completa del evento de interés. Además, este sistema debería realizar un diagnóstico sobre discapacidad y secuelas de LCT (Figura 5).

Invertir en investigación es igualmente prioritario. Existen áreas que podrían verse beneficiadas con resultados de investigación específicos y evidencias para la toma de decisiones (Figura 6). La diversidad de resultados de investigación, que en ocasiones parecen contradictorios, resalta la importancia del contexto sobre este problema particular. La evidencia científica tiene poco sentido para la toma de decisiones, si no se adapta a las circunstancias del lugar donde se aplicará: la evidencia de lo que funciona debe ser combinada con la evidencia del contexto. El rol de la ciencia (sin considerar el contexto) es indicar lo que sabemos funciona en general; en el caso de la guía que considera al contexto es iluminar los dos: lo que funciona o no y cómo debe ser implementado en circunstancias específicas bajo consideración [69]. Incorporar la perspectiva de la comunidad permite identificar la problemática local y priorizar estrategias de prevención sensibles al contexto y culturalmente aceptadas [70].

Abordajes que han mostrado ser efectivos en países de altos ingresos pueden no dar los mismos resultados favorables en países en desarrollo. Por ejemplo, una ley sobre el uso del cinturón de seguridad puede proteger a los conductores y pasajeros, pero dicha ley tendrá poco impacto en un país cuyo problema mayor sean los atropellamientos [71]. En virtud de que las intervenciones en salud pública tienden a ser complejas, programáticas, y a depender del contexto, si una intervención no funciona debemos determinar si la intervención falló (falla inherente a la intervención) o si fue una falla en su implementación [72].

No todas las políticas de salud encaminadas a prevenir las LCT son benéficas para todos los usuarios, y algunas evidencias sugieren que los más vulnerables son los que se benefician menos. Dado que en México, la mayor parte de la evidencia generada se centra en ocupantes de vehículos automotores, no extraña que la mayoría de las intervenciones se haya centrado en este tipo de actor y poco en el respeto de los demás actores viales, lo que aumenta la desigualdad y vulnerabilidad de éstos [24]. Aunque el tema de la equidad está presente en la estrategia nacional, poco énfasis se hace en los mecanismos que permitirán disminuir las brechas existentes. Por

Figura 5

Atención médica pre-hospitalaria y de urgencias.

El quinto pilar de la Década de Acción por la Seguridad Vial tiene que ver con la respuesta del sistema de salud, cuando las lesiones causadas por el tránsito se han presentado. Este pilar busca incrementar la respuesta a las emergencias, con el objetivo de mejorar la habilidad del sistema de salud para proveer atención de pre-hospitalaria y hospitalaria apropiada y oportuna, así como la subsecuente rehabilitación en el largo plazo. A pesar de que se ha resaltado su importancia, por ahora existe poca información secundaria en el país, en relación a la calidad de la atención médica de los lesionados desde el enfoque de la salud pública. Poca información es recabada de forma sistemática por los sistemas de información disponibles. Cuando existe esta información, el acceso suele estar restringido lo que complica el análisis subsecuente. Esto es particularmente evidente en el tema de la atención pre-hospitalaria.

En este sentido, Pinet [89] identifica serios problemas de coordinación, regulación y evaluación del desempeño de la atención pre-hospitalaria en la Ciudad de México. Algunos reportes recientes muestran que ha habido avances al respecto, que pudieran explicar el decremento observado en la mortalidad por atropellamientos en esta misma ciudad, como la creación del Sistema Integral de Urgencias Médicas [90]. Por otro lado, Mock et al. [91] han documentado la experiencia de Monterrey a este respecto. Según este autor al menos 50% del personal que otorga atención pre-hospitalaria no cuenta con la capacitación adecuada. Las distintas estrategias de entrenamiento y capacitación que han mostrado resultados exitosos en otros contextos, no se han diseminado exitosamente en esta ciudad. La falta o deficiente cobertura de recursos tiene un impacto negativo, pues se ha observado que los tiempos promedio totales están por encima de lo ideal.

Figura 6

Algunas áreas de investigación prioritarias para México.

- Estimar la carga de las LCT que es atribuible directamente a los distintos factores de riesgo: alcohol y otras drogas, no uso de casco, uso de casco no certificado, uso de celular, no uso de sistemas de retención, entre otros;
- Evaluar y dar seguimiento al uso de dispositivos de seguridad (cinturón de seguridad, SRI, casco) y a la exposición a factores de riesgo: velocidad, telefonía móvil, alcohol y conducción, etc. y la carga de las LCT que puede ser atribuida a cada uno de ellos;
- Evaluar constantemente el uso de otras drogas con el fin de observar su comportamiento en el tiempo;
- Realizar estudios sobre la calidad de la atención pre-hospitalaria, hospitalaria y de servicios de rehabilitación. Idealmente, estos estudios deberían incluir un análisis sobre las potenciales barreras de acceso a los diferentes servicios;
- Documentar el doble riesgo al que se enfrentan las personas que viven con discapacidad, tema pendiente en la agenda de investigación nacional e internacional [36];
- Realizar análisis diagnósticos sistemáticos de la estructura vial (auditorías viales), como estrategia para identificar necesidades de inversión en materia de infraestructura vial;
- Generar evidencias constantemente sobre el nivel de aplicación de la legislación vigente;
- Evaluar el impacto de diferentes intervenciones, programas e iniciativas nacionales y locales sobre el estado de salud, tema poco documentado en el contexto nacional. Incluir el análisis de la inversión en prevención de LCT y su efecto sobre la carga de estos eventos en el sistema de salud.

LCT: lesiones causadas por el tránsito; SRI: sistemas de retención infantil.

ejemplo, no es explícita la política de respeto al peatón y sus espacios.

Dado el alto número de peatones, ciclistas y motociclistas que se lesionan y mueren, la estrategia debería estar equilibrada de tal manera que atienda las necesidades de todos los usuarios. Como se ha enfatizado con anterioridad, de acuerdo al tipo de usuario, se pueden identificar problemáticas diferentes y, por tanto, distintas alternativas de solución. De ahí que se requiere un cambio de paradigma para dar igual protección a todos los usuarios, para que las calles y las autopistas no produzcan una carga injusta de lesiones y muerte en los grupos más vulnerables [73].

En este sentido, se debe valorar la inclusión y evaluación, como parte de la estrategia de seguridad vial, de medidas que incrementen la visibilidad de los usuarios de la vía pública: obligatoriedad del uso de las luces diurnas para vehículos de motor; uso de ropa, accesorios y vehículos de colores brillantes que mejoren la visibilidad de los peatones, ciclistas y motociclistas [74]. De igual forma, se debe promover el uso obligatorio de casco en ciclistas.

Podemos concluir que existen aún retos y oportunidades en el tema de prevención de las LCT. Al ser un problema complejo y multicausal que atañe a diferentes sectores y disciplinas, un aspecto importante de resaltar es que su manejo y prevención requieren de abordajes multisectoriales. Así, la prevención de las consecuencias de las LCT es el resultado de la definición de responsabilidades que atañen a cada sector en particular y del trabajo intersectorial coordinado con objetivos claramente definidos y comunes a todos [3]. Un primer paso es reconocer en las LCT un problema urgente de salud pública que afecta de forma diferenciada a cada uno de los usuarios de la vía pública. En términos de políticas públicas se requiere incrementar el uso de sistemas de retención y cascos, y disminuir la exposición al alcohol y drogas al conducir. Para ello se debe dedicar especial atención a la actualización de la legislación y su estricta aplicación. También se debería fortalecer las capacidades de los gobiernos para garantizar e impulsar la movilidad de forma segura, equitativa, saludable y sostenible para todos los actores viales. Una movilidad segura implica considerar las necesidades de todos los actores de la vía pública, y en especial, de los más vulnerables. Para dar respuesta a los acuerdos establecidos en la Estrategia Nacional de Seguridad Vial 2011-2020 y reducir las lesiones, discapacidades y muertes causadas por el tránsito, se deberá continuar, ampliar y fortalecer la Iniciativa Mexicana de Seguridad Vial (IMESEVI).

Resumo

Por meio da revisão oficial de informações secundárias, publicações científicas e da análise da ENSANut 2012, este trabalho visa a proporcionar uma visão abrangente da magnitude atual das lesões causadas pelo trânsito no México e analisar criticamente a resposta social organizada. Os altos índices de acidentes, lesões, mortes e invalidez atribuídos a esse problema de saúde pública representam um alto custo para a sociedade mexicana, especialmente para as famílias. Discutimos neste estudo como a resposta mexicana tem focado em motoristas, deixando de fora os usuários vulneráveis das vias, e tem favorecido a implementação de estratégias pouco efetivas. Embora exista legislação que abrange os principais fatores de risco, tem sido negligenciada a sua correta aplicação. A estratégia mexicana poderia ser fortalecida por meio da implementação de estratégias de mobilidade segura, equitativa, saudável e sustentável para os diferentes atores da vias. Apesar dos grandes avanços que foram feitos em termos de prevenção das lesões causadas pelo trânsito, ainda existem desafios e oportunidades para o país.

Acidentes de Trânsito; Políticas Públicas de Saúde; Inquéritos Epidemiológicos

Colaboradores

R. Pérez-Núñez participó de la concepción del estudio, análisis, redacción y aprobación de la versión final. M. Híjar, A. Celis y E. Hidalgo-Solórzano participaron de la concepción del estudio, análisis, revisión crítica del documento y aprobación de la versión final.

Agradecimientos

Se agradece el apoyo brindado por Juan Daniel Vera López y Lourdes Gómez García para la preparación de este documento; así como los comentarios recibidos por el grupo de análisis de la ENSANut-2012 y, particularmente, al Dr. Adolfo Martínez Valle por comentar y retroalimentar versiones previas de este reporte. Se agradece el apoyo brindado por la Dirección General Adjunta de Epidemiología y la Dirección de Información en Salud por facilitarnos información recopilada por sus dependencias. Agradecemos los comentarios recibidos por los pares revisores de la revista *Cadernos de Saúde Pública*.

Referencias

1. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012; 380: 2095-128.
2. World Health Organization. Global status report on road safety 2013: supporting a decade of action. Geneva: World Health Organization; 2013.
3. Híjar-Medina M, Vázquez-Vela E. Foro nacional sobre accidentes de tránsito en México. Enfrentando los retos a través de una visión intersectorial. Cuernavaca: Instituto Nacional de Salud Pública; 2003.
4. Peden MM, Scurfield R, Mohan D, Hyder AA, Jarawan E, Mathers C. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
5. Norton R, Kobusingye O. Injuries. N Engl J Med 2013; 368:1723-30.
6. Romero-Martínez M, Shamah-Levy T, Franco A, Villalpando S, Cuevas-Nasu L, Gutiérrez J, et al. Encuesta Nacional de Salud y Nutrición 2012: diseño y cobertura. Salud Pública Mex 2013; 55 Suppl 2:S332-40.
7. Gutiérrez J, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L, et al. Encuesta Nacional de Salud y Nutrición 2012. Resultados nacionales. Cuernavaca: Instituto Nacional de Salud Pública; 2012.
8. Pérez-Núñez R, Híjar M, Celis A, Hidalgo-Solórzano E. Lesiones causadas por el tránsito: hora de poner el freno. Cuernavaca: Instituto Nacional de Salud Pública; 2012.
9. Hijar M, Chandran A, Pérez-Núñez R, Lunnen JC, Rodriguez-Hernandez JM, Hyder AA. Quantifying the underestimated burden of road traffic mortality in Mexico: a comparison of three approaches. Traffic Inj Prev 2012; 13 Suppl 1:5-10.
10. Shahraz S, Bhalla K, Lozano R, Bartels D, Murray CJ. Improving the quality of road injury statistics by using regression models to redistribute ill-defined events. Inj Prev 2013; 19:1-5.
11. Bartels D, Bhalla K, Shahraz S, Abraham J, Lozano R, Murray CJ. Incidence of road injuries in Mexico: country report. Int J Inj Contr Saf Promot 2010; 17:169-76.
12. Juárez-Adauta S, Ávila-Burgos L. Atención en servicios de urgencias a pacientes lesionados en vía pública. Rev Med Inst Mex Seguro Soc 2006; 44:433-40.
13. Hidalgo-Solorzano EC, Hjar M, Blanco-Munoz J, Kageyama-Escobar ML. Factors related with the severity of injuries in public streets of an urban area in Cuernavaca, Morelos, Mexico. Salud Pública Méx 2005; 47:30-8.
14. Ávila-Burgos L, Ventura-Alfaro CE, Hidalgo-Solorzano EC, Hijar-Medina M, Aracena-Genao B, Celis-de la Rosa AJ. Atención de lesiones por tipo de causa externa en salas de urgencia en tres ciudades de México: Composición, frecuencia y gravedad. Rev Invest Clín 2012; 64:336-43.
15. Ávila-Burgos L, Medina-Solis CE, Pérez-Núñez R, Hijar-Medina M, Aracena-Genao B, Hidalgo-Solorzano E, et al. Prevalencia de accidentes de tránsito no fatales en México: resultados de la ENSANUT 2006. Salud Pública Méx 2008; 50 Suppl 1:S38-47.
16. Bhalla K, Shahraz S, Naghavi M, Lozano R, Murray C. Estimating the distribution of external causes in hospital data from injury diagnosis. Accid Anal Prev 2008; 40:1822-9.
17. Ávila-Burgos L, Ventura-Alfaro C, Barroso-Quiab A, Aracena-Genao B, Cahuana-Hurtado L, Serván-Mori E, et al. Las lesiones por causa externa en México. Lecciones aprendidas y desafíos para el Sistema Nacional de Salud. Cuernavaca: Instituto Nacional de Salud Pública; 2010.
18. Valdespino JL, Olaiz G, López-Barajas MP, Mendoza L, Palma O, Velázquez O, et al. Encuesta Nacional de Salud 2000. Tomo I. Vivienda, población y utilización de servicios de salud. Cuernavaca: Instituto Nacional de Salud Pública; 2003.
19. Centro Nacional para la Prevención de Accidentes. Iniciativa Mexicana de Seguridad Vial y Prevención de Lesiones en el Tránsito (IMESEVI). Construcción de línea base. Reporte final. México DF: Secretaría de Salud; 2009.
20. Cuevas-Colunga AC, Villegas-Villegas N, Mayoral-Grajeda EF, Mendoza-Díaz A. Anuario estadístico de accidentes en carreteras federales 2009. Sanfandila: Instituto Mexicano del Transporte, Secretaría de Comunicaciones y Transportes; 2010.
21. Arreola-Rissa C, Santos-Guzman J, Esquivel-Guzman A, Mock CN. Traffic related deaths in Nuevo Leon, Mexico: causes and associated factors. Salud Pública Méx 2008; 50 Suppl 1:S48-54.
22. Hijar M, Carrillo C, Flores M, Anaya R, Lopez V. Risk factors in highway traffic accidents: a case control study. Accid Anal Prev 2000; 32:703-9.
23. Hijar M, Flores M, Lopez MV, Rosovsky H. Alcohol intake and severity of injuries on highways in Mexico: a comparative analysis. Addiction 1998; 93:1543-51.
24. Híjar M. El crecimiento urbano y sus consecuencias no planeadas. El caso de los atropellamientos. In: Knaul F, Nigenda G, editors. Caleidoscopio de la salud. De la investigación a las políticas y de las políticas a la acción. México DF: Funsalud; 2003. p. 89-97.
25. Olaiz-Fernández G, Rivera-Dommarco J, Shamah-Levy T, Rojas R, Villalpando-Hernández S, Hernández-Ávila M, et al. Encuesta Nacional de Salud y Nutrición 2006. Cuernavaca: Instituto Nacional de Salud Pública; 2006.
26. Pérez-Núñez R, Chandran A, Hijar M, Celis A, Carmona-Lozano MS, Lunnen JC, et al. The use of seatbelts and child restraints in three Mexican cities. Int J Inj Contr Saf Promot 2013; 20:385-93.
27. Mock C, Arreola Rissa C, Trevino Perez R, Almazan Saavedra V, Enrique Zozaya J, Gonzalez Solis R, et al. Childhood injury prevention practices by parents in Mexico. Inj Prev 2002; 8:303-5.
28. Chandran A, Lunnen JC, Pérez-Núñez R, Hijar M, Hidalgo-Solorzano Edel C, Hyder AA. The prevalence of motorcicle helmet use in three Mexican cities. Inj Prev 2012; 18 Suppl 1:A233.

29. Hidalgo-Solorzano EC, Inclán-Valadez C, Pérez-Núñez R, Hijar M. Motorcicle non-standard helmet use in an urban area of Mexico. Inj Prev 2012; 18 Suppl 1:A192.
30. Vera-Lopez JD, Pérez-Núñez R, Hijar M, Hidalgo-Solorzano E, Lunnen JC, Chandran A, et al. Distracted driving: mobile phone use while driving in three Mexican cities. Inj Prev 2013; 19:276-9.
31. Pérez-Núñez R, Hidalgo-Solorzano E, Vera-Lopez JD, Lunnen JC, Chandran A, Hijar M, et al. The prevalence of mobile phone use among motorcyclists in three Mexican cities. Traffic Inj Prev 2014; 15:148-50.
32. Organización Panamericana de la Salud. Informe sobre el estado de la seguridad vial en la región de las Américas. Washington DC: Organización Panamericana de la Salud; 2009.
33. Celis A, Gomez Z, Martinez-Sotomayor A, Arcila L, Villasenor M. Family characteristics and pedestrian injury risk in Mexican children. Inj Prev 2003; 9:58-61.
34. Hijar M, Trostle J, Bronfman M. Pedestrian injuries in Mexico: a multi-method approach. Soc Sci Med 2003; 57:2149-59.
35. Hidalgo-Solorzano E, Campuzano-Rincón J, Rodríguez-Hernández JM, Chias-Becerril L, Resendiz-Lopez H, Sanchez-Restrepo H, et al. Motivos de uso y no uso de puentes peatonales en la Ciudad de México: la perspectiva de los peatones. Salud Pública Méx 2010; 52:502-10.
36. Shakespeare T. Double jeopardy? Disability and road traffic injury. Road Traffic Injuries Research Network Newsletter 2011; (2):2-3.
37. Inclan C, Hijar M, Tovar V. Social capital in settings with a high concentration of road traffic injuries. The case of Cuernavaca, Mexico. Soc Sci Med 2005; 61:2007-17.
38. Ávila-Burgos L, Aracena-Genao B, Ventura-Alfaro C, Barroso-Quiab CA. Consecuencias económicas de las lesiones por accidente de tránsito para el sistema de salud mexicano. In: 14 Congreso de Investigación en Salud Pública. Cuernavaca: Instituto Nacional de Salud Pública; 2011. p. 75.
39. Pérez-Núñez R, Avila-Burgos L, Hijar-Medina M, Pelcastre-Villafuerte B, Celis A, Salinas-Rodriguez A. Economic impact of fatal and non-fatal road traffic injuries in Guadalajara Metropolitan Area and Jalisco, Mexico. Inj Prev 2011; 17:297-303.
40. World Health Organization. Investing in heatlh: a full report of the findings of the Commission on Macroeconomics and Health. Geneva: World Health Organization; 2003.
41. Pérez-Núñez R, Pelcastre-Villafuerte B, Hijar M, Avila-Burgos L, Celis A. A qualitative approach to the intangible cost of road traffic injuries. Int J Inj Contr Saf Promot 2012; 19:69-79.
42. Hijar M, Vazquez-Vela E, Arreola-Risa C. Pedestrian traffic injuries in Mexico: a country update. Inj Control Saf Promot 2003; 10:37-43.
43. Arreola-Rissa C, Santos-Guzmán J, Esquivel-Guzmán A, Mock C, Herrera-Escamilla A. Barriles de absorción y contención del impacto: reducción de mortalidad por accidentes de tránsito. Salud Pública Méx 2008; 50 Suppl 1:S55-9.
44. Haddon Jr. W. The changing approach to the epidemiology, prevention, and amelioration of trauma: the transition to approaches etiologically rather than descriptively based. Am J Public Health Nations Health 1968; 58:1431-8.
45. Robertson LS, Kelley AB, O'Neill B, Wixom CW, Eiswirth RS, Haddon Jr. W. A controlled study of the effect of television messages on safety belt use. Am J Public Health 1974; 64:1071-80.
46. Doyle YG, Furey A, Flowers J. Sick individuals and sick populations: 20 years later. J Epidemiol Community Health 2006; 60:396-8.
47. Rose G. Sick individuals and sick populations. Int J Epidemiol 1985; 14:32-8.
48. Ajzen I. The theory of planned behavior. Organ Behav Hum Decis Process 1991; 50:179-211.
49. Evans D, Norman P. Predicting adolescent pedestrians' road-crossing intentions: an application and extension of the Theory of Planned Behaviour. Health Educ Res 2003; 18:267-77.
50. Lorenc T, Petticrew M, Welch V, Tugwell P. What types of interventions generate inequalities? Evidence from systematic reviews. J Epidemiol Community Health 2012; 67:190-3.
51. Recommendations to reduce injuries to motor vehicle occupants: increasing child safety seat use, increasing safety belt use, and reducing alcohol-impaired driving. Am J Prev Med 2001; 21(4 Suppl):16-22.
52. Híjar-Medina MC, Carrillo-Ordaz CE, Flores-Aldana ME, Anaya R, López-López MV. Factores de riesgo de lesión por accidentes de tráfico y el impacto de una intervención sobre la carretera. Rev Saúde Pública 1999; 33:505-12.
53. WHO Regional Office for South-East Asia. Regional report on status of road safety. The South-East Asia region: a call for policy direction. New Delhi: WHO Regional Office for South-East Asia; 2009.
54. Hernández Hernández V. Análisis exploratorio espacial de los accidentes de tránsito en Ciudad Juárez, México. Rev Panam Salud Pública 2012; 31:396-402.
55. Hijar MC, Kraus JF, Tovar V, Carrillo C. Analysis of fatal pedestrian injuries in Mexico City, 1994-1997. Injury 2001; 32:279-84.
56. Híjar-Medina MC. Utilidad del análisis geográfico en el estudio de las muertes por atropellamiento. Salud Pública Méx 2000; 42:188-93.
57. Roberts I, Norton R, Jackson R, Dunn R, Hassall I. Effect of environmental factors on risk of injury of child pedestrians by motor vehicles: a case-control study. BMJ 1995; 310:91-4.
58. Agran PF, Winn DG, Anderson CL, Tran C, Del Valle CP. The role of the physical and traffic environment in child pedestrian injuries. Pediatrics 1996; 98(6 Pt 1):1096-103.
59. Ameratunga S, Hijar M, Norton R. Road-traffic injuries: confronting disparities to address a global-health problem. Lancet 2006; 367:1533-40.
60. Medina-Ramírez S. La importancia de reducción del uso del automóvil en México. Tendencias de motorización, del uso del automóvil y de sus impactos. México DF: Instituto de Políticas para el Transporte y el Desarrollo; 2012.

61. Hidalgo D, Carrigan A. Modernización del transporte público. Washington DC: EMBARQ, World Resources Institute; 2010.
62. Mathers C, Fat DM, Boerma JT; World Health Organization. The global burden of disease: 2004 update. Geneva: World Health Organization; 2008.
63. Híjar M, Pérez-Núñez R, Inclán-Valadez C, Silveira-Rodrigues EM. Road safety legislation on the Americas. Rev Panam Salud Pública 2012; 32:70-6.
64. Global status report on road safety: time for action. Geneva: World Health Organization; 2009.
65. Hidalgo-Solórzano E. Uso de casco en motociclistas: un estudio en la zona urbana de Cuernavaca, México. In: 14º Congreso de Investigación en Salud Pública. Cuernavaca: Instituto Nacional de Salud Pública; 2011.
66. Organización Mundial de la Salud. Estrategia mundial para reducir el uso nocivo del alcohol. Geneva: Organización Mundial de la Salud; 2010.
67. Ackaah W, Afukaar F, Agyemang W, Thuy Anh T, Hejar AR, Abdul G, et al. The use of non-standard motorcycle helmets in low- and middle-income countries: a multicentre study. Inj Prev 2013; 19:158-63.
68. Zhu M, Cummings P, Chu H, Coben JH, Li G. Graduated driver licensing and motor vehicle crashes involving teenage drivers: an exploratory age-stratified meta-analysis. Inj Prev 2013; 19:49-57.
69. Lomas J, Culyer T, McCutcheon C, McAuley L, Law S. Conceptualizing and combining evidence for health system guidance (final report). Ottawa: Canadian Health Services Research Foundation; 2005.
70. Trevino-Siller S, Hijar M, Mora G. Prioritisation of road traffic injury interventions: results of a participative research with stakeholders in Mexico. Int J Inj Contr Saf Promot 2011; 18:219-25.
71. Nantulya VM, Sleet DA, Reich MR, Rosenberg M, Peden M, Waxweiler R. Introduction: the global challenge of road traffic injuries: can we achieve equity in safety? Inj Control Saf Promot 2003; 10: 3-7.
72. Rychetnik L, Frommer M, Hawe P, Shiell A. Criteria for evaluating evidence on public health interventions. J Epidemiol Community Health 2002; 56:119-27.
73. Nantulya VM, Reich MR. Equity dimensions of road traffic injuries in low- and middle-income countries. Inj Control Saf Promot 2003; 10:13-20.
74. Mohan D, Tiwari G, Khaayesi M, Nafunkho FM. Prevención de lesiones causadas por el tránsito. Manual de capacitación. Washington DC: Organización Panamericana de la Salud; 2008.
75. Elvik R, Vaa T. The handbook of road safety measures. Amsterdam: Elsevier Science; 2004.
76. Zhu M, Cummings P, Chu H, Cook LJ. Association of rear seat safety belt use with death in a traffic crash: a matched cohort study. Inj Prev 2007; 13:183-5.
77. Zaza S, Sleet DA, Thompson RS, Sosin DM, Bolen JC. Reviews of evidence regarding interventions to increase use of child safety seats. Am J Prev Med 2001; 21(4 Suppl):31-47.
78. Liu BC, Ivers R, Norton R, Boufous S, Blows S, Lo SK. Helmets for preventing injury in motorcycle riders. Cochrane Database Syst Rev 2008; (1):CD004333.
79. Crompton JG, Bone C, Oyetunji T, Pollack KM, Bolorunduro O, Villegas C, et al. Motorcycle helmets associated with lower risk of cervical spine injury: debunking the myth. J Am Coll Surg 2011; 212: 295-300.
80. Peek-Asa C, McArthur DL, Kraus JF. The prevalence of non-standard helmet use and head injuries among motorcycle riders. Accid Anal Prev 1999; 31:229-33.
81. Redelmeier DA, Tibshirani RJ. Association between cellular-telephone calls and motor vehicle collisions. N Engl J Med 1997; 336:453-8.
82. McEvoy SP, Stevenson MR, McCartt AT, Woodward M, Haworth C, Palamara P, et al. Role of mobile phones in motor vehicle crashes resulting in hospital attendance: a case-crossover study. BMJ 2005; 331:428.
83. Wilson FA, Stimpson JP. Trends in fatalities from distracted driving in the United States, 1999 to 2008. Am J Public Health 2010; 100:2213-9.
84. Hatfield J, Murphy S. The effects of mobile phone use on pedestrian crossing behaviour at signalized and unsignalized intersections. Accid Anal Prev 2007; 39:197-205.
85. Mohan D. Road safety in less-motorized environments: future concerns. Int J Epidemiol 2002; 31:527-32.
86. LaScala EA, Gruenewald PJ, Johnson FW. An ecological study of the locations of schools and child pedestrian injury collisions. Accid Anal Prev 2004; 36:569-76.
87. Secretaría de Comunicaciones y Transportes. Acuerdo por el que se da a conocer la Estrategia Nacional de Seguridad Vial 2011-2020. Diario Oficial de la Federación. Órgano del Gobierno Constitucional de los Estados Unidos Mexicanos 2011; número 4, sección 1. Tomo DCXCIII. http://dof.gob.mx/nota_detalle.php?codigo=5193284&fecha=06/06/2011.
88. Gobierno del Distrito Federal. 6to. Informe de Gobierno del Distrito Federal 2011-2012. México DF: Corporación Mexicana de Impresión; 2012. p. 152-3.
89. Pinet LM. Atención pre-hospitalaria de urgencias en el Distrito Federal: las oportunidades del sistema de salud. Salud Pública Méx 2005; 47:64-71.
90. Rodríguez-Hernández JM, Campuzano-Rincón JC, Hijar M. Comparación de datos sobre mortalidad por atropellamientos en la Ciudad de México: ¿se han presentado cambios en una década? Salud Pública Méx 2011; 53:320-8.
91. Mock C, Arreola-Risa C, Quansah R. Strengthening care for injured persons in less developed countries: a case study of Ghana and Mexico. Inj Control Saf Promot 2003; 10:45-51.

Recibido el 08/Feb/2013
Versión final presentada el 12/Ago/2013
Aprobado el 10/Feb/2014

Capítulo 11.
Evaluación de políticas y programas

Evaluar no sólo es una acción técnica, sino también un acto de responsabilidad ética frente a la salud pública. Es una herramienta fundamental para generar evidencias y, así, visibilizar la respuesta de las intervenciones a las necesidades de salud de la población, su implementación, la eficiencia en el uso de los recursos y el logro de los objetivos propuestos. Sobre esta idea básica, en el CISS, la evaluación de políticas y programas se ha realizado desde una perspectiva integral que no sólo busca medir o determinar los resultados finales o el impacto de las intervenciones. Su objetivo ha sido comprender el funcionamiento de cada programa en sus diferentes etapas. Además, como parte de esa perspectiva integral, los estudios de evaluación realizados en nuestro centro no se han limitado a la utilización de metodologías cuantitativas, sino que han incluido el análisis cualitativo como uno de sus elementos fundamentales, incursionando así en la evaluación basada en métodos mixtos.

La figura 1 presenta el marco bajo el cual se desarrolla la evaluación integral en el CISS.

Si bien el CISS cuenta con una vasta producción de artículos científicos sobre evaluación de políticas y programas, en este capítulo incluimos sólo algunos ejemplos relevantes.

Figura 1. Marco para la evaluación integral



Fuente: elaboración de investigadoras e investigadores del CISS.

El primer artículo revela diferencias importantes en eficiencia y eficacia del programa Municipios y Comunidades Saludables, así como las deficiencias en su implementación que limitaron su impacto en la mejora de comunidades saludables. Por su parte, el análisis comparativo del desempeño del sistema de salud mexicano entre 2000 y 2018 destacó avances en cobertura y protección financiera gracias al Seguro Popular. No obstante, el estudio advierte que disponer de más recursos no basta si no se utilizan adecuadamente.

Un caso exitoso es el del programa de educación sexual integral en escuelas públicas. El artículo que presentamos sobre el tema revela que la capacitación docente y el acompañamiento a estudiantes permitieron retrasar el inicio de la vida sexual y aumentar el uso de métodos anticonceptivos, lo que mostró tener alta eficacia. De igual manera, una intervención educativa para reducir residuos fue efectiva gracias a la presencia de liderazgo institucional e infraestructura, factores aplicables también a programas de salud. Finalmente, el análisis de la carga de la enfermedad en México en 2013 representó el primer estudio con un marco integral para observar el fenómeno en los niveles nacional y estatal. Este análisis permitió caracterizar la rápida transición epidemiológica por la que atravesó el país entre el final de los años noventa y la primera década del siglo XXI, y generó evidencia sólida para evaluar tanto la capacidad de respuesta del sistema de salud como la oportunidad de los programas y políticas implementados durante esos años.

ciss

Research Full Report

SDC

Evaluation of Health Promotion Program at the Community Level in Mexico: Is the Program Efficient and Effective?

Jacqueline E. Alcalde-Rabanal, DSc; Yuliana Flores-Loera, MSc; Carlos Chivardi, MSc; Ma. Guadalupe Ruelas-González, DSc, MA; Nayeli Macías, MSc; María Cecilia González-Robledo, DSc

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

ABSTRACT

Context: Health promotion programs have been encouraged in the Americas since 1990. In Mexico, health program promotion at the community level was implemented by the Ministry of Health in 2001 to encourage community health status improvement. Despite the longtime of its implementation, evaluations of its efficiency and effectiveness are scarce.

Objective: To evaluate the efficiency of the Healthy Environments and Communities Program (HECP) through 2 means: (1) efficiency of the implementation and (2) technical efficiency, as well as to evaluate its effectiveness.

Setting: Target communities of the HECP of 32 Mexican states during 2013-2017. The HECP developed community interventions to improve community organization, health behaviors, and family and communitarian sanitation.

Methodology: We conducted a cross-sectional study to evaluate the efficiency of HECP implementation and estimated the inclusion of target communities (focalization index), the retention of communities (continuity index), and the desertion of communities in the program (desertion index). To evaluate the adequate use of the program resources (technical efficiency), we used data-enveloped analysis and the Tobit regression model to identify external factors that can influence results. Finally, to evaluate the program's effectiveness, we estimated the index of the communities that improved their health indicators and were certified as healthy (community certification).

Results: The median rate of focalization was 3.44 (1.31-85.13); the continuity of communities' rate was 0.50 (0.16-2.67). Regarding technical efficiency to reach healthy communities, only 2 states reached the optimal efficiency (score 1); where the efficiency was adjusted for external factors, 6 states reached a score of 1. The median of global effectiveness was 0.19 (0.01-0.78). We found differences in efficiency and effectiveness scores among states.

Conclusion: We found lower efficiency of the implementation and technical efficiency, as well as poor effectiveness of the program to reach healthy communities. To achieve HECP purpose, it is necessary to revise its guidelines, improve its strategies to work in communities, and establish the right mechanisms to monitor its implementation. It is essential to focus on the resources used to enhance technical efficiency and effectiveness at the community level.

KEY WORDS: effectiveness, efficiency, evaluation, healthy communities, program evaluation, technical efficiency

Author Affiliations: *Center for Health System Research (Drs Alcalde-Rabanal and González-Robledo), Center for Evaluation and Survey (Dr Ruelas-González), and Center for Nutrition and Health Research (Ms Macías), Instituto Nacional de Salud Pública, Cuernavaca, Morelos, Mexico; Centre for Health Economics, University of York, England (Mr Chivardi); and Instituto de Seguridad Social y Salud de Trabajadores del Estado, Cancún, Q.R., Mexico (Ms Flores-Loera).*

The authors declare no conflicts of interest.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (http://www.JPHMP.com).

Correspondence: *Yuliana Flores-Loera, MSc, Instituto de Seguridad Social y Salud de Trabajadores del Estado, Libramiento A. Kabah Región 93, C. Colonia Centro, 77571 Cancún, Q.R., Mexico (dra.floresloera@gmail.com).*

Copyright © 2023 Wolters Kluwer Health, Inc. All rights reserved.

DOI: 10.1097/PHH.0000000000001741

Context

In the 1960s, the paradigm of health that oriented programs and resources to fight diseases and not their causes began to be questioned. At that time, the relevance of biological, environmental, and lifestyle factors and limited essential health services to explain the health of individuals and populations was recognized.[1] In this context, in 1986, the World Health Organization (WHO) promoted the Healthy Cities Program,[2] which was later implemented in the 1990s by the Pan American Health Organization (PAHO) in the Americas[3] as a Program of Healthy

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Flores-Loera Y, González-Robledo MC, Macías N, Chivardi C, Alcalde-Rabanal JE, Ruelas-González MG. Evaluation of health promotion program at the community level in Mexico: is the program efficient and effective? J Public Health Manag Pract. 2023;29(5):654-662. https://doi.org/10.1097/PHH.0000000000001741

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

Municipalities and Communities. In this proposal, a community was considered healthy when "society and organizations, both public and private dedicate constant efforts to improve their health conditions for the population's well-being."[4] This conceptualization implied an extensive modification of program implementation in terms of alliances and participation of community and health institutions. The main strategy was to promote healthy lifestyles and developed interventions to address determinants of health; therefore, the involvement of the community at the national and local levels was essential to achieve community health status improvement.[5]

In Mexico, the Healthy Environments and Communities Program (HECP) has been implemented since 2001. The HECP has been strengthened by several government administrations, and it is one of the most important programs that Mexico has implemented for health promotion in the last 20 years. The HECP has been implemented in the area of communities of primary care units with the participation of national and local governments, civil society organizations, community leaders, and the population. To this day, the HECP is implemented in communities with high social vulnerability (500-2500 inhabitants). Its objective was to improve the health conditions of communities by strengthening individual and community competencies for health care. After an evaluation of the physical characteristics of the dwelling, basic family sanitation, and characteristics of the family environment indicators, and according to its results, the community was certified as healthy.[5]

Undoubtedly, health programs are the main government instruments to implement their policies. Each program has targets to be achieved and activities to implement; therefore, adequate program management is required. Under these initial considerations, the program's effectiveness and efficiency evaluations are a basic tool for stakeholders' decision-making. Effectiveness programs will be assessed to the extent to which they accomplish the purpose for which they were implemented.[6] Whereby to address a program toward the fulfillment of its goals, it is crucial to follow their implementation, choosing the key program processes linked to its objectives to measure their progress.[7] This information for decision makers provides a clear understanding of the program progress and permits them to adjust their strategies.

In addition, to measure the efficiency of program implementation, an assessment of the use of financial, human, and material resources is crucial to evaluate its optimal performance (technical efficiency).[8] Technical efficiency consists of the optimal use of resources (inputs) in such a way as to maximize the outputs. Therefore, its measurement involves the relationship between inputs and outputs, considering the maximum frontier of production ("best practices").[9] Technical efficiency will be higher or lower according to the way the resources are spent. Furthermore, it is imperative to know to what extent a production unit minimizes inputs for an expected level of product or maximizes products to a given level of inputs.[10-12] There are several methods to measure technical efficiency. However, in the health sector, frontier methods are the ones most used.[13,14] These models acknowledge that production units usually produce below their full capacity.

In Mexico, the evaluation of programs has been strongly promoted by the government through the National Evaluation Council (CONEVAL, for its acronym in Spanish). The purpose of CONEVAL is to coordinate social development policies and programs, ensuring their accountability and results. Despite the actions to promote evaluation, the assessment of programs' efficiency and effectiveness is still limited. In 2016, CONEVAL evaluated HECP performance in terms of its achievements related to the certification of healthy communities; nevertheless, based on its technical report, they indicate that it was not possible to evaluate the certification of healthy communities due to lack of information.[15] After more than 20 years after HECP implementation, an evaluation of its efficiency and effectiveness is essential to enhance the strategies implemented or to seek a change concerning achieving its expected objectives. This article's main objective is to evaluate the efficiency of the HECP through 2 means: (1) efficiency of the implementation and (2) technical efficiency, as well as to evaluate its effectiveness to certify healthy communities in Mexico during 2013-2017.

Materials and Methods

Settings

The HECP was implemented in all of the Mexican states (32 states) by the Ministry of Health that were included in the present evaluation. We evaluated the HECP for a 5-year period (2013-2017), and this was carried out from June to December 2019. According to the community progress, the HECP classify them into initiated communities, informed communities, and certified communities. The criteria for its classification are presented in Supplemental Digital Content Appendix Table 1 (available at http://links.lww.com/JPHMP/B168).

Sources

The data come from the information system of the Ministry of Health available on the platform

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

"Dynamic Cubes," which is freely accessible and provides information from different health programs, including the HECP (http://www.dgis.salud.gob.mx/contenidos/basesdedatos/BD_Cubos_gobmx.html). We collected information from communities in which the HECP was implemented, human resources, and the program's budget of the 31 states.

Descriptive analysis

We estimated the total initiated communities, informed communities, and certified communities, the average of human resources, and the total program budget. These estimates were done for 2013-2017. We present information at the estate level and median as a representative measure since data do not follow a normal distribution.

Program implementation efficiency

We evaluated (1) the program focalization, that is, the inclusion of target communities (focalization index), (2) the continuity of the communities, that is, retention of communities in the program (continuity index), and desertion of communities, communities dropping out of the program (desertion index) (Table). For the focalization index, the ideal score is 1; scores below 1 indicate that the HECP has not been implemented in all its target communities, while a score above 1 indicates the program was implemented in all target communities and included other communities. For the continuity index, the ideal score is 1. Scores below 1 reflect lower retention of the communities in the HECP. For the desertion index, the ideal score is 0 and a score closer to 1 means higher desertion of communities.

Technical efficiency evaluation involving data analysis

Data envelopment analysis (DEA) was used to evaluate technical efficiency.[16,17] DEA is a nonparametric method that compares the productivity of different production units (PUs) using similar inputs to generate similar outputs. Technical efficiency was estimated by dividing the weighted sum of the outputs by the weighted sum of the inputs. The maximum efficiency frontier is calculated from the best performing PUs, that is, the one that makes the best use of the inputs and has the best productivity.[10] Thus, PUs lying on the frontier reached their maximum productivity and received a rate of 1 (which means reaching 100% of their productivity).[18,19]

Variables for DEA

Units of production

We considered as production units the 32 states that oversee HECP implementation.

Inputs

We considered as inputs doctors and nurses who work in units where the program was implemented. The variables taken into consideration were the average of general doctors and nurses from 2013 to 2017. Another input was the accumulated expenditure of the HECP for the same period.

Outputs

According to the guidelines of the HECP, we considered 3 outputs: (*a*) Initiated communities, (b) Informed communities, and (c) certified communities.

TABLE
Efficiency and Effectiveness Indicators

Indicators	What It Measures	Estimation Period 2013-2017
Implementation efficiency		
Focalization	The capacity to involve communities to implement the HECP	$(\Sigma Ic_{2013\text{-}2017}) - (\text{Total de } C_{500\text{-}2500})/(\text{Total } C_{500\text{-}2500})$
Continuity	Initiated communities not achieving informed community status	$(\Sigma Ic_{2013\text{-}2017}) - (\Sigma Inc_{2013\text{-}2017})/(\Sigma Ic_{2013\text{-}2017})$
Desertion	Communities not achieving certification as healthy	$(\Sigma Ic_{2013\text{-}2017}) - (\Sigma Cc_{2013\text{-}2017})/(\Sigma Ic_{2013\text{-}2017})$
Effectiveness		
Community certification	Communities involved in the HECP that achieved certification as healthy	$1 - [(\Sigma Ic_{2013\text{-}2017}) - (\Sigma Cc_{2013\text{-}2017})/(\Sigma Ic_{2013\text{-}2017})]$

Abbreviations: Cc, certified community; Ic, initiated community; Inc, informed community; HECP, Healthy Environments and Communities Program.

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

Specification of the DEA model

The output-oriented DEA model was adopted, leaving fixed inputs and variable returns, due to the heterogeneity in the availability of inputs that may affect the production function in the states. In other words, it indicates how much a PU can increase its output for a given level of input (raw technical efficiency). The estimation model of technical efficiency is as follows[16]:

$$\theta_B$$

$$\text{subject } a\ \theta_B y_0 - Y\lambda \leq 0$$

$$X\lambda \ \leq \ x_0$$

$$e\lambda = 1$$

$$\lambda \geq 0$$

where θ_B is the output (efficiency); X and Y are input and output vectors, respectively; λ is a non-negative vector, where $e\lambda$ is the condition of convexity that allows having a limited number of solutions to the maximization problem.

Afterward, we analyzed the contextual determinants that can influence technical efficiency through the Tobit regression model (Ji and Lee, 2010).[20] The dependent variable was the technical efficiency coefficient for the Cc, while the explanatory variables were as follows: population density, rate of housing improvement, rate of insecurity, gross domestic product, the Gini coefficient, and the rate of marginalization ($R^2 = 0.2460$). On the basis of this model, we estimated the adjusted technical efficiency coefficient. After that, we plotted the raw technical efficiency and adjusted technical efficiency coefficients.

Effectiveness evaluation

Effectiveness measured the level at which the HECP accomplished healthy communities. To measure the effectiveness, the following indicator was considered: communities' certification index (see Supplemental Digital Content Appendix Table 1, available at http://links.lww.com/JPHMP/B168). Effectiveness scores vary from 0 to 1. A score of 1 indicates the PU is completely effective, and lower scores mean that it operates within a certain level of ineffectiveness.

Results

Mexico has 15 185 communities between 500 and 2500 inhabitants (target communities). The PUs of Chiapas, Guanajuato, Edo Mexico, Oaxaca, Puebla, and Veracruz have 50% of these communities. During 2013-2017, an average of 34 556 doctors and 35 515 nurses worked in primary health facilities of the units of production (states) and 16 536 526 million pesos (US $856 814) were spent in the HECP. During these years, 61 842 communities started their process to become healthy communities, 30 044 reached the status of informed communities and 10 116 were certified as healthy communities. The median of nurses and doctors working for each certified community was 7.6, and the expense was 1465 pesos (US $86). Nevertheless, considerable differences were observed among states. For example, Oaxaca, Mexico City, Colima, Baja California Sur, and Sinaloa have the highest number of nurses and physicians per certified community; Colima and Baja California Sur have the highest expenditure per certified community (see Supplemental Digital Content Figure 1, available at http://links.lww.com/JPHMP/B169).

Figure 1 shows the results of the program implementation efficiency, technical efficiency, and effectiveness of PUs. Concerning the program implementation efficiency, the median of the HECP index of program focalization is 3.44 (min 1.31-max 85.13); it means that for each target community, there were 2 nontarget communities involved in the HECP. Furthermore, only the states of Nayarit and Sinaloa (6.6%; n = 2) have coefficients close to 1; the values obtained for Mexico City, Tabasco, Quintana Roo, and Durango are noteworthy due to the large number of nontarget communities in which the HECP is being implemented. The median of the continuity index is 0.50 (min 0.16-max 2.67), which means that for every initiated community we lose an informed community. Only 4 states have a continuity index close to 1, which means that all initiated communities reached the status of informed communities, and the rest of the states (87.5%; n = 28) reached coefficients lower than 1, which means low levels of communities continue in the process to be healthy. The desertion index reports a median of 0.81 (min 0.22-max 0.99), which means from 10 initiated communities, 8 communities drop out of the HECP. Only 2 states (Morelos and Yucatan) have a high index of retention of communities; 90% of the states (n = 27) show more than 50% of communities leaving the program.

In the evaluation of technical efficiency to reach initiated communities, we observed that the most efficient (score = 1) states were Chiapas, San Luis de Potosí, Tabasco, and Zacatecas; the states of Durango, Hidalgo, Guerrero, and Edo Mexico had a score from 0.6 to 0.98, the rest of the states (75%; n = 24) had a score lower than 0.6. Regarding technical efficiency to reach informed communities, the most efficient states (score = 1) were Durango, San Luis Potosí, and Zacatecas; the states of Campeche, Hidalgo, Quintana Roo, and Tabasco had a score from 0.6 to 0.78,

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

00 2023 • Volume 00, Number 00 www.JPHMP.com 5

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

State	Program implementation efficiency			Technical efficiency (DEA SCORE)			Effectiveness
	Focalization	Continuity	Desertion	To achieve Ic	To achieve Oc	To achieve Cc	Comunity certification
AGUASCALIENTES	4.06	0.78	0.59	0.26	0.33	0.56	0.41
BAJA CALIFORNIA	6.34	0.28	0.92	0.34	0.15	0.14	0.08
BAJA CALIFORNIA SUR	1.79	0.31	0.83	0.05	0.02	0.05	0.17
CAMPECHE	2.69	2.67	0.73	0.14	0.60	0.23	0.27
CHIAPAS	2.10	0.18	0.92	1.00	0.34	0.55	0.08
CHIHUAHUA	2.31	0.32	0.81	0.29	0.12	0.28	0.19
CIUDAD DE MEXICO	85.13	0.32	0.87	0.13	0.07	0.10	0.13
COAHUILA	6.17	0.61	0.85	0.18	0.18	0.14	0.15
COLIMA	4.78	0.65	0.43	0.01	0.01	0.04	0.57
DURANGO	10.87	0.77	0.80	0.98	1.00	1.00	0.20
GUANAJUATO	1.67	0.40	0.58	0.18	0.10	0.38	0.42
GUERRERO	3.75	0.49	0.93	0.78	0.59	0.31	0.07
HIDALGO	4.79	0.56	0.81	0.83	0.72	0.93	0.19
JALISCO	1.64	0.40	0.80	0.07	0.05	0.07	0.20
EDO MÉXICO	8.88	0.27	0.83	0.61	0.23	0.54	0.17
MICHOACÁN	2.46	1.13	0.80	0.30	0.49	0.33	0.20
MORELOS	3.07	0.62	0.22	0.18	0.15	0.73	0.78
NAYARIT	1.42	0.21	0.75	0.15	0.05	0.22	0.25
NUEVO LEÓN	4.77	0.64	0.37	0.11	0.11	0.34	0.63
OAXACA	2.08	0.66	0.99	0.51	0.53	0.04	0.01
PUEBLA	1.89	0.31	0.83	0.23	0.10	0.21	0.17
QUERÉTARO	3.79	0.16	0.95	0.33	0.09	0.09	0.05
QUINTANA ROO	10.25	1.18	0.78	0.37	0.65	0.45	0.22
SAN LUIS POTOSÍ	7.57	0.62	0.81	1.00	1.00	1.00	0.19
SINALOA	1.31	0.52	0.92	0.12	0.09	0.05	0.08
SONORA	1.96	0.32	0.75	0.09	0.05	0.12	0.25
TABASCO	11.29	0.46	0.95	1.00	0.78	0.34	0.05
TAMAULIPAS	5.09	0.48	0.73	0.13	0.09	0.19	0.27
TLAXCALA	3.13	0.64	0.37	0.29	0.29	1.00	0.63
VERACRUZ	2.20	0.24	0.85	0.30	0.10	0.24	0.15
YUCATÁN	1.68	1.48	0.29	0.11	0.25	0.41	0.71
ZACATECAS	8.14	0.64	0.94	1.00	1.00	0.39	0.06
Median	3.44	0.50	0.81	0.28	0.16	0.30	0.19
Ideal value	1	1	0	1	1	1	1

FIGURE 1 Implementation Process Efficiency, Technical Efficiency, and Effectiveness Scores of the Healthy Environments and Communities Program This figure is available in color online (www.JPHMP.com).

and the rest of the states (78%; n = 25) had scores lower than 0.6. Moreover, the states that got a score of 1 in technical efficiency to reach certified communities are Durango, San Luis Potosí, and Tlaxcala; the states of Hidalgo and Morelos had a score from 0.73 to 0.93, and the rest of the states (84%; n = 27) had a score lower than 0.55 (see Supplemental Digital Content Figure 2, available at http://links.lww.com/JPHMP/B170).

In the analysis of determinants of technical efficiency to reach certified communities, the results were as follows: for each unit of increment in population

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

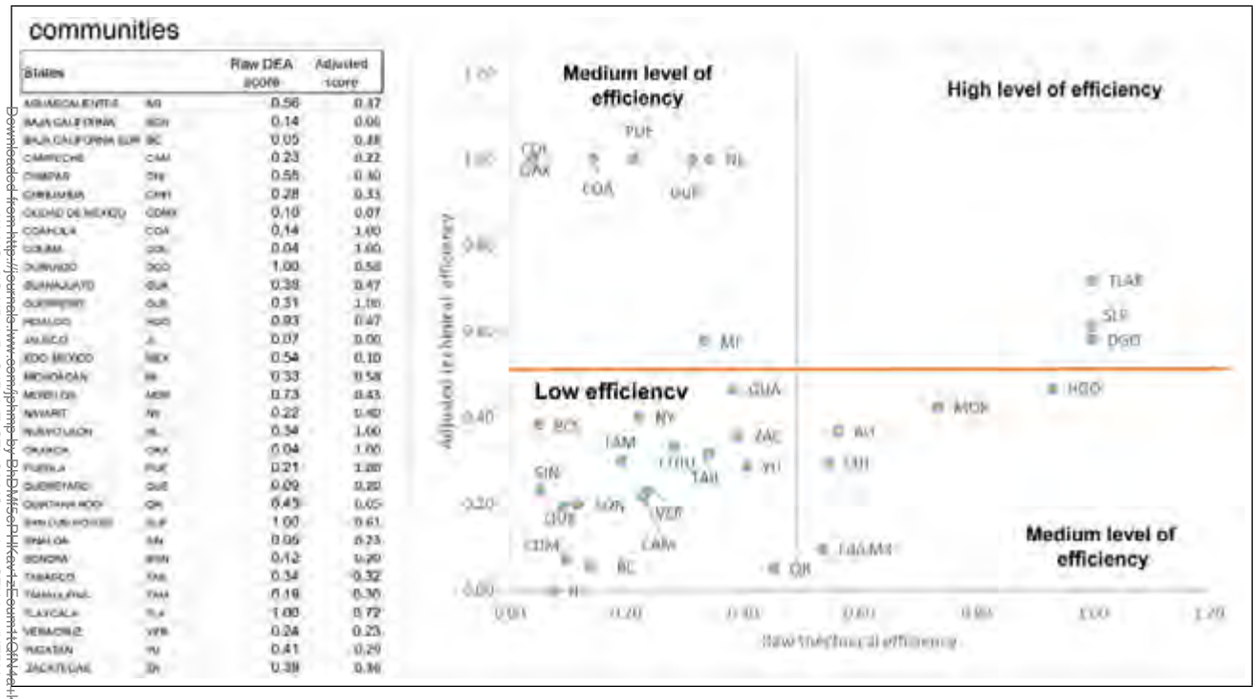


FIGURE 2 Raw and Adjusted Technical Efficiency for the Certification of Healthy Communities
This figure is available in color online (www.JPHMP.com).

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

density, there was an increase of 0.0002% in the probability of the technical efficiency ($P = .02$). The states in the fifth quintile of marginalization have −1.14 times ($P = .1$) less probability of technical efficiency than states in the first quintile or less marginalized states. For each unit of decrease on the Gini coefficient ($P < .05$), there was a reduction of 6.88 times the probability of technical efficiency. This model was adjusted for housing improvement, insecurity index, and gross domestic product. In Figure 2, we present the raw and adjusted coefficients of technical efficiency; only 9% of the states (n = 3) have a higher technical efficiency index and 54% (n = 17) have lower levels of efficiency. As well, 22% of the states (n = 7) have a raw technical efficiency index under 0.5, but for the adjusted coefficient, 6 states reach the optimal value. Sixteen percent of the states (n = 5) have a raw technical efficiency index over 0.5, but for the adjusted coefficient, their scores are under 0.5 (Figure 2).

According to the effectiveness, the community certification index (Figure 1) has a median of 0.19 (min 0.01-max 0.78). This figure reflects the low levels of effectiveness of the program to certify communities as healthy; only the states of Morelos and Yucatan have coefficients higher than 0.7 and the states of Colima, Nuevo León y Tlaxcala have coefficients from 0.57 to 0.63; the rest of the states (84%; n = 27) have coefficients less than 0.5.

Discussion

The lack of previous studies evaluating the efficiency and effectiveness of health promotion programs is evident. To our knowledge, this is the first study in Mexico that comprehensively evaluates the program implementation process, technical efficiency, and effectiveness of the HECP, although the program has been implemented a long time ago. The present evaluation shows a low level of efficiency achieved by the HECP; it is practicable for decision makers to refocus or redesign the program implementation process to achieve the expected results.[21]

We found low levels of implementation efficiency, technical efficiency, and effectiveness of the HECP. As part of the evaluation of the implementation efficiency, we found many communities starting the process to be healthy, which indicates the great acceptance of the communities to be involved in the HECP.[22] However, this high number of communities starting the process to be healthy results in a focalization index higher than 1, which means that many communities involved in the HECP are not target communities. One of the most important starting points of program implementation is to reach the population for whom it was created since the target population has the greatest need for the program benefits. Theoretical reflections and the empirical

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

findings reveal that an inadequate program focalization constitutes inefficiency in its implementation.[23] Since the program spent its resources on the nontarget population,[24] the gaps increase as well as inequity. We must question why nontarget communities were included in the HECP. There may be multiple explanations, such as a lack of knowledge of inclusion criteria, geographical inaccessibility of target communities, and limited monitoring of its implementation, among others. Based on the answers to this question, it will allow us to propose strategies for improving the focalization of the program.

Health promotion programs require continuity in their implementation on target communities since improving social determinants requires sustained actions in the medium and long terms. The low levels of continuity and the high levels of desertion of communities on the HECP are proof of their implementation inefficiency. Low continuity of target communities in the program implies a loss of resources; since the communities break their improvement to become healthy and will not reach the program goal. According to the literature, this can be a consequence of failures in community recruitment,[25] heterogeneity strategies on its implementation,[26,27] poor monitoring of the program implementers,[28] and poor competency levels of health personnel to implement and manage the program.[29] Therefore, we consider that continuity must be acknowledged as a tracer indicator of the implementation process efficiency of health programs.

Technical efficiency is a useful indicator to evaluate health program performance. Efficiency is a relevant issue because public resources to finance programs are scarce. It has been documented that between 20% and 40% of health system resources are not used appropriately.[30] Regarding technical efficiency of the HECP to achieve initiated communities, informed communities, and certified communities, only 4 or 5 states (out of 32) get the maximum frontier of production.[27] These results show the low levels of technical efficiency of the program. This means the HECP in the majority of the states does not use their resources adequately,[31] and there is an opportunity to maximize the use of the resources and increase the frontiers of production. Notwithstanding, other programs implemented in primary care units got an adequate level of technical efficiency[13] because they adopt innovative organizational models, health services production,[32] and intersectoral actions. As part of these findings, the literature points out the necessity to integrate the health sector in all policies through institutional arrangements that include intersectoral governance.[33]

Some evidence discusses the influence of external factors in technical efficiency.[34] Population density has a positive association with technical efficiency and marginalization rate, and the Gini coefficient has a negative association and turns out to be significant. It seems logical the target communities tend to be in remote areas, which makes it difficult to implement the program's actions. On the other hand, states with high marginalization and low Gini indexes face more poverty; in this scenario, improving determinants can be very difficult.

When adjusting the technical efficiency by contextual factors, only 6 states achieved the maximum production. The comparison of the raw and adjusted technical efficiency scores shows slight differences in the number of states that achieved a score of 1, which proves that the maximum frontier of production is similar in terms of raw and adjusted estimations. The states of Tlaxcala, San Luis Potosí, and Durango got the highest levels of raw and adjusted technical efficiency scores. The present study does not allow to identify the states that developed strategies for getting the highest technical efficiency in order to certify communities as healthy. These results open a window of opportunities for future research to identify the strategies, processes developed, contextual factors, and lessons learned[34] to achieve these results.[35]

As expected, low levels of implementation process efficiency and low levels of technical efficiency of the HECP result in low levels of effectiveness.[35,36] Only 2 states accomplished optimal levels to certify communities as healthy in the 2013-2017 period. This finding coincides with those established by other authors who have identified that weaknesses in program implementation can be expected to result in poor levels of effectiveness.[37]

This evaluation highlights the utilization of administrative records of programs that have public access. The benefit of using available administrative data for program evaluation is the reduction of its costs, although criticisms regarding the quality of data from administrative sources persist. However, there is a lot of evidence that supports the fact that the health information systems have undergone significant improvement due to technological advances[38] and it was used for evaluation.[39] This study evaluates efficiency using a comprehensive perspective and allows us to know the program's efficiency with accuracy and can motivate researchers to perform similar research evaluations. Among the limitations of this study, we can point out that the DEA model does not allow variations on measurement errors when collecting data.[18] On the other hand, all of the health workers were

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Implications for Policy & Practice

The results show an evident low level of efficiency and effectiveness of the HECP; based on this finding, decision makers need:

- To review the guidelines to implement the program and check again the criteria of target communities, as well as verify the programs execution in the field.
- To identify the best strategies developed in the states with the best technical efficiency score and effectiveness in order to replicate and adequately apply them in the states with low levels of efficiency.
- To identify the key indicator to monitor the implementation program and the use of the available resources of the HECP.
- To perform a regular evaluation of the effectiveness and efficiency of the program.

considered as input since it was impossible to determine who was involved in the HECP.

Conclusions

The evaluation highlights most of the states have a low level of implementation, technical efficiency, and effectiveness of the HECP in Mexico. Regarding the implementation process, we observed an inadequate focalization of the program in target communities, low levels of continuity, and high desertion of communities. Most of the states have a low level of technical efficiency, which means that they do not optimize the available resources to produce properly. Only 2 states achieved acceptable levels of effectiveness in getting healthy communities.

References

1. Lalonde M. *A New Perspective on the Health of Canadians*. Antigonish, NS, Canada: National Collaborating Centre for Determinants of Health; 1974. http://nccdh.ca/resources/entry/new-perspective-on-the-health-of-canadians. Accessed June 30, 2020.
2. Latapí J. *Ciudades saludables en el contexto internacional*. Cuauhtémoc, CDMX, Mexico: Mexico Academia Nacional de Medicina; 2015:185. httpswwwanmmorgmxpublicaciones CAnivANM150L26_ANM_Ciudades_saludablespdf. https://www.anmm.org.mx/publicaciones/CAnivANM150/L26_ANM_Ciudades_saludables.pdf. Accessed September 22, 2022.
3. Restrepo H, Llanos G, Contreras A, Recabado F, Gross S. *La Experiencia de OPS/América Latina Con Los Municipios Saludables*. Virtual Library of Sustainable Development and Environmental Health; 2017.
4. Secretaría de Salud. Programa de acción específico: entornos y comunidades saludables 2013-2018. https://www.gob.mx/salud/acciones-y-programas/programa-de-accion-especifico-entornos-y-comunidades-saludables-2013-2018-12265. Published 2015. Accessed June 30, 2020.
5. Santos-Burgoa C, Rodríguez-Cabrera L, Macedo de la Concha E, Alvarez García E, Cebrián Gómez A. Healthy communities program. *Prev Chronic Dis*. 2008;6(1):A31.
6. Lam Diaz RM. Los términos: eficiencia, eficacia y efectividad ¿son sinónimos en el área de la salud? *Rev Cubana Hematol Inmunol Hemoter*. 2008;24(2):22-26. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-02892008000200009. Accessed June 25, 2021.
7. Gilio A. La gestión por resultado en el contexto latinoamericano. In: *XV Congreso Internacional Del CLAD*. República Dominicana: Centro Latinoamericano de Administración para el Desarrollo (CLAD); 2010:8. https://cladista.clad.org/bitstream/handle/123456789/6565/0066240.pdf?sequence=1&isAllowed=y. Accessed June 30, 2020.
8. Akazili J, Adjuik M, Chatio S, et al. What are the technical and allocative efficiencies of public health centres in Ghana? *Ghana Med J*. 2008;42(4):149-155. http://www.ncbi.nlm.nih.gov/pubmed/19452023. Accessed July 19, 2020.
9. Mandl U, Dierx A, Ilzkovitz F. *The Effectiveness and Efficiency of Public Spending*. Brussels, Belgium: European Commission; 2008.
10. Coelli T, Prasada Rao DS, O'Donnell C, Battesse G. *An Introduction to Efficiency and Productivity Analysis*. 2nd ed. New York, NY: Springer-Verlag; 2005:1-9.
11. Farrell MJ. The measurement of productive efficiency. *J R Stat Soc Ser A*. 1957;120(3):253-290.
12. Palmer S, Torgerson DJ. Definitions of efficiency. *BMJ*. 1999;318(7191):1136.
13. Ruiz-Rodriguez M, Rodriguez-Villamizar LA, Heredia-Pi I. Technical efficiency of women's health prevention programs in Bucaramanga, Colombia: a four-stage analysis. *BMC Health Serv Res*. 2016;16(1):576.
14. Pelone F, Kringos DS, Romaniello A, Archibugi M, Salsiri C, Ricciardi W. Primary care efficiency measurement using data envelopment analysis: a systematic review. *J Med Syst*. 2015;39(1):156.
15. Consejo Naconal de Evaluación de la Politica de Desarrollo Social. Infome de La Evaluación Especifica de Desempeño 2014-2015: Programa Comunidades Saludables. https://www.coneval.org.mx/Evaluacion/Documents/EVALUACIONES/EED_2014_2015/SALUD/S037_CSALUDABLES/S037_CSALUDABLES_IC.pdf. Published 2018. Accessed June 30, 2020.
16. Banker RD, Charnes A, Cooper WW. Some models for estimating technical and scale inefficiencies in DEA. *Manag Sci*. 1984;30(9):1078-1092.
17. Hollingsworth B, Dawson PJ, Maniadakis N. Efficiency measurement of health care: a review of non-parametric methods and applications. *Health Care Manag Sci*. 1999;2(3):161-172.
18. Di Giorgio L, Flaxman AD, Moses MW, et al. Efficiency of health care production in low-resource settings: a Monte-Carlo simulation to compare the performance of data envelopment analysis, stochastic distance functions, and an ensemble model. *PLoS One*. 2016;11(1):e0147261.
19. Jehu-Appiah C, Sekidde S, Adjuik M, et al. Ownership and technical efficiency of hospitals: evidence from Ghana using data envelopment analysis. *Cost Eff Resour Alloc*. 2014;12(1):9.
20. Mujasi PN, Asbu EZ, Puig-Junoy J. How efficient are referral hospitals in Uganda? A data envelopment analysis and Tobit regression approach. *BMC Health Serv Res*. 2016;16:230.
21. Honeycutt S, Leeman J, McCarthy WJ, et al. Evaluating policy, systems, and environmental change interventions: lessons learned from CDC's prevention research centers. *Prev Chronic Dis*. 2015;12:E174.
22. Monreal-Bosch P, del Valle A, Perera S. Activando municipios para la promoción de la salud: Un estudio de caso en comunidades rurales. *Anu Psicol*. 2013;43(2):217-235. https://dialnet.unirioja.es/servlet/articulo?codigo=4635595. Accessed June 30, 2020.
23. Pérez León JA. Política social, pobreza y focalización—Dialnet. *Teoría y Praxis*. 2007;4:9-22. https://dialnet.unirioja.es/servlet/articulo?codigo=2929431. Accessed July 1, 2020.
24. Bitrán R, Muñoz C. *Focalización En La Salud: Conceptos y Análisis de Experiencias*. Latin America: Organización Panamericana de la Salud and Agencia de los Estados Unidos para el Desarollo Internacional (USAID); 2000.
25. Silva MO da S e, Lima VFS de A. Evaluating the impacts of income transfer programs in Latin America. *Rev Katál*. 2018;21(2):369-386.

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

26. Hoekstra F, van Offenbeek MAG, Dekker R, et al. Implementation fidelity trajectories of a health promotion program in multidisciplinary settings: managing tensions in rehabilitation care. *Implement Sci*. 2017;12(1):143.
27. Kilbourne AM, Neumann MS, Pincus HA, Bauer MS, Stall R. Implementing evidence-based interventions in health care: application of the replicating effective programs framework. *Implement Sci*. 2007;2:42. http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&DbFrom=pubmed&Cmd=Link&LinkName=pubmed_pubmed&LinkReadableName=Related Articles&IdsFromResult=18067681&ordinalpos=3&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum. Accessed May 18, 2021.
28. Field E, Vila M, Runk L, Mactaggart F, Rosewell A, Nathan S. Lessons for health program monitoring and evaluation in a low resource setting. *Rural Remote Health*. 2018;18(4):4596.
29. Pantoja T, Opiyo N, Lewin S, et al. Implementation strategies for health systems in low-income countries: an overview of systematic reviews. *Cochrane Database Syst Rev*. 2017;9(9):CD011086.
30. Nassar H, Sakr H, Ezzat A, Fikry P. Technical efficiency of healthcare systems in selected middle-income countries: an empirical investigation. *Rev Econ Pol Sci*. 2020;5(4):267-287.
31. Kapelko M. Measuring inefficiency for specific inputs using data envelopment analysis: evidence from construction industry in Spain and Portugal. *Cent Eur J Oper Res*. 2018;26(1):43-66.
32. Yavich N, Báscolo EP, Haggerty J. Comparing the performance of the public, social security and private health subsystems in Argentina by core dimensions of primary health care. *Fam Pract*. 2016;33(3):249-260.
33. Cid C, Báscolo E, Morales C. La eficiencia en la agenda de la estrategia de acceso y cobertura universales en salud en las Américas. *Salud Publica Mex*. 2016;58(5):496-503.
34. Ettorchi-Tardy A, Levif M, Michel P. Benchmarking: a method for continuous quality improvement in health. *Healthc Policy*. 2012;7(4):e101-e119.
35. Tiwari R, Negandhi H, Zodpey SP. Health management workforce for India in 2030. *Front Public Health*. 2018;6:227.
36. Ravangard R, Hatam N, Teimourizad A, Jafari A. Factors affecting the technical efficiency of health systems: a case study of Economic Cooperation Organization (ECO) countries (2004-10). *Int J Health Policy Manag*. 2014;3(2):63-69.
37. Breuer E, Lee L, De Silva M, Lund C. Using theory of change to design and evaluate public health interventions: a systematic review. *Implement Sci*. 2016;11:63.
38. Lozano R, Soliz P, Gakidou E, et al. Evaluación comparativa del desempeño de los sistemas estatales de salud usando cobertura efectiva. *Salud Publica Mex*. 2007;49(suppl 1):S53-S69.
39. Llorian ER, Mason G. Healthcare utilization and telemedicine: an evaluation using linked administrative data from Manitoba. *J Telemed Telecare*. 2021:1357633X20981227. doi:10.1177/1357633X20981227.

Downloaded from http://journals.lww.com/jphmp by BhDMf5ePHKav1zEoum1tQfN4a+kJLhEZgbsIHo4XMi0hCywCX1AWnYQp/IlQrHD3i3D0OdRyi7TvSFl4Cf3VC1y0abggQZXdtwnfKZBYtws= on 04/25/2023

Copyright © 2023 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

Health Policy and Planning, **38**, 2023, 689–700
DOI: https://doi.org/10.1093/heapol/czad028
Advance access publication date: 3 May 2023
Original Article

An assessment of the performance of the Mexican health system between 2000 and 2018

Octavio Gómez-Dantés[1], Evelyn Fuentes-Rivera[2], Joaquín Escobar[3] and Edson Serván-Mori[1,*]

[1]Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Morelos 62100, Mexico
[2]Center for Demographic, Urban and Environmental Studies, College of Mexico A.C., Mexico City 14110, Mexico
[3]Independent Consultant, Tonala, Chiapas 30500, Mexico

*Corresponding author. Center for Health Systems Research, National Institute of Public Health, Cuernavaca, Morelos 62100, Mexico. E-mail: eservan@insp.mx

Accepted on 2 May 2023

Abstract

This paper offers a comprehensive picture of the performance of the Mexican health system during the period 2000–18. Using high-quality and periodical data from the Organization for Economic Cooperation and Development, the World Bank, the Institute for Health Metrics and Evaluation and Mexico's National Survey of Household Income and Expenditure, we assess the evolution of seven types of indicators (health expenditure, health resources, health services, quality of care, health care coverage, health conditions and financial protection) over a period of 18 years during three political administrations. The reform implemented in Mexico in the period 2004–18—which includes the creation of 'Seguro Popular'—and other initiatives helped improve the financial protection levels of the Mexican population, expressed in the declining prevalence of catastrophic and impoverishing health expenditures, and various health conditions (consumption of tobacco in adults and under-five, maternal, cervical cancer and human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS) mortality rates). We conclude that policies intended to move towards universal health coverage should count on strong financial mechanisms to guarantee the consistent expansion of health care coverage and the sustainability of reform efforts. However, the mobilization of additional resources for health and the expansion of health care coverage do not guarantee by themselves major improvements in health conditions. Interventions to deal with specific health needs are also needed.

Keywords: UHC, Mexican health system, health system performance, Mexico

Key messages

- Policies intended to move towards universal health coverage (UHC) should count on strong financial mechanisms to guarantee the consistent expansion of healthcare coverage and the sustainability of reform efforts.
- The existence of an explicit reform policy does not guarantee the same level of support from different political administrations.
- The mobilization of additional resources for health and the expansion of health care coverage do not guarantee by themselves major improvements in health conditions. Interventions to deal with specific health needs are usually necessary.
- Gaps in health conditions are extremely difficult to close and need special attention.

Introduction

Several frameworks for the performance assessment of health systems have been designed in the past 20 years. Murray and Frenk published a paper in 2000 identifying what they call 'intrinsic goals' of health systems (health improvement, responsiveness to expectations and fairness in financial contribution) and the four functions that explain the performance of the health system: (1) financing, which includes revenue collection, fund pooling and purchasing; (2) provision of health services (personal and non-personal); (3) resource generation; and (4) stewardship, which includes overall system design, performance assessment, priority setting, intersectoral advocacy, regulation and consumer protection (Murray and Frenk, 2000).

In 2004, Roberts *et al.*, (2008) designed a framework that identifies three 'targets' for health systems: health status, customer satisfaction and risk protection. According to these authors, the targets can be met through the manipulation of five 'control knobs': financing, payment, organization, regulation and behaviour. The success in the use of these knobs can be initially evaluated through three 'intermediate performance measures': efficiency, quality and access.

A third framework proposed by the World Health Organization (WHO) in 2010 includes four 'overall outcomes/goals' (improved health, responsiveness, social and financial risk protection and improved efficiency), which are reached through the use of six 'building blocks': (1) service delivery, (2) health workforce, (3) health information systems, (4) access to essential medicines, (5) financing and (6) leadership/governance (WHO, 2010). This is basically a modified version of the Murray and Frenk framework.

© The Author(s) 2023. Published by Oxford University Press in association with The London School of Hygiene and Tropical Medicine.
All rights reserved. For permissions, please e-mail: journals.permissions@oup.com

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

In 2018, Romaniuk *et al.*, (2018) suggested the use of a synthetic outcome framework that includes three types of results: (1) epidemiological results (life expectancy; mortality by contagious and parasitic diseases, diabetes and cardiovascular diseases; and infant, maternal, cancer and tuberculosis mortality rates); (2) results in terms of health behaviours (alcohol intake per person, people smoking regularly, consumption of tobacco products and accidents at work); and (3) results in systemic terms (outpatient medical visits per person, hospital beds per inhabitant, beds occupied for short hospitalization per inhabitant, share of acute beds occupied, level of hospital bed use and average hospitalization time).

Following the tradition of the performance assessment of the health system described earlier, this paper aims to discuss the recent evolution of a set of health indicators that provides a comprehensive picture of the performance of the Mexican health system during the period 2000–18, which includes the period of implementation of the 'Seguro Popular' (SP) (2003–18). It is important to emphasize that the aim of the paper is not the evaluation of SP, although its implementation stands out in the operation of the Mexican health system during this period. For this reason, we make continuous references to this programme. Following are the three specific purposes of this paper: (1) to compare the performance of the Mexican health system in the three political administrations included in the period 2000–18 (2000–06, 2006–12 and 2012–18); (2) to provide a baseline for future evaluations of the performance of the health system during the present administration (2018–24); and (3) to offer lessons for developing countries willing to implement major health system reforms.

Background—the Mexican health system

The Mexican health system has a public and a private component (Gómez Dantés, 2009; Gómez Dantés *et al.*, 2011; González Block *et al.*, 2020). The public component includes two segments: the social security segment [the Mexican Institute of Social Security (IMSS), Institute for Social Security and Services for State Workers (ISSSTE), Social Security Institute for Oil Workers (PEMEX), Social Security Institute for the Army (SEDENA) and Social Security Institute for the Navy (SEMAR)], which provides comprehensive health care to the formally employed population (~50 million people), and the segment providing health care to the population without social security (~70 million people), which includes the federal and state ministries of health and IMSS-'Bienestar' (IMSS-B), a small programme managed by the IMSS that provides basic care to the poor rural populations.

The social security segment of the Mexican health system has essentially remained unchanged since the establishment of the IMSS in 1943 and the other social security agencies in the 1960s. The segment responsible for providing health care to the non-formally employed population, in contrast, changed considerably in 2004, when a public insurance scheme called the SP was established to finance access to comprehensive health care to >50 million people who at turn of the century lacked social security and, for that reason, received only basic essential care provided by the federal Ministry of Health (MoH) and the 32 state ministries of health (CNPSS, 2019). The budget of this ministry increased more than four times in real terms between 2004 and 2015 to finance this health coverage expansion (SHCP, 2022). By 2018, the SP counted on 53.5 million beneficiaries (CNPSS, 2015) and guaranteed access to 294 interventions included in the Universal Health Services Catalogue and 66 high-cost interventions financed through a special fund (the Fund for Protection against Catastrophic Expenses).

In 2019, the responsibility for financing the provision of comprehensive health care services to the population without social security was transferred from the SP, which was dismantled, to a new agency, the Health Institute for Welfare ('Instituto de Salud para el Bienestar' or INSABI), which was responsible for both financing and providing care to the uninsured population. The failed implementation of INSABI forced the federal government to substitute it with IMSS-Welfare ('IMSS-B') programme in 2022, a reinforced version of the IMSS programme that had provided essential health services to the uninsured rural poor over the past 40 years (Reich, 2020; El CEO, 2022).

Methods

The basic assumption of this paper is that in order to meet its intrinsic objectives (to improve health, to offer responsive health care and to provide financial protection), health systems mobilize financial, human and physical resources to produce high-quality health services, the coverage of which should be universal (Murray and Frenk, 2000; Roberts *et al.*, 2008).

To assess the performance of the Mexican health system—through the analysis of the degree to which the goals of this health system are being met—we use a modified/operational version of the Murray and Frenk framework. We followed indicators related to two of the intrinsic goals identified in this framework: health improvement and fairness in financial contribution. We did not use indicators related to responsiveness because we did not find data sources that could provide us with information for the whole period of analysis. To this, we added indicators that gave us an idea of how three of the four functions of the health system were performing: financing, resource generation and service provision.

More specifically, we followed the evolution of seven types of indicators over a period of 18 years: health expenditure (expressed in PPP—international purchasing power parity dollar—constant dollars of 2013), health resources, health services, quality of care, health care coverage, health conditions (risk, morbidity and mortality indicators) and financial protection (out-of-pocket expenditures and prevalence of catastrophic and impoverishing expenditures) indicators. We assumed that the availability of suitable and sufficient financial, physical and human resources enables the production of high-quality services, which, in turn, allows the health system to reach its intrinsic objectives.

For the seven types of indicators, we present the 2000, 2006, 2012 and 2018 values and their rate of change by political administration, which gives us a general idea of the performance of the health system in specific areas in the three political periods covered by this study (see details in Supplemental Appendix). The government in the first two periods was headed by the National Action Party, a right-wing political party. The government in the third period was headed by a centre-oriented party, the Institutional Revolutionary

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

Party. The 2018 values provide a baseline for future evaluations of the present administration (2018–24), headed by a left-wing party, 'Movimiento de Regeneración Nacional' or 'MORENA'.

According to Murray and Frenk (2000), when assessing the performance of health systems, we should focus not only on the average level of goals but also on its gaps. For this reason, we also included risk, morbidity and mortality figures—the ratio of the state with the highest value divided by the state with the lowest value—that express efforts to close gaps in health conditions among states in the past three administrations (2000–06, 2006–12 and 2012–18).

Most of the indicators utilized in this paper are regularly used to monitor the performance of the health system by various multilateral organizations, such as the WHO and the Organization for Economic Cooperation and Development (OECD) (OPS, 2017; OECD, 2020b). In fact, most of the information sources used to monitor the performance of the Mexican health system are databases from these organizations. This allows for the international comparisons made for this paper. These data sources were complemented with information from the Institute for Health Metrics and Evaluation (GBD Network, 2021)—mostly the information on health risks and health conditions—and the Mexican National Health Information System, which includes regular registries and periodical health and nutrition surveys (Shamah-Levy *et al.*, 2020), and other national periodical surveys, such as the National Survey of Household Income and Expenditure (ENIGH) (INEGI, 2021). Finally, the data on financial protection (the prevalence of catastrophic and impoverishing health expenditures) were retrieved from two papers, a previous study by Knaul *et al.*, (2016) on this topic for the period 2000–14 and a working paper by Knaul *et al.*, (2023) for the period 2016–18.

There is one indicator for which specific data were developed by the authors, which is social protection in health, defined as household access to needed health services without experiencing undue financial hardship (Rahman *et al.*, 2022). The reason is that there is no source of periodical information for this indicator in conventional databases. We estimated the values of this indicator using the data on health insurance from ENIGH for the periods 2000, 2006, 2012 and 2018 (INEGI, 2021). We defined health insurance at the household level and according to four excluding categories: none, the SP, social security (IMSS, ISSSTE, SEDENA, SEMAR and PEMEX) or mixed (more than one public health insurance or private insurance in the household) (Wirtz *et al.*, 2012). These estimates considered the sample design effect of ENIGH.

Results

Health expenditure

Health expenditure as a percentage of Gross Domestic Product (GDP) in Mexico grew by 21%, from 4.4% in 2000 to 5.4% in 2018 (Figure 1). This growth can be attributed mostly to public health expenditure, which increased at a higher rate than private expenditure in this period. In fact, private expenditure on health lost its dominant position in 2010, when public expenditure on health reached 50.2% of the total health expenditure (THE), up from 45.2% in 2000. In 2013, public expenditure on health reached 53.8% of the THE. However, this rising tendency changed in 2014, when public health expenditure began to decline to reach 49.7% of the THE in 2018.

There are important variations in the evolution of health expenditure in this period. It grew consistently from 4.4 to 6.1% of GDP between 2000 and 2009, stabilized ∼5.7% in the period 2010–15 and then declined from 5.7 to 5.4% in the period 2015–18 (Figure 1). The latter was most probably due to a drop in the budget of the MoH, which decreased by 20% in real terms in the period 2015–18 (SHCP, 2022).

Health expenditure per capita (in real terms) decreased by 11.6% in the period 2000–18, declining from $PPP 999.3 in 2000 to $PPP 883.5 in 2018. There was a 12.3% increase in the period 2000–06 (from $PPP 999.3 to $PPP 1,122.2), a decline of 11.9% in the period 2006–12 and an additional decline of 10.6% in the period 2012–18 (Table 1).

Health resources

Thanks to the increase in health expenditure in Mexico in the recent past, the availability of physicians and nurses showed some improvements (Table 1). Between 2000 and 2018, the ratio of physicians per 1000 population increased from 1.6 to 2.4 (49.7%), while the ratio for nurses increased from 2.2 to 2.9 (28.7%). The growth rates in the values of these two indicators for the three political administrations were the following: 16 and 0% for physicians and nurses, respectively, in the period 2000–06; 12.2 and 14.8%, respectively, in the period 2006–12; and 15.1 and 12.1%, respectively, in the period 2012–18.

The other resource indicator used for this exercise, hospital beds per 1000 population, shows a declining trend in the period 2000–18 (Table 1). The value of this ratio decreased from 1.1 per 1000 population in 2000 to 1.0 per 1000 population in 2018. The growth rates for this indicator in the three political administrations under study were the following: −2.9% in the period 2000–06, 1.0% in the period 2006–12 and −4.9% in the period 2012–18. The figures for psychiatric beds were very low during the three administrations covered in this analysis. The growth rate of this indicator for the period 2000–18 was −40%.

Health services

Immunization coverage shows three distinct patterns during the period of analysis associated with each of the three political administrations under study: a high coverage period (2000–06), with measles and diphtheria-tetanus-poliomyelitis (DPT) coverages >95%; a slightly unstable and high coverage period (2006–12), with coverages >95% for both vaccines; and an unstable and low coverage period (2012–18) with coverages <95% in five years of the period for DPT, and coverage <85% for both DPT and measles in 2017 (Table 1).

The value for 'births attended by skilled personnel' shows a positive increasing trend in the period of study, with figures <90% in the early years of the first decade of this century to figures >95% from 2011 to 2017 (Table 1).

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

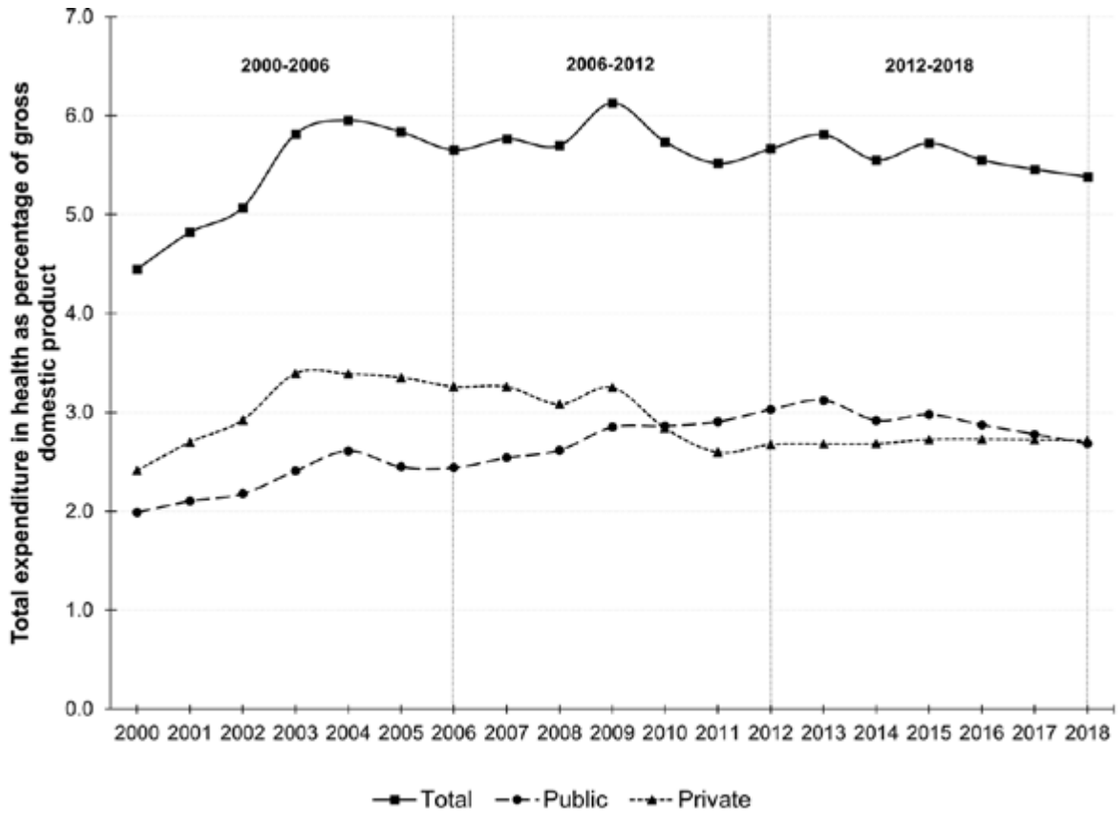


Figure 1. The total expenditure on health as the percentage of GDP in Mexico in the period 2000–18
Note: The authors' elaboration using the data retrieved from the Organisation for Economic Cooperation and Development's (OECD's) website (OECD, 2022a).

Quality of care

The two indicators used to evaluate the quality of care reflect the quality of medical care in outpatient facilities: the better the quality in these facilities, the less the number of patients with diabetes and hypertension that would require hospital care (AHRQ, 2022). The number of hospital discharges in diabetic patients increased from 114.2 patients per 100 000 population in 2000 to 131.1 patients in 2008 and then decreased to reach figures below those of 2000 in 2018 (100.4), while the number of hospital discharges in patients with hypertension has increased consistently in the period of study from 30.1 patients per 100 000 population in 2000 to 33.2 patients in 2018 (Table 1).

Social protection in health/health care coverage

The percentage of the total population without health care coverage declined consistently during the period of study: from 55% in 2000 to 6.7% in 2018 (Figure 2). This increase is mostly explained by the introduction of the SP, since the proportion of the total population affiliated with social security institutions (IMSS, ISSSTE and others) remained relatively constant between 2006 and 2018 at ∼35%. The period of the greatest expansion of health care coverage was the period 2006–12, which was the period of major growth of the SP. It is important to mention that the term 'health care coverage' refers here to affiliation to an insurance scheme and not to 'effective coverage', a concept associated with actual, effective coverage of specific interventions (Ng *et al.*, 2014).

Health conditions

The results of the evolution of health conditions in Mexico are divided into three groups: health risks, morbidity and mortality (Table 1).

Two of the health risks analysed for this paper show an increasing, disturbing trend: the prevalence of overweight and obesity in adults and the unhealthy consumption of alcohol. The relative changes for overweight for the 2000–06, 2006–12 and 2012–18 periods were 7.9, 6.8 and 8.5% for men and 5.1, 4.7 and 6.2% for women, respectively. The relative change for the 2000–18 period was a worrisome 21% for both sexes. The relative changes for unhealthy consumption of alcohol in all three periods were 2.4, 2.0 and 3.8% for men and 3.5, −0.2 and 0.9% for women, respectively. The relative change for the 2000–18 period was also high, i.e. 7% for both sexes. In contrast, the prevalence of tobacco consumption in adults shows a decreasing trend with declining rates for the three periods analysed in this paper: −12.6, −14.5 and −14.0% for men and −14.2, −17.3 and −18.0% for women, respectively. The rate for the period 2000–18 for both sexes was −37.6% (Table 1).

The three diseases used to evaluate the evolution of morbidity show an increasing tendency (Table 1). The prevalence

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

Table 1. Dashboard for the evaluation of the performance of the Mexican Health System, 2000–18

Indicator	Sex	2000	2006	2012	2018	Relative change (%) 2000–06	2006–12	2012–18	2000–18
Health expenditure									
Current health expenditure (CHE) as % of GDP[a]		4.4	5.7	5.7	5.4	27.1	0.2	−5.0	21.0
Constant health expenditure per capita ($PPP)[a]		999.3	1,122.2	988.3	883.5	12.3	11.8	−11.6	−11.6
Government health expenditure as % of CHE[a]		45.2	42.8	53.1	49.6	−5.3	23.9	−6.5	9.8
Private health expenditure as % of CHE[a]		54.8	57.2	46.9	50.4	4.4	−17.9	7.4	−8.1
Health resources									
Doctors[b,c]		1.6	1.9	2.1	2.4	16.0	12.2	15.1	49.7
Nurses[b,c]		2.2	2.2	2.6	2.9	0.0	14.8	12.1	28.7
Hospital beds[b,c]		1.1	1.0	1.0	1.0	−2.9	1.0	−4.9	−6.7
Psychiatric care beds[b,c]		0.1	0.1	0.0	0.0	0.0	−20.0	−25.0	−40.0
Health services									
DPT vaccination coverage[d] (%)		97.0	98.0	99.0	88.0	1.0	1.0	−11.1	−9.3
Measles vaccination coverage[e] (%)		96.0	96.0	99.0	97.0	0.0	3.1	−2.0	1.0
Bacillus Calmette-Guerin vaccination coverage[f] (%)		99.0	99.0	99.0	96.0	0.0	0.0	−3.0	−3.0
Births attended by skilled health personnel[g] (%)		88.6	93.4	99.6	96.6 [q]	5.4	6.6	−3.0	9.0 [h]
Quality of care									
Diabetes treatment[a,h]		114.2	127.5	130.5	100.4	11.6	2.4	−23.1	−12.1
Hypertension treatment[i,h]		30.1	35.5	45.2	33.2	17.9	27.3	−26.5	10.3
Coverage of social protection in health									
No health insurance[j] (%)		55.0	44.2	10.5	6.7	−19.6	−76.4	−35.9	−87.9
Popular health insurance[j] (%)		0.0	10.3	35.5	31.8		243.2	−10.3	
Social security[j] (%)		43.4	37.2	34.3	36.3	−14.4	−7.6	5.7	−16.4
Mixed affiliation[j] (%)		1.6	8.3	19.8	25.3	417.5	138.8	28.0	1481.3
Health conditions									
Risk factors									
Prevalence of overweight in adults[k] (%)	Male	53.1	57.3	61.2	66.4	7.9	6.8	8.5	25.0
	Female	58.3	61.3	64.2	68.2	5.1	4.7	6.2	17.0
	Both	55.9	59.5	62.8	67.4	6.4	5.5	7.3	20.6
Prevalence of unhealthy alcohol consumption in adults[p] (%)	Male	14.1	14.4	14.7	15.3	2.4	2.0	3.8	8.4
	Female	4.6	4.7	4.7	4.8	3.5	−0.2	0.9	4.3
	Both	9.1	9.4	9.5	9.8	2.6	1.5	3.1	7.4
Prevalence of tobacco consumption in adults[l] (%)	Male	12.7	11.1	9.5	8.1	−12.6	−14.5	−14.0	−35.7
	Female	3.9	3.4	2.8	2.3	−14.2	−17.3	−18.0	−41.8
	Both	8.1	7.0	6.0	5.1	−13.2	−15.3	−15.0	−37.6
Morbidity									
Prevalence of diabetes mellitus type 2[l] (%)	Male	8.1	8.8	9.7	11.9	8.6	10.6	22.3	46.9
	Female	8.9	9.3	9.2	9.9	5.1	−1.4	7.2	11.1
	Both	8.5	9.1	9.5	10.8	6.7	4.0	14.4	27.0
Prevalence of hypertension[l] (%)	Male	25.4	25.9	26.4	28.1	1.8	2.0	6.3	10.4
	Female	24.7	25.5	26.2	28.4	3.0	2.8	8.3	14.7
	Both	25.1	25.7	26.3	28.3	2.5	2.5	7.5	12.8
Prevalence of depression[l] (%)	Male	1.7	1.8	1.8	1.8	2.8	0.4	4.0	7.3
	Female	3.1	3.2	3.8	3.8	5.2	16.8	0.5	23.5
	Both	2.4	2.5	2.8	2.9	4.5	11.4	1.4	18.1

(continued)

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

Table 1. (Continued)

Indicator	Sex	2000	2006	2012	2018	Relative change (%) 2000–06	2006–12	2012–18	2000–18
Mortality									
Under-five mortality[m, n]	Male	31.1	24.2	19.6	16.0	−22.2	−19.0	−18.4	−48.6
	Female	25.6	19.9	16.2	13.2	−22.3	−18.6	−18.5	−48.4
	Both	28.4	22.1	17.9	14.6	−22.2	−19.0	−18.4	−48.6
Maternal mortality[l, o]	Female	1531	1329	1159	1061	−13.3	−12.7	−8.5	−30.7
HIV/AIDS mortality[l]	Male	8.8	8.9	7.8	6.4	0.4	−12.4	−18.1	−28.0
	Female	1.8	2.0	2.1	1.7	10.0	1.2	−15.4	−5.9
	Both	5.2	5.3	4.8	4.0	1.9	−9.6	−17.3	−23.8
Cervical cancer mortality[l]	Female	16.8	12.7	10.1	9.5	−24.1	−20.5	−5.7	−43.0
Breast cancer mortality[i]	Female	11.9	12.0	12.1	12.6	0.9	0.4	3.9	5.2
Diabetes mortality[l]	Male	55.2	56.7	58.6	67.1	2.7	3.4	14.5	21.6
	Female	62.0	59.1	56.8	59.2	−4.8	−3.8	4.2	−4.5
	Both	58.8	58.0	57.7	63.0	−1.4	−0.5	9.1	7.1
Cardiovascular diseases mortality[l]	Male	177.6	163.9	166.7	175.5	−7.7	1.7	5.3	−1.2
	Female	159.9	144.2	139.7	140.4	−9.8	−3.1	0.5	−12.2
	Both	168.2	153.5	152.3	156.8	−8.8	−0.8	3.0	−6.8
Financial protection									
Out-of-pocket expenditure as % of CHE		52.2	53.8	42.6	42.1	2.9	−20.8	−1.2	−19.4
Prevalence of catastrophic health expenditures (%)		3.1[p]	3.5[p]	2.3[p]	2.0[p]	12.9	−34.3	−13.0	−35.5
Prevalence of impoverishing health expenditures (%)		3.3[p]	1.5[p]	0.7[p]	0.7[p]	−54.5	−53.3	0.0	−78.8

Notes:
[a]Retrieved from the Organisation for Economic Cooperation and Development's (OECD's) website (OECD, 2022a).
[b]Retrieved from OECD's website (OECD, 2022b).
[c]Value rate per 1000 people.
[d]Retrieved from the World Bank's website (WB, 2022a).
[e]Retrieved from the World Bank's website (WB, 2022b).
[f]Retrieved from the WHO's website (WHO, 2022a).
[g]Retrieved from the WHO's website (WHO, 2022b).
[h]Value rate per 100 000 people.
[i]Retrieved from the Mexican Ministry of Health's website (SSa, 2022).
[j]The authors' estimates using the data from the National Survey of Household Income and Expenditure (ENIGH) for the period 2000–18 (INEGI, 2021).
[k]Retrieved from the World Bank's website (WB, 2022c).
[l]Retrieved from the Global Burden of Disease (GBD) study (GBD Collaborative Network, 2021).
[m]Retrieved from the World Bank's website (WB, 2022d).
[n]Value rate per 1000 live births.
[o]Number of deaths.
[p]Retrieved from Knaul *et al.* (2016) and Knaul *et al.* (2023).
[q]Value for 2017.

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

Health Policy and Planning, 2023, Vol. 38, No. 6

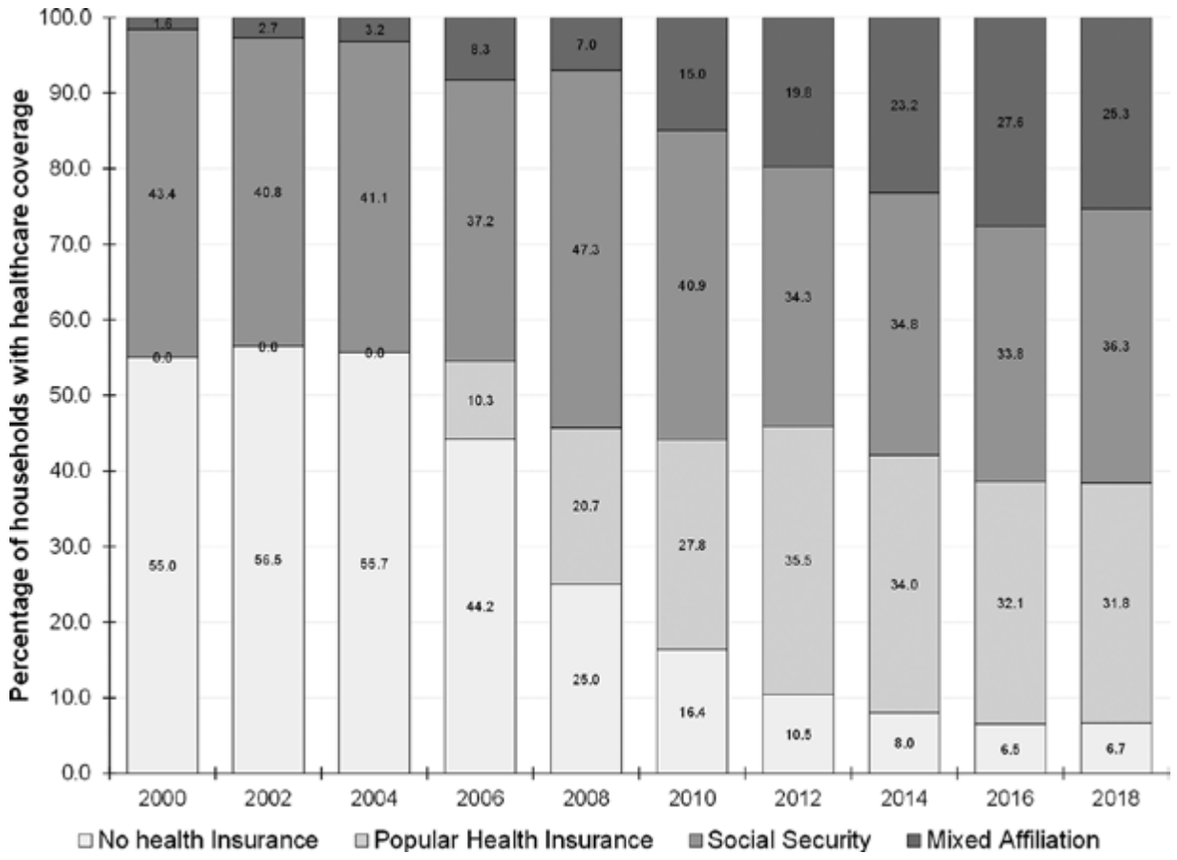


Figure 2. The percentage of households with financial protection in Mexico in the period 2000–18
Note: The authors' estimates using the data from the National Survey of Household Income and Expenditure (ENIGH) (2000–18) (INEGI, 2021).

of diabetes increased by 13% in the period 2012–18 to reach 10.8%. It was slightly higher in men than in women in the period as a whole. The prevalence of hypertension also increased. Its relative change for the period 2000–18 was 12.8% for both sexes. Finally, the prevalence of depression, which is higher in women, also increased. The growth rate for both groups in the period 2000–18 was 18%, but it was much higher in women (23.5%) than in men (7.3%) (Table 1). It is important to mention that part of the increasing tendency in the prevalence of these diseases may be explained by the recent use of better screening procedures.

Mortality figures for three of the pre-transitional ailments included in this dashboard (under-five, maternal and cervical cancer mortality rates) show a declining trend. In the 2000–18 period, under-five mortality decreased by 48.5%, maternal deaths by 30.7% and cervical cancer mortality by 43%. The trend in human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS) mortality shows a positive shift in 2010, when the values for this indicator began to decline. In the period 2000–18, the mortality figure for this ailment decreased by 23.8% (Table 1).

In contrast, mortality figures for the three non-communicable diseases (NCDs) included in this dashboard show an increasing trend. Breast cancer mortality rate increased in the three periods analysed in this paper: 0.9% in 2000–06, 0.4% in 2006–12 and 3.9% in 2012–18. Its growth rate for the period 2000–18 was 5.2%. The mortality rate for diabetes decreased in the 2000–06 and 2006–12 periods but increased in the last period by 9.1%. Its growth rate for the period 2000–18 was 7.1%. Finally, the mortality rate due to cardiovascular diseases decreased in the first two periods included in this analysis but increased in the period 2012–18 by 3%. Its growth rate for the period 2000–18 was –6.8% (Table 1).

Gaps in health conditions

There are several patterns in the evolution of gaps in health conditions in the period 2000–18. The gaps (the ratio of the state with the highest value divided by the state with the lowest value) in most health conditions analysed in this paper are relatively small and have changed very little in the period of this study (Figure 3). There are five indicators (the prevalence of overweight and obesity in adults, non-healthy consumption of alcohol, diabetes, hypertension and depression) with small gaps and almost no change in the period 2000–18. There are other four indicators (diabetes, cervical-uterine, breast cancer and cardiovascular diseases mortality rates) with moderate-to-high gaps, which show almost no change in the period of analysis. There are two indicators, under-five mortality and maternal deaths, with a big gap during the initial period of analysis, which declined dramatically, one between 2000

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

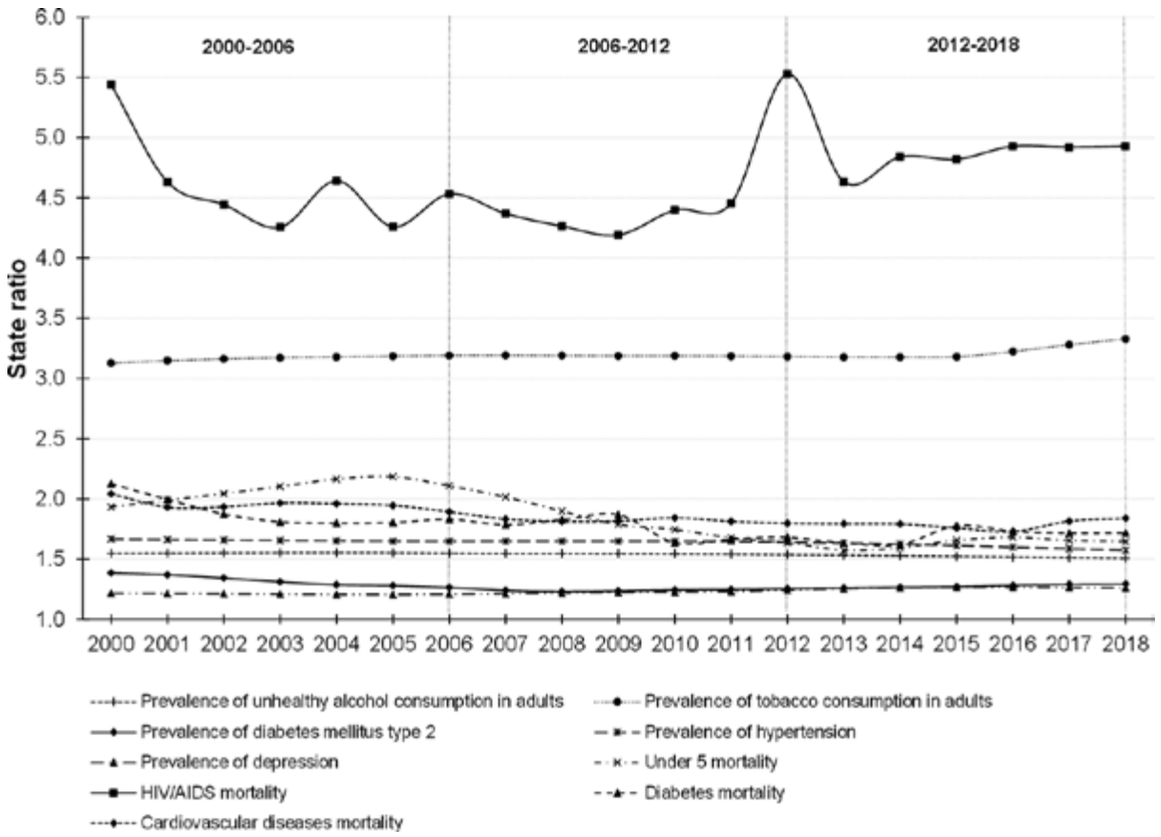


Figure 3. The evolution of gaps for various health conditions in Mexico in the period 2000–18
Note: The data were retrieved from the Global Burden of Disease (GBD) study (GBD Collaborative Network, 2021).

and 2006 (maternal deaths) and the other one between 2005 and 2012 (under-five mortality). The gap in the prevalence of tobacco consumption in adults is consistently high and increases at the end of the period. Finally, the HIV/AIDS mortality shows a huge gap with a very irregular behaviour during the period of analysis.

We also measured the gap between women and men for all health conditions. There were small differences between these two groups, except for the prevalence of depression, which is much higher in women. The gap for this condition increased in the period of analysis (Figure 3).

Financial protection

The prevalence of catastrophic and impoverishing health expenditures decreased during the period of study from 3.1 and 3.3% of the total households in 2000 to 2.0 and 0.7% of the total households in 2018, respectively (Figure 4). There was an important reduction of impoverishing expenditures in the period 2000–06, a major reduction in both catastrophic and impoverishing expenditures in the period 2006–12 and a slight increase in the value of both indicators in the period 2012–18. There was also an important decrease in the out-of-pocket expenditure in the whole period: from 52.2% of the THE in 2000 to 42% in 2018. The value of this indicator remained constant in the period 2000–06, decreased considerably (–20.8%) in the period 2006–12 and remained relatively constant between 2012 and 2018.

Discussion

The overall analysis of the data in this paper indicates that the interventions implemented in Mexico in the period 2000–18 helped improve the financial protection levels of the Mexican population—expressed in the declining prevalence of catastrophic and impoverishing health expenditures—and various health conditions (consumption of tobacco in adults and under-five, maternal, cervical cancer and HIV/AIDS mortality). The decline in mortality figures in most of them was considerable.

The progress in the levels of financial protection is associated with an increase in health expenditure—from 5% to 6% of GDP—due to unprecedented growth of public expenditure in health, mostly in the period 2004–12, mainly explained by the creation of the SP that benefitted the population without social security—although Mexico still has one of the lowest health expenditure figures in Latin America (OECD, 2020a). This increase in public health expenditure, however, was not enough to absorb the demographic growth and the fluctuations in inflation, which negatively influenced the per capita expenditure in health for the country as a whole in this

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

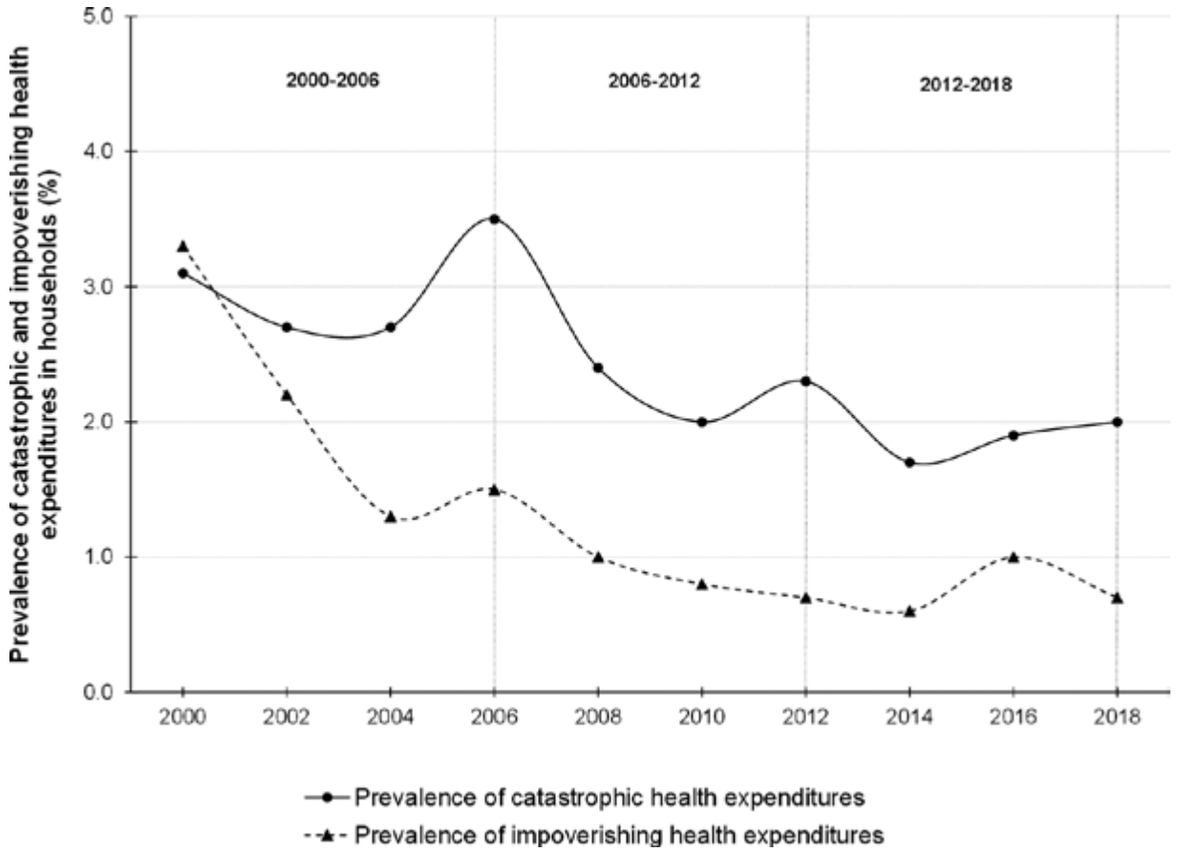


Figure 4. The prevalence of catastrophic and impoverishing health expenditures in Mexico in the period 2000–18
Note: Estimations retrieved from Knaul *et al.* (2016) and Knaul *et al.*, (2023).

period. However, the increase in public expenditure in health allowed for a major expansion of health care coverage, from 45% to >90% of the total population, and improvements in the levels of financial protection. Conditional cash transfer programmes, such as 'Progresa/Oportunidades/Prospera', and cash remittances from abroad, may have also contributed to the reduction of the prevalence of catastrophic and impoverishing expenditures in health. Their specific weight should be estimated in future research.

The improvements in the prevalence of tobacco consumption and under-five, maternal, cervical cancer and HIV/AIDS mortality are probably explained both by the expansion of health care coverage and the implementation of specific initiatives—most of them not related to the SP—intended to meet the objectives of the WHO International Convention on Tobacco Control and the health-related Millennium Development Goals (MDGs). These initiatives were implemented by all actors in the health system, including social security agencies. Salient among them are the national policy to combat the consumption of tobacco, which was designed at the turn of the century and is still active; the Universal Immunization Programme, which started in the late 1980s and remains in place; the programme 'Fair Start in Life', implemented between 2001 and 2006, which strengthened maternal and child services in public institutions; and universal access to antiretrovirals, guaranteed by the SP (Soler Claudín, 2009; Frenk and Gómez-Dantés, 2011; Reynales-Shigematsu *et al.*, 2019). It is important to mention that despite the 30% decrease in maternal mortality in the period 2000–18, Mexico was unable to meet the MDG related to this crucial topic (Gobierno de México, 2015).

However, indicators related to NCDs show a negative tendency in the period 2000–18. This is true for the prevalence of diabetes and hypertension and for breast cancer, diabetes and cardiovascular disease mortality. Given the expansion of health care coverage associated with the SP, which covered the treatment for diabetes, acute myocardial infarction (AMI) and breast cancer, these negative figures could be explained mostly by problems in the quality of care, which affect both social security agencies and the MoH. Although hospital discharges in diabetic patients declined by 12% in the period 2000–18, the figures are high compared with those of other Latin American countries with similar levels of development, such as Brazil, Colombia or Uruguay (OECD, 2020a). This is also true for cardiovascular diseases. Mortality figures for these diseases declined by 6.7% in the period 2000–18. However, there was a shift in this declining tendency between 2012 and 2018. In addition, Mexico has a very high in-hospital-case fatality rate following AMI (28%), much higher than the OECD average (6.9%) and that of Brazil (13%), Chile (8%), Colombia (6%), Costa Rica (0.3%) and Uruguay (9%) (OECD, 2020a). Finally, access to the treatment for breast cancer increased

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

between 2000 and 2018 thanks to the SP. However, there were no changes in the diagnosis and treatment delays in this same period (Huerta-Gutierrez *et al.*, 2022). This could partly explain the high and increasing breast cancer mortality in Mexico.

The increasing tendency of prevalence and mortality figures for NCDs is also explained by poor control of certain risk factors. The dramatic reduction in the prevalence of tobacco consumption in adults is a major achievement. However, the prevalence of overweight among adults is the highest of all OECD countries and it is increasing (OECD, 2021). The prevalence of unhealthy consumption of alcohol is not too high compared with other countries, but it is also increasing both in men and women (OCED, 2021).

Mention should also be made to the prevalence of depression. It grew at a fast pace in the period 2000–18, especially in women (23.5%). Despite the increasing importance of mental diseases, very few resources have been mobilized to address them, as shown by the declining availability of psychiatric beds. The rate for these beds decreased by 40% in the period of this study. There is also a chronic lack of human resources specialized in mental health (Katz *et al.*, 2017).

In terms of gaps, a discouraging finding is the fact that most gaps in health conditions remained unchanged during the period of study, except for the gap in the prevalence of depression, which increased considerably. This finding suggests that specific efforts should be designed to monitor and reduce these and other inequities.

In terms of the impact of the reform on health system performance by political periods, the data in this article show three reform phases associated with each of the three administrations involved in this study: (1) launching phase (2000–06), (2) consolidation phase (2006–12) and (3) waning phase (2012–18). Two measures characterize the launching phase of the period under analysis: (1) the establishment of a legal financial mechanism to provide social protection in health, through the SP, to the population without social security, which guaranteed the expansion of health care coverage and the sustainability of the reform efforts; and (2) the implementation of specific health interventions (Fair Start in Life, Universal Immunization Programme and universal access to antiretrovirals), which helped achieve most of the health-related objectives of the MDG. The consolidation phase is marked by a consistent expansion of resources that financed a major growth of health care coverage—which had an important impact on the levels of financial protection—and the continuation of most of the specific interventions designed during the previous administration. During this phase, there was also an important effort to expand access to costly health interventions for children through the Medical Insurance for a New Generation, which was incorporated into the SP (Muñoz-Hernández *et al.*, 2012). (3) The waning phase is marked by a dramatic reduction of the MoH budget between 2015 and 2018 that signalled the end of an increasing trend both in health care expenditure and health care coverage, which affected the levels of financial protection of the Mexican population. This decreasing concern for the mobilization of resources for health is also expressed in the erratic evolution of various health interventions, some of them not directly related to the health reform, most notably immunizations, the coverage of which declined during this period.

We have identified four limitations of this study. First, given its descriptive, time series nature, no causal relationships can be established with its results. Second, this article cannot be used as an impact evaluation of a specific intervention implemented in the period of analysis of the study, like the SP, which would demand a different approach requiring quasi-experimental methods and the disaggregation of the information to identify its effects or impacts. Third, even though we use high-quality and robust data, we cannot rule out memory bias, especially in the data collected from households' surveys. Finally, further research would be needed to compare Mexico with a country with similar baseline figures but no policies to expand health care coverage in order to identify the presence of counterfactual/secular trends that could explain some of the outcomes.

Conclusions

There are five basic lessons/conclusions of the assessment of the performance of the Mexican health system during the period 2000–18:

(a) Policies intended to move towards universal health coverage should count on sustainable financial mechanisms to guarantee the consistent expansion of health care coverage. The Mexican health system, through the SP, counted on a strong legal foundation that guaranteed the mobilization of resources to provide financial protection in health to >50 million people.
(b) The existence of an explicit reform policy does not guarantee the same level of support from different political administrations. The evolution of the reform associated with the SP shows that shifts in the level of support for this type of initiative should be expected with changes in federal administrations, especially when they are related to changes in the political party heading the government, which was the case in the third period of analysis of this study.
(c) The mobilization of additional resources for health and the expansion of health care coverage do not guarantee by themselves major improvements in health conditions. The mobilization of financial, technological and human resources should be aligned with specific health needs and general economic conditions in order to generate major impacts. In fact, the design of interventions to deal with specific health needs during the first two phases of the Mexican reform indicates that focused efforts to deal with pressing problems render important benefits.
(d) The gaps in health conditions are extremely difficult to close. The unchanged magnitude of health gaps during the period 2000–18 in Mexico suggests that specific efforts are needed to monitor and reduce them.
(e) Progress in health policy is not linear; it can be subject to reversals. The dismantling of the SP in 2019 shows that interventions that deliver improvements in health care coverage, financial protection and health conditions may still be the target of attacks coming from opponents of those responsible for the reform

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

effort. For this reason, reforms should be evaluated and adjusted, but if they produce major benefits, they should also be actively protected.

Supplementary data

Supplementary data are available at *Health Policy and Planning* online.

Data availability

This study constitutes a secondary analysis of data obtained from public repositories. The dataset is available from the corresponding author on request.

Funding

This study was funded by the National Institute for Health and Care Research (NIHR), Global Health Policy and Systems Research (GHPSR) researcher-led grant [grant number NIHR150067] using UK aid from the UK Government to support global health research. The views expressed in this publication are those of the authors and not necessarily those of the NIHR or the UK Government.

Author contributions

O.G.-D. conceived the idea of the paper and designed the study. E.S.-M. led the formal analysis and performed the data curation. O.G.-D. and E.S.-M. wrote the first draft of the manuscript. E.F.-R. and J.E. provided critical inputs on multiple iterations. O.G.-D. and E.S.-M. are the guarantors of the work and, as such, had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. The final version of the manuscript was revised and approved by all the authors.

Reflexivity statement

The authors include three males and one female and span multiple levels of seniority. One of the authors (O.G.-D.) has a 30-year experience in health systems research and has worked as a high official at the Ministry of Health, Mexico. Another author (E.S.-M.) has a PhD in Economics and has extensive experience conducting quantitative research in various areas (impact of health and social programmes, evaluation of health interventions, social protection in health among vulnerable groups, etc.). The third author (E.F.-R) is presently a doctoral student in demography at the most prestigious social sciences centre in Mexico (El Colegio de Mexico). Finally, the fourth author (J.E.) recently finished his master's degree in health systems at the National Institute of Public Health and is developing his professional career as a consultant in a poor state of Mexico (Chiapas).

Ethical approval. Ethical approval is not required by our institute for this type of study.

Conflict of interest. The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Dedication death quote

We dedicate this paper to our colleague Sandra Sosa-Rubi who passed away in March 2021. Dr Sosa will be remembered as a remarkable health economist, friend, professor and human being.

References

Agency for Healthcare Research and Quality (AHRQ). 2022. *AHRQ Quality Indicators—Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions*. AHRQ Pub. No. 02-R0203. https://qualityindicators.ahrq.gov/measures/pqi_resources, accessed 5 May 2022.

Comisión Nacional de Protección Social en Salud (CNPSS). 2015. *Sistema de Protección Social en Salud. Informe de Resultados. Enero-Diciembre 2015*. Ciudad de México. http://www.transparencia.seguro-popular.gob.mx/contenidos/archivos/transparencia/planesprogramaseinformes/informes/Informe%20de%20Resultados%20Ene-Dic%202015.pdf, accessed 10 April 2023.

Comisión Nacional de Protección Social en Salud (CNPSS). 2019. *Informe de resultados del Sistema de Protección Social en Salud enero–junio 2018*. Ciudad de México. http://www.transparencia.seguro-popular.gob.mx/contenidos/archivos/transparencia/planesprogramaseinformes/informes/2018/IRE-J2018Integrado(31-07-2018).pdf, accessed 10 April 2023.

El CEO. 2022. *Lanza IMSS Bienestar nuevo programa de salud para personas sin seguro social*. https://elceo.com/politica/lanzan-imss-bienestar-nuevo-programa-de-salud-para-personas-sin-seguridad-social/, accessed 13 July 2022.

Frenk J, Gómez-Dantés O. 2011. Extending the right to health care and improving child survival in Mexico. In: Selendy JMH (ed). *Water and Sanitation-Related Diseases and the Environment*. Wiley Online Books, 475–9.

Global Burden of Disease (GBD) Collaborative Network. 2021. *Global Burden of Disease Study 2019 (GBD 2019) Results*. http://ghdx.healthdata.org/gbd-results-tool, accessed 5 November 2021.

Gobierno de México. 2015. *Los objetivos de desarrollo del milenio en México: Informe de avances 2015*, 1st edn. Ciudad de México: Oficina de la Presidencia de la República. https://apps1.semarnat.gob.mx:8443/dgeia/pdf/InfMex2015.pdf, accessed 5 May 2022.

Gómez Dantés O. 2009. Mexico. In: Johnson J, Stoskopf C (eds). *Comparative Health Systems*, 1st edn. Boston, MA: Jones and Bartlett Publishers, 337–47.

Gómez Dantés O, Sesma S, Becerril VM *et al.* 2011. Sistema de salud de México. *Salud Pública de México* **53**: S220–32.

González Block MÁ, Hurtado LC, Balandrán A *et al.* 2020. Mexico: health system review. *Health Systems in Transition* **22**: 1–222.

Huerta-Gutierrez R, Murillo-Zamora E, Ángeles-Llerenas A *et al.* 2022. Patient and treatment delays among Mexican women with breast cancer before and after the Seguro Popular. *Salud Pública de México* **64**: 87–95.

Katz G, Lazcano-Ponce E, Madrigal E. 2017. La salud mental en el ámbito poblacional: la utopía de la psiquiatría social en países de bajos ingresos. *Salud Pública de México* **59**: 351–3.

Knaul FM, Arreola-Ornelas H, Méndez-Carniado O. 2016. Protección financiera en salud: actualizaciones para México a 2014. *Salud Pública de México* **58**: 341–50.

Knaul FM, Arreola-Ornelas H, Touchton M *et al.* 2023. Setbacks in the quest for universal health coverage in Mexico: polarized politics, policy upheaval, and pandemic disruption. *Accepted for publication in the Lancet*.

Muñoz-Hernández O, Chertorivski-Woldenberg S, Cortés-Gallo G *et al.* 2012. The medical insurance for a new generation: a viable answer

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

for the health needs of Mexican children. *Salud Pública de México* **54**: s3–10.

Murray CJL, Frenk J. 2000. A framework for assessing the performance of health systems. *Bulletin of the World Health Organization* **78**: 717–31.

National Institute of Statistics and Geography (INEGI). 2021 *Encuesta Nacional de Ingresos y Gastos de los Hogares 2020 (ENIGH). Nueva serie: Diseño conceptual*. Ciudad de México. https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=889463901204, accessed 3 March 2022.

Ng M, Fullman N, Dieleman JL *et al.* 2014. Effective coverage: a metric for monitoring universal health coverage. *PLoS Medicine* **11**: e1001730.

Organisation for Economic Cooperation and Development (OECD). 2020a. *Health at a Glance: Latin America and the Caribbean 2020*, 1st edn. Paris: Organisation for Economic Cooperation and Development (OECD).

Organisation for Economic Cooperation and Development (OECD). 2020b. *Health at a Glance 2019: OECD Indicators*, 1st edn. Paris: Organisation for Economic Cooperation and Development (OECD).

Organisation for Economic Cooperation and Development (OECD). 2021. *Health at a Glance 2021*, 1st edn. Paris: Organisation for Economic Cooperation and Development (OECD).

Organisation for Economic Cooperation and Development (OECD). 2022a. *OECD.Stat, Health Expenditure and Financing*. https://stats.oecd.org//Index.aspx?QueryId=115244, accessed 1 February 2022.

Organisation for Economic Cooperation and Development (OECD). 2022b. *Health, OECD Data*. https://data.oecd.org/health.htm, accessed 15 February 2022.

Organización Panamericana de la Salud (OPS). 2017. *Situación de salud en las Américas: indicadores básicos 2017*. Washington DC. https://iris.paho.org/handle/10665.2/34330, accessed 8 June 2020.

Rahman T, Gasbarro D, Alam K. 2022. Financial risk protection from out-of-pocket health spending in low- and middle-income countries: a scoping review of the literature. *Health Research Policy and Systems* **20**: 83.

Reich MR. 2020. Restructuring health reform, Mexican style. *Health Systems & Reform* **6**: e1763114.

Reynales-Shigematsu LM, Wipfli H, Samet J *et al.* 2019. Tobacco control in Mexico: a decade of progress and challenges. *Salud Pública de México* **61**: 292–302.

Roberts M, Hsiao W, Berman P *et al.* 2008. *Getting Health Reform Right: A Guide to Improving Performance and Equity*. New York, NY: Oxford University Press.

Romaniuk P, Kaczmarek K, Syrkiewicz-Świtała M *et al.* 2018. Health systems and their assessment: a methodological proposal of the synthetic outcome measure. *Frontiers in Public Health* **6**: 1–10.

Secretaría de Hacienda y Crédito Público (SHCP). 2022. *Paquete económico y presupuesto*. https://www.finanzaspublicas.hacienda.gob.mx/es/Finanzas_Publicas/Paquete_Economico_y_Presupuesto, accessed 13 July 2022.

Secretaría de Salud (SSa), Dirección General de Información en Salud (DGIS). 2022. *Egresos Hospitalarios, Cubos dinámicos*. http://www.dgis.salud.gob.mx/contenidos/basesdedatos/bdc_egresoshosp_gobmx.html, accessed 15 February 2022.

Shamah-Levy T *et al.* 2020. In: Oropeza Abúndez C (ed). *Encuesta Nacional de Salud Y Nutrición 2018-19. Resultados Nacionales*, 1st edn. Cuernavaca: Instituto Nacional de Salud Pública (INSP), 17–21.

Soler Claudín C. 2009. Acceso universal al Programa de VIH/SIDA de la Ciudad de México: resultados a seis años. *Salud Pública de México* **51**: 26–33.

Wirtz VJ, Santa-Ana-Tellez Y, Servan-Mori E *et al.* 2012. Heterogeneous effects of health insurance on out-of-pocket expenditure on medicines in Mexico. *Value in Health* **15**: 593–603.

The World Bank (WB). 2022a. *Immunization, DPT (% of Children Ages 12–23 Months), 3.b Children Who Received Three Doses of DPT*. https://databank.worldbank.org/views/reports/reportwidget.aspx?Report_Name=3.b.-Children-who-received-three-doses-of-DPT&Id=a02809ec&ti=n, accessed 15 February 2022.

The World Bank (WB). 2022b. *Immunization, Measles (% of Children Ages 12–23 Months)—Mexico, The World Bank Data*. https://data.worldbank.org/indicator/SH.IMM.MEAS?locations=MX&view=chart, accessed 15 February 2022.

The World Bank (WB). 2022c. *Prevalence Overweight, DataBank Health Nutrition and Population Statistics*. https://databank.worldbank.org/Prevalence-overweight/id/ada0d1f1, accessed 15 February 2022.

The World Bank (WB). 2022d. *World Development Indicators, DataBank*. https://databank.worldbank.org/reports.aspx?source=2&series=SH.DYN.MORT&country=MEX, accessed 15 February 2022.

World Health Organization (WHO). 2010. *Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and Their Measurement Strategies*, 1st edn. Geneva: World Health Organization.

World Health Organization (WHO). 2022a. *Births Attended by Skilled Health Personnel: Data by Country, Global Health Observatory Data Repository*. https://apps.who.int/gho/data/node.main.SKILLEDBIRTHATTENDANTS?lang=en, accessed 15 February 2022.

World Health Organization (WHO) (2022b). *Bacillus Calmette–Guérin (BCG) Vaccination Coverage, WHO Immunization Data*. https://immunizationdata.who.int/pages/coverage/BCG.html?CODE=MEX&YEAR=, accessed 15 February 2022.

Downloaded from https://academic.oup.com/heapol/article/38/6/689/7150650 by guest on 05 May 2025

Ramírez-Villalobos *et al. BMC Public Health* (2021) 21:1439
https://doi.org/10.1186/s12889-021-11388-2

BMC Public Health

RESEARCH Open Access

Delaying sexual onset: outcome of a comprehensive sexuality education initiative for adolescents in public schools

Dolores Ramírez-Villalobos[1], Eric Alejandro Monterubio-Flores[2], Tonatiuh Tomás Gonzalez-Vazquez[1], Juan Francisco Molina-Rodríguez[1], Ma. Guadalupe Ruelas-González[3] and Jacqueline Elizabeth Alcalde-Rabanal[1*]

Abstract

Background: A common risk behavior in adolescence is the early initiation of unprotected sex that exposes adolescents to an unplanned pregnancy or sexually transmitted infections. Schools are an ideal place to strengthen adolescents' sexual knowledge and modify their behavior, guiding them to exercise responsible sexuality. The purpose of this article was to evaluate the knowledge of public secondary school teachers who received training in comprehensive education in sexuality (CES) and estimate the counseling's effect on students' sexual behavior.

Methods: Seventy-five public school teachers were trained in participatory and innovative techniques for CES. The change in teacher knowledge ($n = 75$) was assessed before and after the training using t-tests, Wilcoxon ranks tests and a Generalized Estimate Equation model. The students' sexual and reproductive behavior was evaluated in intervention ($n = 650$) and comparison schools ($n = 555$). We fit a logistic regression model using the students' sexual debut as a dependent variable.

Results: Teachers increased their knowledge of sexuality after training from 5.3 to 6.1 ($p < 0.01$). 83.3% of students in the intervention school reported using a contraceptive method in their last sexual relation, while 58.3% did so in the comparison schools. The students in comparison schools were 4.7 ($p < 0.01$) times more likely to start sexual initiation than students in the intervention schools.

Conclusion: Training in CES improved teachers' knowledge about sexual and reproductive health. Students who received counseling from teachers who were trained in participatory and innovative techniques for CES used more contraceptive protection and delayed sexual debut.

Keywords: Adolescent, Sex education, Sexual debut, School teacher, Sexual behavior, Mexico

Background

Adolescence is the stage in which reproductive capacity is developed, identity is affirmed, independence is built, and self-assertion is strengthened [1]. During adolescence, life plans are established, but behavioral patterns may represent health risks. One of the patterns is the early debut of unprotected sex that exposes the adolescent to an unplanned pregnancy or sexually transmitted infection (STI) [2]. According to the World Health Organization (WHO), teenage pregnancy is a public health problem, which has negative effects such as: 1) school dropout, 2) abuse of children raised by adolescents, and 3) limited academic and/or job growth; these factors often serve to perpetuate the cycle of poverty [3–6].

* Correspondence: jackeline.alcalde@gmail.com
[1]Center for Health Systems Research, National Institute of Public Health, Avenida Universidad 655, Colonia Santa María de Ahuacatitlán, 62100 Cuernavaca, Morelos, Mexico
Full list of author information is available at the end of the article

© The Author(s). 2021 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

The WHO reported in 2012 that around sixteen million teenagers worldwide between the ages of 15 and 19 give birth each year. The children of teenage mothers represent 11% of all births, of which 95% occur in low and middle-income countries [7]. In 2016, Mexico ranked first in adolescent pregnancies (ages 15–19) among members of the Organization for Economic Co-operation and Development (OECD). Mexico's birth rate of 64.2 per thousand adolescents is much higher than the rest of the member countries [5, 8]. Consequently, the sexual and reproductive health of the adolescent population is a national priority. To address this problem, the Mexican government launched the National Strategy for the Prevention of Adolescent Pregnancy (ENAPEA) in 2015 [9]. ENAPEA aims to reduce births in girls aged 10–14 to zero and to decrease the fertility rate of adolescents aged 15–19 by 50% by 2030. The national average for teenage pregnancy in 2016 was 35 per 1000, with high variability between states. Morelos is a state located in the center of the country near Mexico City and it has one of the highest teen pregnancy rates (36.2 per 1000 adolescents) [10].

Previous research shows that high school students have little knowledge and low perception of the risks and consequences of unprotected sexual practices. Early sexual debut (SD) is a risk factor for adolescent pregnancy and sexually transmitted diseases [11]. International recommendations support the need for comprehensive sexuality education (CSE) programs for adolescents. These programs aim to strengthen knowledge, attitudes and skills in seven areas: gender, sexual and reproductive health, sexual citizenship, pleasure, violence, diversity and interpersonal relationships. Their implementation has been associated with improved knowledge in sexual and reproductive health and fewer risky practices that result in pregnancy and sexually transmitted infections [12, 13]. On the other hand, proper sexual education has been shown to delay sexual initiation, reduce the risk of teenage pregnancies, the frequency of sexual intercourse, the number of sexual partners, and increase the use of condoms and other contraceptive methods [14–16].

Schools are an ideal place to strengthen adolescents' knowledge and modify their behavior, guiding them to exercise responsible sexuality [17]. It has been documented that teachers who are trained in sex education can act as agents of change and provide students with good quality information, which in turn helps prevent reproductive risk behaviors [18–21]. Research shows encouraging results of sex education interventions that have a multidisciplinary perspective, focus on sexual and reproductive rights, and involve teachers, adolescents, and parents [13–15]. In Mexico, as in other parts of the world, sexual education initiatives for adolescents have been developed in schools but face challenges, such as: teachers' inadequate knowledge of sexuality issues and limited skills for addressing these topics; occasional educational content that does not match students' concerns and needs; as well as resistance from parents and educational authorities [22]. Given these problems, it is important to support initiatives for sexual education among adolescents and measure their results. This article aims to assess the knowledge of public secondary school teachers in Morelos, Mexico who received sexual education training and estimate the effect of counseling on students' sexual behavior.

Materials and methods

Description of the intervention

The training model is based on best practices for a Comprehensive Sexuality Education. CSE is built on a framework of rights; it aims to provide adolescents with knowledge, skills, attitudes and values that allow them to enjoy their physical and emotional sexuality on an individual level and in their relationships. CSE views sexuality in a holistic manner, as an integral part of adolescents' emotional and social development. It recognizes that information alone is not enough; sexual education should provide the opportunity to acquire essential life skills and develop positive attitudes and values towards sex [23]. CSE was implemented in Mexican public schools in two stages. The first focused on teachers and the second on students.

The first stage consisted of two phases. In the first phase, we defined objectives, designed the content and prepared evaluation instruments. In the second phase, teachers were invited to participate in training through the Institute of Basic Education of the State of Morelos (IEBEM). The training workshop was held to improve teachers' knowledge and skills in CSE for adolescents. The workshop lasted 3 days and focused on four theoretical-methodological axes, which are defined by the following concepts and content: 1) Gender perspective, which distinguishes the differential characteristics, attitudes and behaviors that society attributes to men and women that must be recognized in order to achieve equity [24] (Gender and its expressions in the community, expectations and life-plans, gender inequalities, empowerment, assertive communication); 2) Adolescence and sexuality, which refers to the period of life between 10 and 19 years when sexuality is explored [25] (sexual debut, mythos in sexuality, sexually transmitted infections, Internet and appropriate information sources); 3) Teenage pregnancy and responsible sexuality, which refers to pregnancies during ages 10 to 19 and the responsibility that adolescents must assume when exercising their sexuality [26] (anatomy of pregnancy, implications of teenage pregnancy, sexual self-care); and 4) Teenage

contraceptive methods, which focuses on adolescents' right to know about contraceptive methods and how to use them [12] (contraceptive methods, advantages and disadvantages). The workshop was developed using participatory and innovative methodology with a Gestalt philosophy that included reflection and discussion of each topic [25]. On the basis of the teachers' tacit knowledge (knowledge embedded in the human mind through experience and jobs) [26] in each theme, a reflective process was carried out and misconceptions and myths were identified. A technique was developed to facilitate teacher-student communication, so that the teacher could learn how to use it and replicate it in class. The workshop facilitators were expert researchers in the subject, knowledgeable about assertive communication skills, and had work experience with teenagers. At the end of the workshop, each teacher was given a kit of materials (electronic folder with the themes developed in the workshop, a flip chart, a poster and leaflets).

The second stage also had two phases. In the first phase, the trained teachers selected the order in which the themes they learned in the workshop (from all four theoretical-methodological axes) would be taught in the classroom (35–40 adolescents from second and third secondary grade). All the topics were addressed in 24 sessions. The methodology employed in each session was diverse, using questions that adolescents proposed and cases that described their sexuality problems, as well as theatrical performances or fairs. Regardless of the technique used, each topic began with a reflection process to recognize positive and negative aspects. Each discussion developed according to the adolescents' knowledge, while teachers clarified erroneous ideas and myths. To close, teachers and students identified healthy behaviors they should adopt. The teachers covered the themes in the classroom for an average of 8 months, in weekly sessions of 1 h (a total of 24 sessions). In the second phase, the evaluation was performed. At the end of the school year, students who received CES in intervention schools and students from comparison schools were selected to answer a questionnaire. The comparison schools used traditional public-school sex education (TSE) [27], which is requiered for all students in all schools in Mexico. Exceptions are only made for students whose parents have requested exemption due to cultural or religious reasons. The themes in the school curriculum are adjusted according to grade level, although the topics are discussed at the teacher's discretion. Classes are usually given 1 h a week for an average of 8 months. The themes are oriented towards the anatomy of sexual organs and the use of contraceptives.

Population and sample

The intervention was designed for teachers and students in second and third grade in public secondary schools in Morelos, Mexico. It was carried out during October 2015–June 2016. For the intervention, 45 schools were randomly selected and 45 for comparison schools. Technical secondary schools are similar to general secondary schools; however, technical secondary emphasizes technological education, according to the economic activity of each region (agriculture, fishing, forestry or services), both in rural and urban communities. Tele secondary is an educational option for communities of less than 2500 inhabitants.

To participate in training of CSE, two teachers who taught sex education were randomly selected from each intervention school. The sample of students who received training in CSE was estimated at 693 (from 3540 students in intervention schools) and for students who received TSE, 738 (4329 students from comparison schools). The questionnaires were answered by randomly selected students in both intervention and comparison schools (Fig. 1).

Outcomes

For teachers, the outcome was knowledge of comprehensive sexuality education, which includes knowledge of gender, adolescence, pregnancy prevention, contraceptive use and sexually transmitted diseases. For adolescents, the outcome was sexual debut, which was measured by self-report of their first sexual intercourse.

Evaluation design

The change in the knowledge of the trained teachers was evaluated before and after the workshop. We used the questionnaire by the Mexican Foundation for Family Planning, made up of 22 questions [28]. It explored the perspective of gender equality, adolescence and sexuality, teenage pregnancy, responsible sexuality and contraceptive methods. Additionally, it included sociodemographic information like age, sex, the teacher's main duty (teaching, principal or assistant principal), and type of school (general, technical or tele secondary). The answers to the questions were multiple choice and only one answer was correct; where 0 = incorrect and 1 = correct. The score obtained by each teacher was transformed into a 10-point scale; the score for each methodological axis was multiplied by 10 and divided by the maximum possible score of each methodological axis. To estimate the global score, we added up the scores obtained in all methodological axes, multiplied by 10 and divided by the maximum possible score (twenty two). We classified the score between 0 and 5 as: inacceptable, 5.1–6: regular, 6.1–7: acceptable, 7.1–8: very acceptable, and 8 or more: excellent.

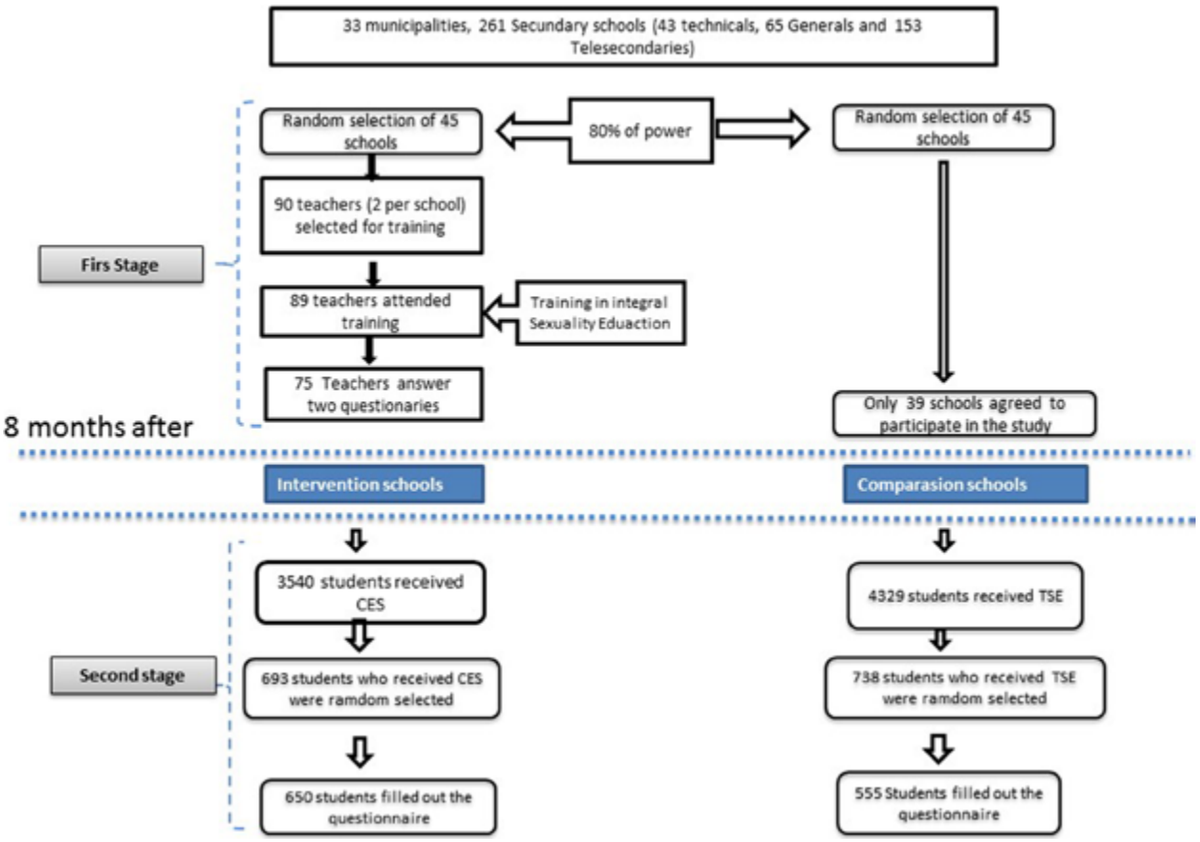


Fig. 1 Selection of the study population

For students, to estimate the effect of CSE, we measured sexual debut as 0 = if the first sexual intercourse occurred more than 6 months prior to the time of answering the questionnaire and 1 = if the first sexual intercourse occurred less than 6 months prior. We applied a questionnaire with 20 items that included sociodemographic variables and explored their reproductive knowledge (gender differences, ITS, Knowledge of contraceptive methods, social effect of pregnancy) and sexual behavior (sexual debut, use of contraceptive in the first and last sexual interaction). The questions to explore reproductive knowledge were multiple choice, e.g. what is the recommended method that provides double protection against pregnancy and sexually transmitted infections? 1 = Abstinence, 2 = Intrauterine device, 3 = Condom, 4 = Hormonal method 5 = I don't know. The questions to explore sexual behavior were dichotomous, e.g. did you use contraceptive methods during your sexual interaction? 1 = yes 2 = not. The instrument was applied at the end of the school year to both intervention and comparison schools after they had received orientation and counseling in sexual education.

Data collection

Teachers answered the self-administered questionnaire electronically on a computer provided by the research team before and after the workshop. At the end of the school year, the students received the questionnaire in their e-mails. After answering it, their responses were linked to the *google docs* platform. The questionnaires from teachers and students were answered anonymously.

Analysis of information

Teachers' overall knowledge was estimated with the sum of correct answers. The average level of knowledge about the four theoretical-methodological axes was also estimated. Descriptive statistics were estimated for all study variables (percentages, means, medians and confidence intervals). To analyze differences by sex, the Cohen Chi^2 test was used. To estimate the change in teacher knowledge, the paired Student t-test was used when the scores presented a normal distribution. The Wilcoxon rank sum test for paired data was used when the distributions did not have a normal distribution. We fit a Generalized Estimation Equations model with mixed

effects to analyze the characteristics associated with the change in the overall rating. The model was adjusted considering the effect of conglomerates at the school level.

Sociodemographic information, knowledge and reproductive behavior was reported for students. To compare the percentages between intervention and non-intervention schools, the Cohen Chi^2 statistic was used. We fit a logistic regression model using sexual debut as the dependent variable and used age, sex, school grade and type of school as covariates. Robust variance estimators were calculated by adjusting for the cluster effect at the school level.

Ethical considerations

The Ethics and Research Committee of the National Institute of Public Health of Mexico (record number 767) approved this project and authorized verbal informed consent for all informants. Therefore, we requested verbal consent from teachers, parents of minors (under the age of 18), and adolescents. Only those informants who freely agreed to participate were included in the study.

Results

Effect of the intervention on teachers

Of the 89 teachers who attended the CES training workshop, 84% (75) participated in both measurements (before and after). The teachers came from 26 municipalities in the state. 36% (27) were women, the mean age was 49 ± 9.9 years and 63% (46) were between 40 and 59 years old. 66% of the teachers worked in general secondary schools and 62.7% (47) were Directors or Deputy Directors who also worked as counselors in sex education in the schools (Table 1).

Table 2 shows the scores that the teachers obtained before and after the workshop. Overall, their score before the workshop was 5.1 and afterwards, it was 6.1 out of a total of 10 points. An increase of 0.8 points ($p < 0.001$) was observed in the unadjusted model and 0.9 when the model was adjusted by age, sex, type of school and teacher duties. In general, teachers' knowledge of adolescence and sexuality, adolescent pregnancy and responsible sexuality and contraceptive methods improved after their participation in the workshop, both in the unadjusted and in the adjusted analysis. ($p < 0.007$).

Effect of the intervention on students

A total of 1205 students (650 in intervention group and 555 in comparison group) were included to assess the effect of the CSE intervention. The median of age of adolescents in the intervention group was 13.4 and for adolescents in the comparison group, it was 13.8. However, a greater percentage of younger adolescents was observed in the intervention group. Regarding the school grade in the intervention group, there was a higher percentage of students in the second grade, while in the comparison group there was a higher percentage of students in the third grade. Finally, in the intervention group, the majority of the participants were in general secondary schools and in the comparison group, in technical secondary schools (Table 3). 89.4% of students in the intervention group vs. 81.1% in the comparison group responded that they received pregnancy prevention advice. Regarding the effects of pregnancy on adolescents, 84.5% of participants in the intervention group reported they would consider dropping out of school in case of pregnancy and in the comparison group, 79.1%. About 2% of participants in the intervention group reported their sexual debut was (on average) at 14.1 ± (1.5) years, while in the comparison group 5.4% started their sexual debut at 13.1 ± (0.7) years; these differences were statistically significant ($p < 0.01$) (Table 3).

With respect to the place where they got a contraceptive method, 38.4% (462) of the adolescents reported that they could only acquire them in health centers, 24.8% (299) in pharmacies, 32.4% (390) in health centers and pharmacies, and the remaining (4.4%) obtained contraceptive methods at school, with their parents, with their partner, or they did not specify. There were no statistically significant differences between the comparison and intervention group. 83.3% of participants used a contraceptive method in their last sexual relation in the intervention group and in the comparison group, it was 58.3%.

The ratio of data of the SD as an indicator of reproductive risk was estimated (Table 4). It was found that

Table 1 Characteristics of the teachers involved in training

	N (75)	%	(95%CI)
Sex			
Male	48	64.0	(52.9, 75.1)
Female	27	36.0	(24.9, 47.1)
Age groups			
19 to 29	1	1.4	(0.0, 4.1)
30 to 39	13	17.8	(8.8, 26.8)
40 to 49	20	27.4	(16.9, 37.9)
50 to 59	26	35.6	(24.4, 46.9)
60 or above	13	17.8	(8.8, 26.8)
Type of school			
General secondary	46	64.8	(64.8, 76.2)
Technical secondary	19	26.7	(16.2, 37.3)
Telesecondary schools	6	8.5	(1.8, 15.1)
Teachers' duties			
Directors or Subdirectors	47	62.7	(51.5, 73.9)
Teaching	28	37.3	(26.1, 48.5)

Table 2 Mean scores and differences in adolescents' sexuality knowledge before and after teacher training

	Mean before	Mean after	Unadjusted difference	Adjusted difference
	(95% CI5%)	(IC95%)	(IC95%)	(IC95%)
Global	5.3 (4.9, 5.6)	6.1 (5.7, 6.4)	0.8*(0.4, 1.2)	0.9* (0.4, 1.3)
Gender perspective	5.2 (4.7, 5.6)	5.7 (5.0, 6.2)	0.5 (−0.2,1.1)	0.7 (0.03, 1.4)
Adolescence and sexuality	5.0 (4.5, 5.5)	5.8 (5.4, 6.2)	0.8* (0.3, 1.4)	0.8*(0.3, 1.4)
Teenage pregnancy and responsible sexuality	4.7 (4.2, 5.2)	5.7 (5.1, 6.3)	1.0* (0.4, 1.6)	1.0*(0.3, 1.7)
Teenage contraceptive methods	6.4 (5.9, 6.8)	7.2 (6.7, 7.8)	0.9* (0.2, 6.5)	0.9 (0.1, 1.6)

Adjusted by: age, sex, type of school and teachers duties
p values were adjusted post-hoc using Bonferroni correction *:$p < 0.035$

Table 3 Characteristics of students in intervention and comparison schools. Morelos, 2016

	INTERVENTION GROUP		COMPARISON GROUP		
	***n* = 650**		***n* = 555**		
a) **Main social demographic characteristics**					
Sex	%	(IC95%)	%	(IC95%)	*p* value[b]
Male	50.5	(46.6 54.3)	46.8	(42.6, 51.0)	
Female	49.5	(45.6, 53.3)	53.2	(48.9, 57.3)	0.211
Age					
12 to 13	52.6	(48.7, 56.4)	33.3	(29.3, 37.2)	
14 to 15	46.3	(42.4, 50.1)	66.5	(62.5, 70.4)	
16 to 17	1.1	(0.2, 1.8)	0.2	–	< 0.001
Grade level					
Second	54.5	(50.6, 58.3)	42.9	(38.7, 47.0)	
Third	45.5	(41.6, 49.3)	57.1	(52.9, 61.2)	< 0.001
Type of school					
General secondary	93.2	(91.2, 95.1)	35.9	(31.8, 39.8)	
Technical secondary	6.8	(4.8, 8.7)	38.9	(34.8, 42.9)	
Telesecondary	0	–	25.2	(21.6, 28.8)	–
b) Reproductive behavior					
Sexual debut					
Yes	2.0	(0.9, 3)	5.4	(3.5, 7.2)	
No	98.0	(96.9, 99)	94.6	(92.7, 96.4)	[c] < 0.001
Pregnancy prevention advice[a,b]					
Yes	89.4	(87, 91.7)	81.1	(77.8, 84.3)	
No	10.6	(8.2, 12.9)	18.9	(15.6, 22.1)	< 0.001
Pregnant women drop out of school					
Yes	84.5	(81.6, 87.2)	79.1	(75.7, 82.4)	
No	15.5	(12.7, 18.3)	20.9	(17.5, 24.2)	< 0.001
Use of contraceptive in first sexual relation					
Yes	63.6	(29.7, 97.5)	66.7	(48.7, 84.5)	
No	36.4	(2.4, 70.2)	33.3	(15.4, 51.2)	0.99
s/d	4.0				
Use of contraceptive in last sexual relation					
Yes	83.3	(69.1, 97.4)	53.8	(22.4, 85.2)	0.061
No	16.7	(2.5, 30.8)	46.2	(14.7, 77.5)	

[a] Pregnancy prevention advice includes: pregnancy prevention, use of contraceptive methods and life project
post-hoc unadjusted *p* values; [b] Cohen ji^2; [c] Fisher exact test

Table 4 Sexual debut and associated factors in intervention and comparison schools. Morelos, México 2016

	OR	(95%CI)
Sexual debut		
Intervention schools	1	
Comparison schools	4.77**	(2.41, 9.43)
Type of school		
General secondary	1	
Technical secondary	0.48*	(0.25, 0.94)
Others	0.4	(0.1, 1.56)
Sex		
Female	1	
Male	0.5	(0.21, 1.19)
Age		
12 to 13	1	
14 to 15	0.77	(0.35, 1.68)
16 to 17	11.29*	(1.54, 82.55)
Grade level		
Second	1	
Third	2.31*	(1.02, 5.19)

p values were adjusted post-hoc using Bonferroni correction *:$p < 0.01$
Adjusted model by all variables presented in the table

students in the comparison group had a higher risk of starting sex life earlier compared to the intervention group (OR = 4.7).

Discussion

Results from the evaluation of the CSE training model demonstrated that teachers who participated in the workshop increased their knowledge of sexual education. Among the students, there was a significant reduction in SD among those who received sex education from the teachers in the intervention schools vs. the students from the schools in the comparison group.

To strengthen sex education in schools, teachers should be trained in CES to promote adequate knowledge of adolescent sexual health and facilitate teacher-student interactions [29]. It has been documented that sex education in schools in Mexico focuses on a biological approach and that CSE is not sufficiently and adequately addressed in the curricula, plus a lack of teacher training [27]. The Kirby study showed that many issues related to SD in adolescents are not covered by the teacher in the classroom, which is why training is needed to prepare teachers as facilitators in sex education [17, 30]. Currently, traditional and conservative norms and pedagogical practices are imposed in school sex education programs [17]. Implementing sexuality-related educational strategies with adolescents through teachers is a challenge [31].

Several studies have shown that school training interventions that improve teachers' skills in sexual health maximize the effectiveness of interactions with their students. These interventions have shown results in reducing risky sexual behaviors and preventing teenage pregnancy [32]. Furthermore, CSE is effective in influencing adolescents' decisions, such as delaying sexual debut [23]. Therefore, training teachers in sex education is a strategy that is recommended worldwide, but its development and implementation is still limited [33]. It is interesting to note that the training offered to teachers in this intervention included topics related to STIs and showed positive results in their knowledge improvement, despite the short period of training. These results could be attributed to the use of a reflective methodology and the teacher's recovery of tacit knowledge, which they could have applied to the subject [34]. It is also important to highlight that young people identify different actors to meet their reproductive health needs; from parents as confidants in courtship issues, to doctors for sexuality problems (sexual impotence and pregnancy), and to teachers as counselors in sexuality issues [35].

Likewise, the evidence shows that STIs occur at an earlier age and that the risk perception is non-existent for adolescents [36]. Therefore, it exposes adolescents to having a greater number of sexual partners which is associated with unsafe sexual practices and carries greater risks of contracting STIs [37, 38]. It also exposes them to an unplanned pregnancy that forces them to take responsibility for the care of a child and alters their personal development plans [34]. The results of this study show that adolescents who receive adequate counseling on sexuality will delay SD. Similar studies show that for the programs to be effective and achieve the expected result in sexual behavior, they must address issues related to pregnancy prevention, STIs, HIV / AIDS, encourage contraceptive use and provide tools to cope with peer pressure [39]. These topics were extensively developed in the training model with the teachers of the intervention schools.

The main limitation of this study lies in the design of the evaluation. The ideal effect evaluation design should include before and after measurements of teachers and students in both the intervention and comparison groups. For budgetary reasons, it was not possible to fully implement this design, so the evaluation in teachers was limited to before-after measurements only performed in the group of teachers who received the training. The other limitation is that we do not evaluate teachers' knowledge and skills in CSE at the end of the school year. It is likely that these skills improved, since they had to review the information in order to teach the themes to their students. In the students, a cross-sectional measurement was conducted after the CSE

implementation in the intervention and comparison schools. Although schools were randomly selected for both the intervention and comparison groups, there were differences in the types of schools included in each group. Additionally, we cannot rule out that other events outside the intervention (social networks and internet use that were not measured in the study) may have influenced the increase in knowledge. It could also be argued that the differences between intervention and comparison groups (in the case of students) are due to differences in their characteristics. In the case of the students, the analysis was adjusted by characteristics (age, sex and schooling and type of school) to control the effect that the differences between the groups could have. It is possible that students in secondary schools have a greater interest in continuing their studies than those in technical secondary schools and tele schools. They may place more importance on staying in school because it is an important part of their future life plans [27, 40, 41]. Finally, we do not know if teachers and students from the schools that participated in the intervention shared materials with teachers and students from the comparison schools.

Conclusions and recommendations

Training teachers in issues related to comprehensive sexuality through participatory and reflexive methodology strengthens their knowledge and skills to transmit information to their students in an appropriate manner. In this study, students who received information from teachers who were trained in CSE used more contraceptive protection and delayed SD [27, 29]. Consequently, in light of the results presented, we recommend that schools develop innovative and attractive sex education programs for adolescents as they are ideal settings to implement responsible sexuality programs for this population. Therefore, teachers must be continuously trained in innovative methodology to become sexual education counselors and help students reduce their sexual risk behaviors [28, 32].

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome; CSE: Comprehensive sexuality education; ENAPEA: National Strategy for the Prevention of Adolescent Pregnancy; HIV: Human Immunodeficiency Virus; IEBEM: Institute of Basic Education of the State of Morelos; OECD: Organization for Cooperation and Development Economic; SD: Sexual debut; STI: Sexually transmitted infection; TSE: Traditional sex education; WHO: World Health Organization

Acknowledgements

To the Institute of Basic Education of the State of Morelos for its interest and support of the Integral Education training project in its public schools.

Authors' contributions

MRV, EMF, JAR conceptualized the research; MRV and EMF analyzed the data; MRV, JAR and GRG conducted data analysis and interpretation; MRV, JAR, EMF and JMR and TGV critically revised the article; MRV, JAR and EMF supervised; MRV, EMF, JAR, JMR, TGV, GRG, and JMR drafted the article and approved the final version. The author(s) read and approved the final manuscript.

Funding

This study was supported by Consejo Nacional de Ciencia y Tecnologia (CONACYT) México, Distrito. Federal [grant number 233761]; 30/1/2015.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available since we made an agreement with the Institute of Basic Education of the State of Morelos not to publish the database for free access. It will be used only for academic purposes. For this reason, the data are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The Ethics and Research Committee of the National Institute of Public Health in Mexico (record number 767) approved this project and authorized verbal informed consent for all informants. The use of verbal informed consent was suggested by the Institute of Basic Education of the State of Morelos. They recommended that mothers authorize their children's participation orally because many have poor reading habits and/or they could be apprehensive about signing documents. In addition, to avoid differences in how the research was implemented, they suggested using verbal consent for all informants. Therefore, we requested verbal consent from teachers, parents of minors (under the age of 18), and adolescents.
Only those informants who freely agreed to participate were included in the study. We confirm that all methods in the present study were carried out in accordance with relevant guidelines and regulations.

Consent for publication

We grant publication rights to BMC Public Health.

Competing interests

The authors declare no conflict of interests.

Author details

[1]Center for Health Systems Research, National Institute of Public Health, Avenida Universidad 655, Colonia Santa María de Ahuacatitlán, 62100 Cuernavaca, Morelos, Mexico. [2]Center for Health and Nutrition Research, National Institute of Public Health, Avenida Universidad 655, Colonia Santa María de Ahuacatitlán, 62100 Cuernavaca, Morelos, Mexico. [3]Center for Evaluation and Survey Research, National Institute of Public Health, Av. Universidad 655, Colonia Santa María, 62100 Cuernavaca, Morelos, México.

Received: 3 March 2021 Accepted: 24 June 2021
Published online: 21 July 2021

References

1. Greydanus DE, Bashe P, American Academy of Pediatrics. Caring for your teenager: the complete and authoritative guide; 2003. p. 606. https://ebooks.aappublications.org/content/caring-for-your-teenager
2. Guzmán J, Hakkert R, Contreras J, Falconier de Moyano M. Diagnóstico sobre Salud Sexual y Reproductiva de Adolescentes en América Latina y el Caribe, (Fondo de Población de las Naciones Unidas (UNFPA), Ed.); 2001. p. 141.
3. Jiménez-González A, Granados-Cosme JA, Rosales-Flores RA. Embarazo en adolescentes de una comunidad rural de alta marginalidad. Un estudio mixto de caso. Salud Publica de Mexico. 2017;59(1):11–8. https://doi.org/10.21149/8410.
4. Organización Panamericana de la salud (OPS). Aceleración mundial de las medidas para promover la salud de los adolescentes: Orientación para la aplicación en los países; 2018. p. 176. Retrieved from http://iris.paho.org/xmlui/handle/123456789/49181
5. Quiroz J, Atienzo EE, Campero L, Suárez-López L. Entre contradicciones y riesgos: Opiniones de varones adolescentes Mexicanos sobre el embarazo temprano y su asociación con el comportamiento sexual. Salud Publica de Mexico. 2014;56(2):180–8. https://doi.org/10.21149/spm.v56i2.7333.

6. Stern, C. El embarazo en la adolescencia como problema público: Una visión crítica. Salud Publica de Mexico. 1997;56(2):180–8. Salud Publica de Mexico. 39(2):137–43. https://doi.org/10.1590/s0036-36341997000200008.
7. Organización Mundial de la Salud. Prevenir el embarazo precoz y los resultados reproductivos adversos en adolescentes en los países en desarrollo: las evidencias. (2012) http://apps.who.int/iris/bitstream/10665/78253/1/WHO_FWC_MCA_12_02_spa.pdf .
8. Fondo de Población de las Naciones Unidas (UNFPA). (2014). Directrices operacionales del UNFPA para la educación integral de la sexualidad. https://doi.org/https://www.unfpa.org/sites/default/files/pub-pdf/UNFPA_OperationalGuidanceREV_ES_web.pdf
9. Gobienro de la Republica de México. Estrategia Nacional para la Prevención del Embarazo en Adolescentes. 2015. https://www.gob.mx/cms/uploads/attachment/file/232826/ENAPEA_0215.pdf
10. Morelos S, Salud SS. Análisis de la Situación de Salud y de la Respuesta Social Organizada de la Población sin Derechohabiencia del Estado de Morelos; 2018.
11. Odeigah L, Rasaki SO, Ajibola AF, Hafsat AA, Sule AG, Musah Y. High risk sexual behavior among adolescent senior secondary school students in Nigeria. Afr Health Sci. 2019;19(1):1467–77. https://doi.org/10.4314/ahs.v19i1.20.
12. IPPF. IPPF framework for comprehensive sexuality education. London: International Planned Parenthood Federation; 2010. http://www.ippf.org/sites/default/files/ippf_framework_for_comprehensive_sexuality_education.pdf
13. Kirby D. Sexuality education: it can reduce unprotected intercourse. SIECUS Rep. 1993;21(2):19–25.
14. Haignere CS, Culhane JF, Balsley CM, Legos P. Teachers' receptiveness and comfort teaching sexuality education and using non-traditional teaching strategies. J School Health. 1996;66(4):140–4. https://doi.org/10.1111/j.1746-1561.1996.tb08234.x.
15. Gayet C, Rosas CA, Magis C, Uribe P. Con quién hablan los adolescentes mexicanos sobre el SIDA Whom do Mexican adolescents talk to about AIDS? Salud publica de Mexico. 2002;44(2):122–8.
16. UNESCO (2015). Comprehensive sexuality education in teacher training in Eastern and Southern Africa. https://hivhealthclearinghouse.unesco.org/org/sites/default/files/resources/cse_in_training_in_esa.pdf.
17. Kirby D. The impact of schools and school programs upon adolescent sexual behavior. J Sex Res. 2002;39(1):27–33. www.jstor.org/stable/3813420. https://doi.org/10.1080/00224490209552116.
18. Clara M, Restrepo A, Ángel J, Roberto J, Manzanero L, Sabina E, et al. La Formación Docente en Educación de la Sexualidad en América Latina y el Caribe; 2010.
19. Juárez F, Gayet C. Salud sexual y reproductiva de los adolescentes en México: un nuevo marco de análisis para la evaluación y diseño de políticas. Papeles de población. 2005;11(45):177–219 http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1405-74252005000300008&lng=es&tlng=es.
20. Lindau ST, Tetteh AS, Kasza K, Gilliam M. What schools teach our patients about sex: content, quality, and influences on sex education. Obstet Gynecol. 2008;111(2 Pt 1):256–66. https://doi.org/10.1097/01.AOG.0000296660.67293.bf.
21. Nguyen G, Costenbader E, Plourde KF, Kerner B, Igras S. Scaling-up normative change interventions for adolescent and youth reproductive health: an examination of the evidence. J Adolescent Health. 2019;64(4S):S16–30. https://doi.org/10.1016/j.jadohealth.2019.01.004 21.
22. Rojas R, de Castro F, Villalobos A, Allen-Leigh B, Romero M, Braverman-Bronstein A, et al. Comprehensive sexual education in Mexico: an analysis of coverage, comprehensiveness and continuity of contents in Mexican public and private schools. Salud Publica de Mexico. 2017;59(1):19–27. https://doi.org/10.21149/8411.
23. Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2014). Educación Integral de la Sexualidad: conceptos, enfoques y competencias. Recuperado de: http://unesdoc.unesco.org/images/0023/002328/232800S.pdfs
24. Ravalli, María José, Calisti, Natalia L. Perspectiva De Género. ¿De qué hablamos cuando hablamos de perspectiva de género? Fondo de las Naciones Unidas para la Infancia (UNICEF). 2017. https://www.unicef.org/argentina/sites/unicef.org.argentina/files/2018-04/COM-1_PerspectivaGenero_WEB.pdf
25. López Piedra J., Martínez Galván, A. I. y López Corral, J.: La sexualidad en las etapas de la vida. Características. Principales conflictos y sus afrontamientos. 2013. 25. Muñoz Polit M, (2008). La sensibilización gestalt en el trabajo terapéutico : desarrollo del potencial humano. Pax-México.
26. Becerril-Montekio V, Alcalde-Rabanal J, Darney BG, Orozco-Nuñez E. Using systematized tacit knowledge to prioritize implementation challenges in existing maternal health programs: implications for the post MDG era. Health Policy Plann. 2016;31(8):1031–8. https://doi.org/10.1093/heapol/czw033.
27. Fondo de Naciones Unidas. Estado de la formación docente en educación de la sexualidad, salud sexual y reproductiva en América Latina y el Caribe. Diagnóstico de los Estados Unidos Mexicanos. 2005
28. Rodríguez Ramírez G. & Aguilar Gil J. A., (2009) Hablemos de sexualidad con la gente joven : modelo educativo para profesores y profesionales que trabajan con jóvenes. Fundación Mexicana para la Planeación Familiar.
29. Goldman JD. An exploration in health education of an integrated theoretical basis for sexuality education pedagogies for young people. Health Educ Res. 2011;26(3):526–41. https://doi.org/10.1093/her/cyq084.
30. Thammaraksa P, Powwattana A, Lagampan S, Thaingtham W. Helping teachers conduct sex education in secondary schools in Thailand: overcoming culturally sensitive barriers to sex education. Asian Nurs Res. 2014;8(2):99–104. https://doi.org/10.1016/j.anr.2014.04.001.
31. Oliveira-Campos M, Giatti L, Malta D, Barreto SM. Contextual factors associated with sexual behavior among Brazilian adolescents. Ann Epidemiol. 2013;23(10):629–35. https://doi.org/10.1016/j.annepidem.2013.03.009.
32. Voisin DR, Salazar LF, Crosby R, Diclemente RJ, Yarber WL, Staples-Horne M. Teacher connectedness and health-related outcomes among detained adolescents. J Adolescent Health. 2005;37(4):337–337.e23. https://doi.org/10.1016/j.jadohealth.2004.11.137.
33. Demaria LM, Galárraga O, Campero L, Walker DM. Educación sobre sexualidad y prevención del VIH: un diagnóstico para América Latina y el Caribe Sex education and HIV prevention: an evaluation in Latin America and the Caribbean. Rev Panamericana de salud publica. 2009;26(6):485–93. https://doi.org/10.1590/s1020-49892009001200003.
34. LaChausse RG, Clark KR, Chapple S. Beyond teacher training: the critical role of professional development in maintaining curriculum fidelity. J Adolescent Health. 2014;54(3 Suppl):S53–8. https://doi.org/10.1016/j.jadohealth.2013.12.029.
35. Mason-Jones AJ, Sinclair D, Mathews C, Kagee A, Hillman A, Lombard C. School-based interventions for preventing HIV, sexually transmitted infections, and pregnancy in adolescents. Cochrane Database Syst Rev. 2016;11(11):CD006417. https://doi.org/10.1002/14651858.CD006417.pub3.
36. Centro Nacional para la prevención y el control del VIH/SIDA & Instituto Nacional de Salud Pública. (2014) Análisis sobre educación sexual integral, conocimientos y actitudes en sexualidad en adolescentes escolarizados. http://www.censida.salud.gob.mx/descargas/transparencia/estudios_opiniones/InformeFinal_INSP.pdf
37. Chacón-Quesada T, Corrales-González D, Garbanzo-Núñez D, Gutiérrez-Yglesias JA, Hernández-Sandí A, Lobo-Araya A, et al. ITS Y SIDA en adolescentes: descripción, prevención y marco legal. Medicina Legal de Costa Rica. 2009;26(2):79–98 http://www.scielo.sa.cr/scielo.php?script=sci_arttext&pid=S1409-00152009000200008&lng=en&tlng=es.
38. Secor-Turner M, Kugler K, Bearinger LH, Sieving R. A global perspective of adolescent sexual and reproductive health: context matters. Adolescent Med. 2009;20(3):1005–xii.
39. Fonner VA, Armstrong KS, Kennedy CE, O'Reilly KR, Sweat MD. School based sex education and HIV prevention in low- and middle-income countries: a systematic review and meta-analysis. PLoS One. 2014;9(3):e89692. https://doi.org/10.1371/journal.pone.0089692.
40. Lorenzo O, Zaragoza J. Secondary and Higher Education in Mexico: theoretical analysis of the current situation. Dialnet. 2014;6:59–72. https://dialnet.unirioja.es/servlet/articulo?codigo=4733974.
41. Secretaría de Educacion Pública. La estructura del Sistema educativo mexicano. 2018. https://siteal.iiep.unesco.org/sites/default/files/sit_accion_files/siteal_mexico_0101.pdf

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Waste Management 114 (2020) 183–195

Contents lists available at ScienceDirect

Waste Management

journal homepage: www.elsevier.com/locate/wasman

Impact of an intervention for reducing waste through educational strategy: A Mexican case study, what works, and why?

P. Torres-Pereda [a], E. Parra-Tapia [b,*], M.A. Rodríguez [c], E. Félix-Arellano [d], H. Riojas-Rodríguez [d]

[a] Center for Health Systems Research, National Institute of Public Health, Av. Universidad 655, CP 62100 Cuernavaca, Morelos, Mexico
[b] Health Jurisdiction No. 02 North, Ministry of Health, Francisco I. Madero 125, CP 40000 Iguala de la Independencia, Guerrero, Mexico
[c] Independent Reseacher, Mexico City, Mexico
[d] Environmental Health Department, Center for Population Health Research, National Institute of Public Health, Av. Universidad 655, CP 62100 Cuernavaca, Morelos, Mexico

ARTICLE INFO

Article history:
Received 23 December 2019
Revised 1 May 2020
Accepted 18 June 2020

Keywords:
Solid waste
Mixed methods
Educational intervention
Impact assessment

ABSTRACT

Generation and inadequate management of solid waste constitute a global challenge. Projections for 2050 portend an annual increase of 3.40 billion tons of waste. This study assessed the impact of an environmental education intervention (EEI) aimed at reducing waste generation and fomenting pro-environmental behaviors in an academic public-health institution in Mexico. The EEI was implemented over 20 months using a model of behavior change. Using a mixed-method design (QUAN + qual), baseline and follow-up measurements were performed through electronic questionnaires (n = 754), focus groups (n = 20), and waste quantification. A double-difference model was performed to measure pro-environmental behaviors impact: overall and by sex, age, educational level and function within the institution. Waste quantification was performed using a quartering method and weekly monitoring. The qualitative data were studied through thematic analysis. As a result of the EEI, women reduced their use of multilayer packaging (−15.6 pp, $p < 0.05$) and frequent use of non-ecological materials (−17.6 pp, $p < 0.05$). Graduate-level participants reduced their regular and frequent use of these materials (−33.3 pp, $p < 0.05$, 27.6 pp, $p < 0.01$), while those with lower educational levels increased their ecological behavior at home (12.1 pp, $p < 0.05$). Waste generation dropped by 60.1% vis-a-vis the baseline measurement. Our qualitative findings showed a relationship between holding a position of power in the institution and recycling. They also revealed that available infrastructure for separating waste contributed substantially to the observed impact. With actions centered on physical structure, community practice and institutional policy components, the EEI improved the pro-environmental behaviors and perceptions of participants.

© 2020 Elsevier Ltd. All rights reserved.

1. Introduction

The generation and inadequate management of solid waste have become one of the most urgent challenges in the environmental arena (Adeniran et al., 2017; Ojedokun, 2011). Apart from constituting a major source of pollution (Rodríguez et al., 2015; SEMARNAT, 2016), solid waste contributes to the depletion of natural resources and has adverse effects on human health (Tello et al., 2011; Adogu et al., 2015; Kiran et al., 2015; Giusti, 2009).

Global estimates have placed annual waste generation at 2.01 billion tons (t) averaging 0.74 kg/inhab/day. Projections for 2050 portend a 70% annual increase in waste generation, pushing the annual figure up to 3.40 billion t (Kaza et al., 2018). The countries in the Latin America and the Caribbean region contribute 11% of global waste, that is, 2.31 million t, annually, averaging 0.99 kg/inhab/day (Kaza et al., 2018).

Mexico is experiencing critical problems caused by urban solid waste (USW) generation (INEGI, 2011; SEMARNAT, 2016). Although integrated waste management is regulated by federal laws such as the General Law for the Prevention and Integrated Management of Waste (LGPGIR) (DOF, 2003), USW generation grew by 61.2%, or 53.1 million t, between 2003 and 2015 (SEMARNAT, 2016), bringing the national average to an above-regional level of 1.2 kg/inhab/day (SEMARNAT, 2016; Hoornweg and Bhada-Tata, 2012; Hernández-Berriel et al., 2017).

USW are those generated in institutions, homes, and public establishments, such as containers, packaging, organic and consumer products (DOF, 2003; SEMARNAT, 2016). In Mexico, UWS are represented by organic waste (52.4%), paper and cardboard

* Corresponding author.
E-mail address: elenaparrata@gmail.com (E. Parra-Tapia).

https://doi.org/10.1016/j.wasman.2020.06.027
0956-053X/© 2020 Elsevier Ltd. All rights reserved.

(13.8%), other (12.1%), plastics (10.9%), glass (5.9%), and 4.8% by aluminum, textiles and metals (SEMARNAT, 2016).

UWS management consists on physical separation for reuse and recycling, biological treatment such as compost; and elimination of sanitary landfills and controlled sites (74.5%), uncontrolled areas (21%) and recycling (5%) (SEMARNAT, 2016).

The problems of waste management ensue primarily from anthropogenic activities. At the individual level, its mechanisms are linked to people's attitudes and behaviors (Erhabor and Don, 2016). The promotion of good management practices (Nogueira-Oviedo and Olivero-Verbel, 2010; Ağdağ, 2009) must center on strategies for reducing, recycling and reusing waste materials (Del Cimmuto et al., 2014; Armijo de Vega et al., 2003).

Higher education institutions (HEIs) are microcosms marked by significant waste management challenges (Gallardo et al., 2016; Adeniran et al., 2017). As part of their institutional operation and responsibility, they need to adopt and promote environmental education strategies aimed at creating sustainable environments within and beyond their communities through university outreach programs (Armijo de Vega et al., 2003, 2008; Gallardo et al., 2016).

The literature on HEIs includes several studies of waste management systems (WMS) focused on recycling (Armijo de Vega et al., 2003, 2008; Kelly et al., 2006; Espinosa et al., 2008; Smyth et al., 2010; Disterheft et al., 2012; Geng et al., 2013; Ebrahimi and North, 2017). Other reported experiences refer to environmental diagnoses (Smyth et al., 2010; Saleem et al., 2019; Tiew et al., 2019b), baseline data reports to create WMS (Kelly et al., 2006; Zhang et al., 2011; Tiew et al., 2019a), design of proposals to implement WMS (Geng et al., 2013; Makrakis and Kostoulas-Makrakis, 2016) or the results of recycling actions in waste reduction (Largo-Wight et al., 2013; Ebrahimi and North, 2017).

In HEIs, the design of interventions aimed at recycling usually includes the implementation of infrastructure (Mason et al., 2003; Armijo de Vega et al., 2008; Smyth et al., 2010; Ebrahimi and North, 2017), the additional use of visual communication strategies (Largo-Wight et al., 2013; Tiew et al., 2019a), and other interventions address educational components for pro-environmental behavior change (Makrakis and Kostoulas-Makrakis, 2016; Tangwanichagapong et al., 2017.

The literature evidences the need for further research on the subject. Most of these studies have installed bin systems and their results show an increase in recycling (Kelly et al., 2006; Smyth et al., 2010; Zhang et al., 2011; Largo-Wight et al., 2013; Tiew et al., 2019a). Although these studies report a reduction on the amount of waste that is sent for treatment or disposal, they do not rigorously assess subjects' behaviors or seek to reduce the consumption.

Even though interventions have shown satisfactory results when modifying knowledge, attitudes and practices, they have been developed in clinical settings, are short-lived, their pre-post evaluations are only quantitative, and have not considered measurements for waste reduction (Tabash et al., 2016; El-Gilany et al., 2017). Other studies have shown a waste reduction, but the increase of self-reported behaviors is not observed (Tangwanichagapong et al., 2017).

The promotion of behavioral changes in waste management has been the object of several continuous education initiatives and environmental education strategies (Wismer and López de Alba, 2011; Armijo de Vega et al., 2003; Moore and Boldero, 2017; Tangwanichagapong et al., 2017). Evidence results indicate that lasting changes occur gradually (Ajaps and McLellan, 2015; De Young, 2011). Some authors point out that recycling consists of behaviors that vary in terms of adoption, maintenance, cost, and effort; therefore, it is important to have behavior change models to succeed (Moore and Boldero, 2017).

The role of environmental education for behavior change is of primary importance because it raises awareness of the problem (Erhabor and Don, 2016; Seng et al., 2018) and influences actions at the individual and community levels (Álvarez and Vega, 2009; Rodríguez et al., 2015) through the generation of knowledge, attitudes and behaviors in favor of caring for the environment (Pooley and O'Connor, 2000; Hansmann et al., 2005; Ajaps and McLellan, 2015; Ebrahimi and North, 2017).

While developed countries have reported positive results from their initiatives to reduce and recycle waste (Gallardo et al., 2016; Disterheft et al., 2012; Ebrahimi and North, 2017). Mexico has generated limited evidence on the impact of its efforts to improve waste management and the strategies it has adopted to advance environmental protection through HEIs (Armijo de Vega et al., 2008). With a focus on characterizing and quantifying waste generation (Maldonado, 2006; Armijo de Vega et al., 2008), most studies in Mexico have provided minimal information on the effects of HEI initiatives, they have not explored the social processes of change with qualitative methods nor have included an environmental education component based on a behavior change model (Armijo de Vega et al., 2003, 2008; Maldonado, 2006; Espinosa et al., 2008). It is thus necessary to rigorously evaluate the environmental protection interventions in Mexico in order to understand the impact of their actions and their action mechanisms, generate scientific evidence for decision-makers and guide the design of integrated management strategies that can respond to the urgent environmental health problem facing Mexico.

The National Institute of Public Health (INSP), a center for research and higher education in the field of public health, is a model institution in Mexico with great influence in Latin America. Its mission is to serve as a leader in innovation, multidisciplinary research and knowledge generation for the development and implementation of public policies in health. Given its prominent position in public health, an environmental management program was developed and conducted within the *INSP* framework. Using a mixed-method approach, we assessed the impact of an EEI aimed at reducing waste generation and fomenting pro-environmental behaviors among the Institute community members.

2. Material and methods

2.1. Study design

EEI impact was assessed using concurrent mixed methods, with the qualitative component integrated under the quantitative component (QUAN + qual) (Creswell et al., 2003; Bishop, and Holmes, 2013). The latter served to measure the effects of the intervention, while the qualitative information helped to understand the mechanisms underlying the effects and the way they were perceived by the population. Qualitative and quantitative data collection was undertaken separately; analysis was achieved through a comparison and contrast exercise in which the qualitative component helped to understand and explain the results of the quantitative component (Creswell et al., 2003; Creswell and Plano, 2007).

The EEI had a total duration of 20 months (January 2014–August 2015) and included baseline (September 2013) and follow-up (December 2015) measurements. The study comprised two *INSP* campuses located in two cities in central Mexico, with intervention activities implemented in only one. The populations at both sites were composed of researchers whose functions centered on teaching and the generation of scientific knowledge, administrative and maintenance staff and students enrolled in the *INSP* master's and doctoral programs.

"Intervention group" was the designation used for the population at the *INSP* campus where the EEI took place; the population

at the alternate *INSP* campus was designated as the "control group." Intervention campus was assigned arbitrarily, with no endogenous involvement. The availability of personnel was taken into consideration for the development of EEI activities.

2.2. The environmental education intervention (EEI)

The EEI was designed according to the principles of the PRECEDE–PROCEED model (Fig. 1), which has proven effective in healthy-behavior strategies at the population level (Glanz et al., 2002; Green and Kreuter, 2005). This model comprises nine phases, beginning with an exhaustive evaluation before planning the intervention (the PRECEDE principle) and concluding with an evaluation after completing the intervention (the PROCEED principle). The purpose of the latter was to measure the effectiveness of the initiative (Wright et al., 2006; Green and Kreuter, 2005). Our study covered the phases on the continuous line in Fig. 1, omitting Phases 7 and 9.

Phases 1 and 2. Focus groups (FGs) were used to identify the needs, as perceived by the *INSP* community. Environmental problems were determined through an integrated diagnosis regarding water, energy, USW and special handling waste (SHW).

Phase 3. An electronic questionnaire and FGs were used to analyze the baseline behaviors of the community with respect to USW and SHW management and to related environmental-protection practices in the *INSP* and at home.

Phase 4. Factors susceptible to change in behavior were determined and classified as predisposing, facilitating and reinforcing factors.

Phase 5. A diagnosis to was carried out to identify and assess any *INSP* requirements that were likely to obstruct or facilitate EEI development and implementation. The following aspects were addressed: budget, resources, organizational capacities and institutional compatibility.

Phase 6. Implementation of the EEI: Components, strategies and activities are described in Supplementary Material 1 and Supplementary Material 2 (EEI video).

Phase 8. The effects of the EEI were assessed according to four indicators: (1) reduced consumption of single-use disposable materials; (2) reduced USW generation; (3) improved SHW management; and (4) improved pro-environmental behaviors at home.

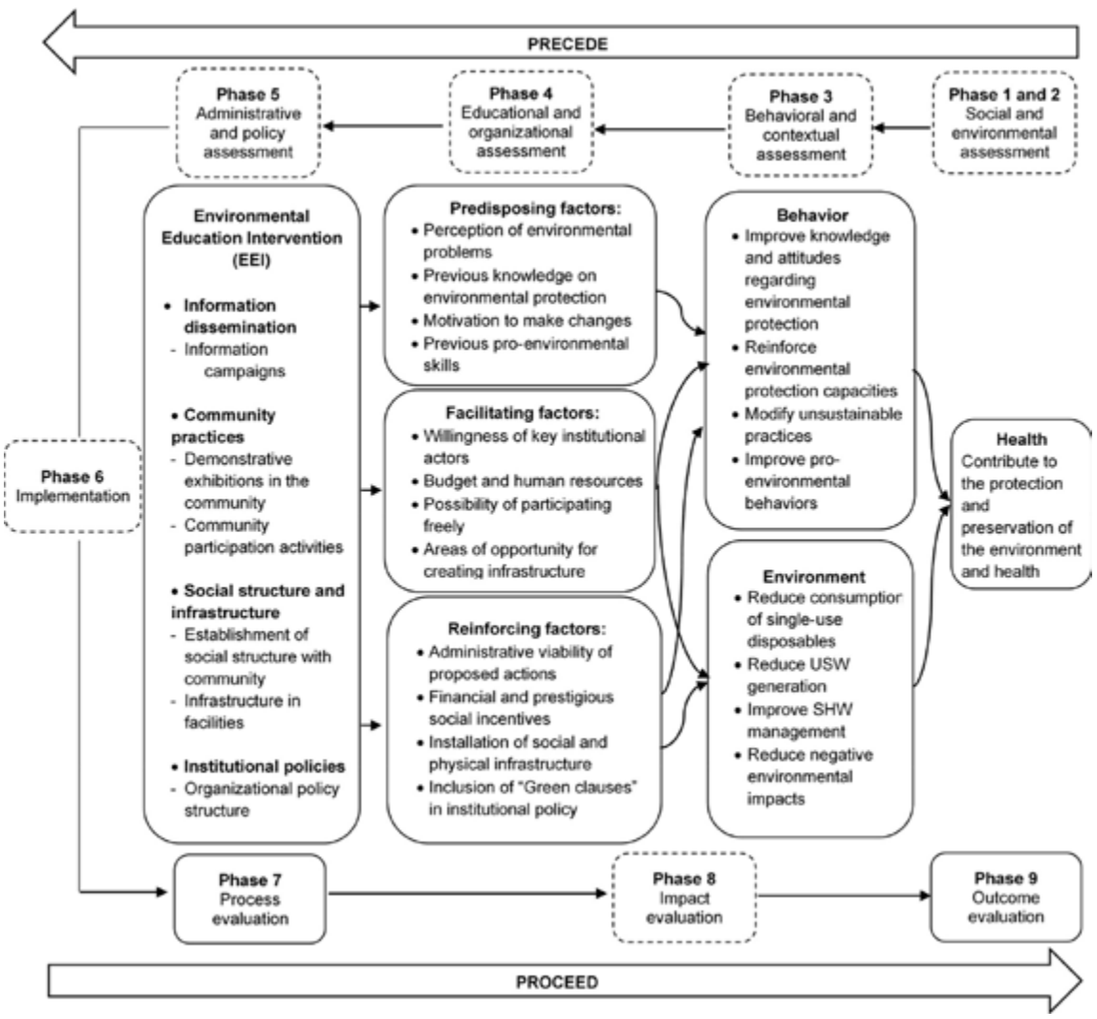


Fig. 1. EEI scheme adopted from the PRECEDE-PROCEED theoretical model.

2.3. Study population

2.3.1. Sample: quantitative component

The study universe included all the employees and students registered with the *INSP* (n = 1712). It was composed of 1268 individuals from the intervention group campus and 444 from the control group campus. Information on the configuration and size of the groups was obtained from official administrative sources. During the baseline and follow-up measurements, we gathered information on 881 and 936 participants, respectively. The response rates for the electronic self-administered questionnaire in the intervention group were 51% at baseline and 60% at follow-up; they were 52% and 41%, respectively, for the control group.

For our analysis, we included individuals who provided information at both measurements and excluded those with missing values. Our final sample was made up of 377 participants: 302 from the intervention group and 75 from the control group (Fig. 2). While excluding observations cut back our sample size considerably, it should be noted that no endogenous involvement occurred during the arbitrary assignment of group members. We selected the difference-in-differences (DD) model to analyze our sample by virtue of its capacity for controlling inter-group differences. The study sample was therefore adequate for our quantitative analysis. The strength of using a mixed-method design should also be noted.

2.3.2. Sample: qualitative component

To ensure representation of all the subgroups (both intervention and control), we selected the qualitative sample using the maximum variation purposive method (Teddlie and Yu, 2007) to generate information on the widest array of possible cases in order to establish comparisons among the different situations. We conducted a total of 20 FGs (9 at baseline and 11 at follow-up), with 109 participants, 54 at baseline and 55 at follow-up. Students were excluded from the FGs since they were a fluctuating population which at the time of the follow-up measurement had completed their school year. (Table 1), using field diaries for each FG as a data validation mechanism. Participants were recruited by means of an open invitation to the entire *INSP* community.

2.4. Instruments and variables

2.4.1. The quantitative component

For EEI indicators 1, 3 and 4, an electronic, self-administered questionnaire was distributed to every *INSP* community member and sent out periodic reminders to ensure its completion. The questionnaire remained available from three months before to three months after EEI implementation (See Supplementary Material 3: questionnaire).

The questionnaire was designed according to previously published instruments and a literature review of three thematic axes on the promotion of environmental protection (Sureda and Colom, 1989; Álvarez and Vega, 2009; Corral, 2010). Our study covered three of the six modules in the questionnaire: (1) sociodemographic characteristics; (2) behavior towards USW and SHW at the *INSP*; and (3) environmental protection practices at the *INSP* and at home (Sureda and Colom, 1989; Álvarez and Vega, 2009; Corral, 2010).

2.4.2. USW quantification and composition

For EEI indicator 2, USW generation and composition were quantified at the intervention campus. At baseline, the quartering method, a procedure established by Official Mexican Standard AA-015-1985 (DOF, 1985a) was followed. The volumetric weight of the USW was determined *in situ* (NMX- AA-019-1985) (DOF, 1985b). Then, it was separated and classified and the amounts of its subproducts was estimated (NMX-AA-022-1985) (DOF, 1985c). At follow-up, the subproducts were weekly monitored, assessing their types and weights. The data was registered on record sheets and electronic logs during the development of the EEI to determine the amount of waste generated at the campus.

2.4.3. The qualitative component

FGs and measurements were conducted in the intervention and control groups. To this end, open invitations were distributed to all research, administrative and maintenance staff. At the FGs, the perceptions and experiences of participants, in relation to EEI indicators 1, 2, 3 and 4, were explored. During discussions, four specific themes were addressed: (1) perceptions concerning the environment, natural resources and the environmental crisis;

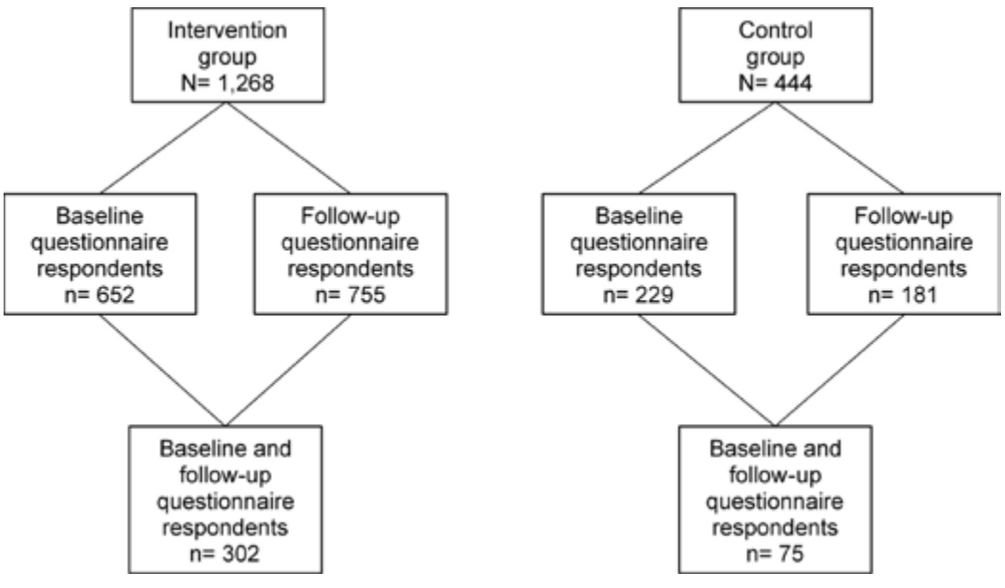


Fig. 2. Configuration of the study sample and groups.

Table 1
Qualitative sample: focus groups.

Measurement	Group	Researchers	Administrative and maintenance staff	Number of participants	Total*
Baseline	Intervention	3	2	31	5
	Control	2	2	23	4
Follow-up	Intervention	2	3	29	5
	Control	2	4	26	6
Total*		9	11	109	20

* Total: total number of focus groups by intervention group, control group and study population (research, administrative and maintenance staff).

(2) consumption and management of resources (USW, SHW, water and energy) at the *INSP*; (3) environmental behavior and willingness to change; and (4) environmental attitudes. Additionally, an EEI evaluation was included (5) during the follow-up measurement.

2.5. Data analysis

2.5.1. The quantitative component

EEI impact was assessed according to eight outcome variables. Four of them, indicated directly by the respondents on the questionnaire (dichotomous), concerned the types of materials used to introduce food into *INSP* facilities: 1. plastic wrapping, 2. disposable plastics (plates or cups), 3. Disposable expanded polystyrene, commonly known as Styrofoam (plates or cups) and 4. multilayer packaging.

The remaining four variables were also constructed according to the reports of respondents: 1. use of non-ecological materials: plastic wrapping, plastic and/or expanded polystyrene disposables and/or multilayer packaging; 2. frequent use of non-ecological materials: daily or four days a week; 3. Improper disposal of SHW: depositing one or more of the following SHW materials in trash containers at the *INSP* or at home: cell phone batteries, alkaline batteries, printer ink cartridges, mercury flashlights, electronics and/or insecticide packages; and 4. pro-environmental behavior at home: performance of one or more of the following practices at home: separation of organic/inorganic waste composting of kitchen waste and/or bringing their own bags when shopping.

The DD model controls for differences among study groups when the differences are fixed over time (Khandker et al., 2009). Hence, for those characteristics that remained unchanged in our study (regardless of whether they were observable), this model yielded unbiased estimates of the EEI impact.

The following statistical model was used:

$$y_{it} = \alpha + \beta_1 \cdot t + \beta_2 \cdot T_{it} + \vartheta_i + \varepsilon_{it} \quad (1)$$

where:

y_{it} represented the value of the outcome variable and $i-th$ the individual in period t;
T_{it}. represented the intervention variable, with 1 indicating whether the $i-th$ individual in period t received the intervention and 0, otherwise;
t represented the period variable, with 0 referring to the baseline measurement (2013) and 1 to the follow-up measurement (2015);
β_1 stood for the change observed over time (before-after comparison) in the absence of intervention (control group);
β_2 captured the impact of the intervention;
ϑ_i referred to the vector for fixed factors: variables that remained constant over time (sex, educational level, function within the *INSP*, etc.); and,
ε_{it} $N(0, \sigma_\varepsilon)$ denoted the error term.

EEI impact was estimated both globally and by sex (female and male), age group (20–39 and 40–63 years), function within the *INSP* (administrative, research or student), and educational level: high school or less, bachelor's degree, or master's/doctorate degree.

For the age groups, the sample size was adopted as the criterion and established two quantiles in order to maximize the minimum number of observations in each category.

The level of statistical significance was 90% ($p\text{-value} \leq 0.10$). The estimator used is commonly known as a "*within estimator*" or "*fixed effects estimator*." We estimated robust errors to control for heterocedasticity and intra-cluster correlation, as repeating observations would have violated the assumption of independent errors. For statistical analysis, Stata (version 14.2) software was used.

2.5.2. The qualitative component

A thematic analysis (Fereday and Muir-Cochrane, 2006) was conducted for the qualitative component, creating analytical categories to assist in finding themes that would allow for understanding the phenomenon being analyzed and provide a detailed and articulate explanation of the study questions.

For the qualitative data, we created 11 analytical codes were created for the five themes explored in the FGs. In turn, the analytical codes were broken down into 27 sub-codes. During the EEI, only those codes related to themes 2 and 5 of the qualitative assessment were analyzed. Data were analyzed comparing the group of researchers to the group of administrative and maintenance staff, given their different functions in the institution: the researchers played an active role in the definition of institutional standards while the administrative staff provided support. Additionally, the group of researchers consistently held master's and doctorate degrees while the other group members had attained bachelor's degrees or less.

The information gathered at the FGs was audio recorded with prior informed consent from participants and transcribed verbatim. Two rounds of readings and the data were carried out analyzed independently by two researchers to ensure interpretative triangulation. Data were analyzed using Atlas.ti (version 7.5.7) software.

2.5.3. Method integration

EEI impact was assessed under a mixed-method approach using a complementarity strategy to integrate the results (Creswell, 2015). This allowed for a comparison and contrast exercise, where the quantitative data helped to understand the magnitude of EEI effects, and the qualitative information, to explain, analyze in greater depth and understand the perceived effects of the EEI from the viewpoint of the participants, thus complementing our quantitative findings. The results were analyzed for each of the quantitative outcome variables and these were compared and contrasted with the qualitative findings for the same topic.

2.6. Ethical aspects

Our study was approved by the *INSP* Research Ethics Committee. FG participants joined the study voluntarily after providing oral consent. It was clearly explained to them that their participation would be handled in a confidential and anonymous manner

through the allocation of codes to their commentaries and responses on the questionnaire.

3. Results

3.1. Quantitative: characteristics of the population

Both the intervention and control groups contained greater proportions of women than men (70% and 59%, respectively); statistically significant differences were observed between the two ($p < 0.063$). Furthermore, over half of the intervention group members were 20–39 years old, whereas in the control group, ~60% were 40–63 years old ($p < 0.071$). The groups were comparable in the other characteristics listed in Table 2.

3.1.1. Impact of the EEI: globally and within population groups (EEI indicators 1, 3 and 4)

As shown in Table 3, the EEI reduced some non-ecological behaviors among participants. Globally, it achieved a drop of −14.98 pp ($p < 0.10$) in the prevalence of non-ecological materials used to bring food to the institution.

In stratifying the impact by sex, it was observed that women improved their ecological behavior at home (5.61 pp; $p < 0.10$) and reduced their use of frequently used non-ecological materials (−17.58 pp; $p < 0.05$), multilayer packaging (−15.57 pp; $p < 0.05$) and disposable plastics (−11.68 pp; $p < 0.10$). On the other hand, men showed tendencies the opposite of what was expected for most variables, although these results were not statistically significant. Nonetheless, even in this group, a significant reduction in the use of plastic wrapping was observed (−26.94 pp; $p < 0.10$).

By age group, a significant reduction in the use of expanded polystyrene disposables (−10.58 pp; $p < 0.10$) was observed among participants from 30 to 63 years old.

Concerning educational level for participants with master's or doctorate degrees, reductions were found in the use of non-ecological materials (−33.26 pp; $p < 0.05$), in the frequent users of these materials (−27.60 pp, $p < 0.01$) and in the use of multilayer packaging (−13.99 pp; $p < 0.10$). Among those with a high school education or less, a reduction in the use of plastic wrapping (−28.79 pp; $p < 0.10$) and an increase in ecological behavior at home (12.12 pp; $p < 0.05$) were noted.

As regards the impact of the EEI by function within the *INSP*, researchers significantly reduced their use of non-ecological materials (−22.70 pp; $p < 0.05$), while administrative staff demonstrated a significant decrease in the use of disposable plastics (−16.42 pp; $p < 0.10$) as well as a significant increase in ecological behavior at home (9.04 pp; $p < 0.10$). No statistically significant results were found regarding the improper disposal of SHW among any of the groups studied

Table 2
Characteristics of the study groups at baseline.

Characteristics	Control group n (%)	Intervention group n (%)	*p-val*[§].
Sex			
Female	44(58.7)	211(69.9)	0.063*
Male	31(41.3)	91(30.1)	
Age groups			
20–39 years	32(42.7)	164(54.3)	0.071*
40–63 years	43(57.3)	138(45.7)	
Educational level			
High school or less	14(18.7)	40(13.3)	0.313
Bachelor's	25(33.3)	125(41.5)	
Master's or doctorate	36(48.0)	136(45.2)	
Function within the *INSP*			
Administrative	26(35.6)	128(42.7)	0.306
Researcher	27(37.0)	113(37.7)	
Student	20(27.4)	59(19.7)	

The N total per characteristic may vary as a result of missing data.
§ P-value of the test (χ^2): Pearson's correlation ($Pr[\chi^2 \geq y|x]$).
* ($p\text{-}val < 0.10$).

3.2. Generation of USW (EEI indicator 2)

The diagnosis performed during the baseline measurement indicated that the intervention campus generated 31 t of waste annually, of which 82.1% (26.1 t) corresponded to waste recoverable through recycling while 17.9% (5.7 t) was trash. In comparing the baseline quantification with respect to monitoring and follow-up, a reduction of 15.7 t in recoverable waste and 3.4 t in trash were observed; this represented a 60.1% (19.1 t) reduction in the total waste generation reported at baseline. The recoverable waste categories showing the greatest reduction between the two measurements were hand towels, with 7.2 t, and plastics, with 4.3 t, in the form of polyethylene terephthalate (PET) packaging, high density polyethylene (HDPE) and polypropylene (PP). Glass (0.4 t) and multilayer packaging (0.8 t) showed the least reduction (0.4 t) (Fig. 3).

3.3. Qualitative results: focus group participants

The majority of FG participants were women; 71% and 62% of participants pertained to the intervention group at baseline and follow-up, respectively, while 52% and 81% pertained to the control group at baseline and follow-up, respectively. The average ages of participants were 48 years at baseline and 45 years at follow-up in the intervention group, and 45 years at baseline and 39 years at follow-up in the control group.

Qualitative findings revealed noteworthy results for the *INSP* workers (research and administrative staff) in the intervention and control groups, at both measurements. The most representative testimonies (Ts) illustrating these findings are presented in Table 4.

3.3.1. Perceptions at baseline: indicators 1, 2 and 4

(a) Perception of the need for and lack of structure for the proper management of USW

A key result for participants, but particularly for the group of researchers –and this without difference by type of campus– was an understanding of the need to protect the environment, with trash generation being recognized as problematic (Table 4, T1-T2). The researchers, in particular, recognized that an inadequate institutional infrastructure prevented waste separation, constituting a barrier to protecting the environment (T3).

(b) Capacity to act vis-a-vis USW management differentiated within the institution

Discussions revealed the different capacities of participants to act related to their functions within the institution. Research staff positioned themselves as change agents, representing examples for the rest of the community to follow in the face of the need to protect the environment (T4). Administrative staff conditioned their participation in the EEI on receiving authorization from their superiors (T5), affirming that the latter were examples to follow (T6) and expressing the need for training and motivation to separate waste (T7).

(c) Pro-environmental behavior at home differentiated by group

Table 3
Impact of the EEI globally and within population groups.

Outcome variables	Global	Sex		Age groups		Educational level			Function within the *INSP*		
		Female	Male	20–39 years	40–63 years	High school or less	Bachelor's	Master's or doctorate	Admin.	Res.	Stud.
Plastic wrapping	−10.83	−1.11	−26.94*	−12.75	−10.43	−28.79*	12.60	−21.53	−12,16	−12.22	−11.84
Plastic disposables	−5.39	−11.68*	3.81	0.51	−9.82	−13.64	−4.81	−6.44	−16.42*	0.79	4.82
Expanded polystyrene disposables	−0.29	−6.90	8.69	10.77	−10.58*	−8.33	9.09	1.89	1.38	−4.76	2.63
Multilayer packaging	−5.36	−15.57**	6.44	−7.25	−4.13	2.27	11.30	−13.99*	0.88	−5.87	−16.67
Non-ecological materials	−14.98*	−17.66	−12.00	−14.82	−16.47	−22.73	16.69	−33.26**	−17.29	−17.22	−13.70
Non-ecological materials (frequent use)	−6.21	−17.58**	7.12	−4.99	−6.60	14.39	16.49	−27.60***	−1.25	−22.70**	15.79
Improper disposal of SHW	2.18	−5.03	9.20	−0.08	4.46	17.19	12.22	−13.51	12.86	−8.11	11.76
Ecological behavior at home	0.22	5.61*	−7.14	−3.29	3.01	12.12**	1.15	1.57	9.04*	0.00	−9.48

Admin.: administrative staff; Res.: researchers; Stud.: students.
Level of significance: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

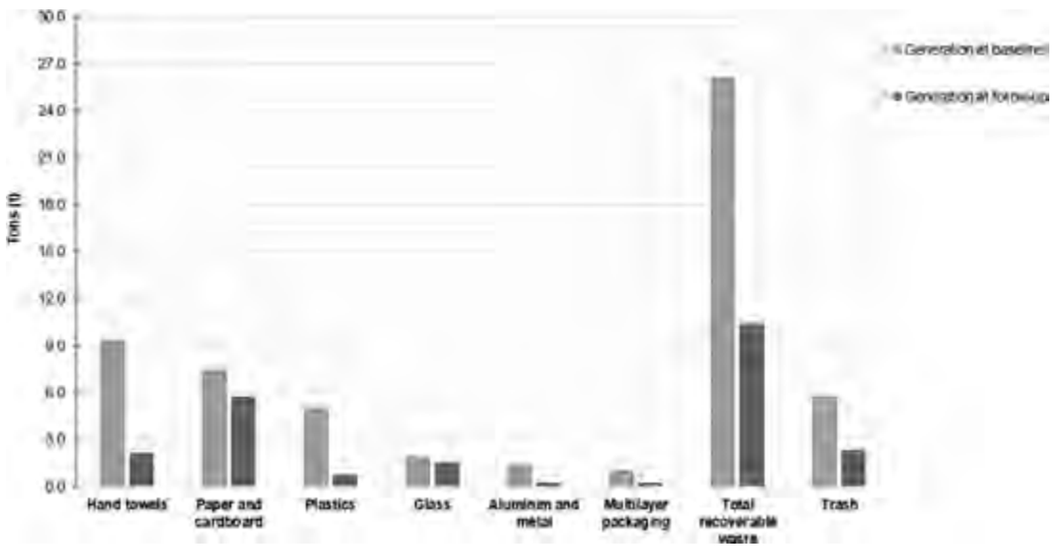


Fig. 3. Generation of recoverable and other waste at the intervention campus: results from quantification during baseline and follow-up measurements.

Researchers generally affirmed that they separated waste at home prior to EEI implementation (T8), while administrative staff made no such assertions in their discourses.

3.3.2. Perceptions at follow-up: Indicators 1, 2, 3 and 4

(a) Evaluation of the EEI: changes in institutional behavior and culture

The intervention group generally affirmed the adoption of relative changes within the *INSP* in the reduced use, separation and management of USW. These changes were perceived as the result of specific EEI actions by means of which staff was incentivized to embrace a reduction in the consumption of disposable materials, energy and USW (T9, T10).

In their discourses, participants recounted the components and activities of the EEI, highlighting those that allowed them to visualize the magnitude of the problem at the local level, and citing actions which they related to favorable changes in their environmental behavior. Among the actions most frequently mentioned as being relevant were the discount offered to cafeteria users who brought their own cups, as well as demonstrative exhibitions on the waste generated each week by the Institute. In addition, participants described what they called the creation of an "institutional culture" for protecting the environment (T10).

(b) Reduction in the use of disposables

Administrative staff emphatically affirmed the change observed in the utilization of single-use disposables which had been part of their daily consumption prior to the EEI; in their discourses they affirmed that this change of behavior was specifically related to EEI activities (T11), and the awareness generated by the EEI concerning the use of expanded polystyrene (T12).

(c) Structure, reduction of USW and challenges in the use of bins and sustainability

Participants affirmed that the installation of bins, the separation and classification of USW as well as the creation of storage space for recyclable waste were key in explaining the reduction in USW (T13).

In spite of this, they pointed to challenges in the use of the bins. They found that highly detailed classification (of paper and cardboard, glass, metal, plastics, organics and trash) generated confusion among users, some of whom –in the face of this

Table 4
Testimonies from the qualitative focus groups on the baseline and follow-up measurements.

	BASELINE: EEI Indicators 1, 2, and 4 **3.3.1 Perceptions of generation and proper management of USW at the *INSP* and pro-environmental behavior at home.**
	Barriers for proper management of USW
(T1)	R7: […] *I believe that yes, […] there is no doubt that the Institute should be an example in health, in environmental health. Look, the Institute has had success stories of, let's say, […]in the case of tobacco, but in the case of environmental health […] I think that […] there are things that the Institute should certainly do. (FG_Control_Research_2013).*
(T2)	R1: […] *I guess we produce a lot of garbage, a lot of pollution specifically garbage. […] for example students have to deliver many things on paper* […] *(FG_Control_Research_2013).*
(T3)	R6:*I think so, at the level of the institution…* R7: *Aha, aha. Then we could, we could separate the garbage, but as they say, we would need to make someone take it separately, wouldn't we? because if they are going to collect it together [mixed] then it doesn't make sense anymore, right? (FG_Control_Research_2013)*
	Capacity to act vis a vis USW within the institution
(T4)	R3: *I think that, like at home, here the example is given by the elders, and the elders start with our directors, etc. So, if you want a worker to make a change of attitude, how are you going to demand it, if you're not doing it? I believe that the example should also come from us [researchers] […] and that it should permeate […] if there is no willingness and empowerment, it doesn't work, it just doesn't work. (FG_Intervention_Research_ 2013)*
(T5)	R1: *And are we going to be given permission* [to participate in the EEI]*?* R2: *Because, it's complicated for us to be able to attend the courses and, all of that, it's complicated for [our bosses] to give us permission.* R3: *It would be worthwhile to be emphatic, that is, for the director to be emphatic in saying that our participation [in the EEI] is important. (FG_Intervention_Administrative _2013)*
(T6)	R4: *My boss is very careful and he has never made photocopies. For example, in a class for his students, the readings are sent to them electronically and I have seen him […] but if he didn't do it I would follow his example. (FG_ Intervention_Administrative_2013)*
(T7)	R2: *I brought a little glass* [plastic], *and I saw inorganic-inorganic, two bins … I brought it here* [to the office] *and threw it in my bin* [without separation] … R3: *I mean, that's really what it is sometimes. At the moment you forget, which is organic and which is inorganic. (FG_Control _Administrative_2013)*
	Pro-environmental behavior at home
(T8)	R1: *From home I do actions, this is a facilitator to act at the political level* [in the public sphere]. *(FG_Intervention_Research_2013).*
	FOLLOW-UP: Indicators 1, 2, 3 and 4 **3.3.2 Perceptions of generation and proper management of USW and SHW within the *INSP* and pro-environmental behavior at home**
	Changes in institutional behavior and culture
(T9)	R12: *Of course! There has been a positive development since the "eco-INSP"* [EEI] *program began. It is positive because […] because we have been shown the results and because I believe that not a few* [many] *of us who have participated have changed some of our habits that go against the environment. (FGs_Intervention_Research_2015)*
(T10)	R1: *I […] saw an infographic published here on the intranet, where we are invited to save water, to separate solid waste […].* R2: *Bringing your cup to the cafeteria* [avoid using disposable cups] *became a habit.* R1: *In the cafeteria. They put water fountains to decrease the use of PET*, [the EEI] *rewards you according to what you've done with a tree […]* R3: *They have also done like an organic products fair* […] R4: *Yes, I like the campaign they have done because, even at Christmas, they made a Christmas tree, right? which was very ecological […]. They also made a huge, impressive expanded polystyrene sculpture. We realized how much* [expanded polystyrene] *is generated in a week. (FG_Administrative_Intervention_2015)*
	Reduction in the use of disposables
(T11)	R1: *Personally, I became aware, "say not to expanded polystyrene", I already made the decision, I don't buy it, I don't consume it, […].* R2: *The light, if I'm going to leave my office for lunch, I really do turn off the printer, the light, the computer.* R3: *They eradicated a lot of the disposable.* R4: *The disposables, that is, in our area meetings, the change is already generated, for example, everyone bought his/her plate and his/her glass.* R3: *But, I think it* [EEI] *has accomplished a lot, we all agree that* [the EEI] *has made us aware, […] we also take it* [practices] *to home […]. In my work, we receive foreign and national visitors, for me it is always very cool to take them to […].* R4: *The waste warehouse…* R3: *The warehouse […]. It's kind of funny because the waste is there, but it's hygienic, […] I take advantage of it and presume it […] and people are shocked,* R4: *[…] we take our cup* [to the cafeteria] *and they charge us one peso less…* R5: *That's five pesos a week we've saved and I wonder why I'm going to be spending it on garbage, right? (FG_ Intervention_Administrative_2015)*
(T12)	R2: *I remember it worked, one day they put a big expanded polystyrene sculpture, which did impact me. I thought, this is what the institution accumulated in a week of expanded polystyrene…* R4: *Now, imagine…* R3: *Yearly! (FG_Intervention _Research_2015)*
	Management of the USW and challenges in the use of bins and sustainability
(T13)	R2: *Well, I think, apart from the workshops, the fact that you see the garbage bins opens the possibility to separate the waste, because they're there and they remind you every day, and when you're going to throw something away you have to separate it, depending on its usefulness.* R3: *And to be able to bring the trash, well, the waste from your house and see that you're not the only person doing it. You arrive at the waste warehouse and you see everything properly ordered, separated. […] in the Institute you can go and take your USW* (laughs) *and here we go the mothers who have several children, "let's go to the institute to leave the trash […] (FG_Intervention_Research_2015)*
(T14)	R3: *The bins were placed to separate the garbage, but not everyone uses them.* R4: *I think the bins are kind of confusing for me. They're unclear, that is, they're not practical.* R5: *For example, recoverable, what is recoverable, I don't know.* Q: *But, don't bins have labels explaining what type of waste goes in?* A4: *Yes, just because sometimes you go in a hurry […] because you have a meeting and you have to study the labels. So, I feel like it should be something more, something quick, something practical. (FG_Intervention_Research_2015)*
(T15)	R3: *I see a lot of participation when they have done the fair […] a lot of people come and buy organic products, but […] like that day we enjoy the event and then we forget the commitment.* R4:*It's a lifestyle, it's not just that day. (FG_ Intervention_Administrative_2015).*
	Pro-environmental behavior at home differentiated by group
(T16)	R6: *Well, having a space to bring everyone recycled items was a very good idea. I started at home, separating, but once I've done it, what now?* [There's no structure for separation at municipal level] R7: *If I take it out to the collection truck, they're going to mix it, […] the organic was used for composting, but I didn't know what to do with the inorganic. When this opportunity was opened at the institute, I started to bring it. I encouraged myself again to separate. (FG_Intervention_Research_2015)*

Table 4 (*continued*)

FOLLOW-UP: Indicators 1, 2, 3 and 4	
3.3.2 Perceptions of generation and proper management of USW and SHW within the *INSP* and pro-environmental behavior at home	
(T17)	R4: *[. . .] In my case I can say that since I started and became involved [in the EEI], I learned things that I implemented in my personal life, in my home. (FG_Intervention_Administrative_2015).*
	TSHW management
(T18)	R1: *The toner cartridges for example, I don't know where I have to take them, do I give them to the cleaning person? [. . .] I don't know where to dispose of these* [waste]. *(FG_Intervention _Administrative _2015)*
	Unintended positive externalities
(T19)	R18: *With the outsiders [street food vendors outside the institution], we go for the "chilaquiles" [food] with our tupperware. At first, they said ay, ah, you really don't want a disposable, do you? just like, oh, funny! [. . .]* R19: *Oh, that's good.* R18: *And they* [street vendors] *aren't bringing expanded polystyrene anymore. (FG_Intervention _Administrative _2015)*
3.3.3 Control group	
	Absence of the intervention
(T20)	R3: *Well, the [EEI] program, as such, is not implemented, we have not been given complete information on how the program is implemented.* R1: *Okay, well, that's very important. Here people have not benefited from the program.* R2: *No.* R2: *At* [another site] *I think there have been benefits. A lot about how you separate garbage. (FG_Control _Research_2015)*
(T21)	R3: *On the other hand, our offices do not have stipulated bins or paper, organic and inorganic. Sometimes you don't even have garbage bins. This somewhat limits the possibility for us to take action in terms of reducing pollution, or positive actions for the environment. (FG_Control_Administrative_2015)*
(T22)	R1: *Right now, we don't know whether to separate the garbage or not, because when it gets to the dump everything goes together.* R2: *The truth, sincerely, you say, what's the use of separating it? [. . .], if when it goes [. . .] where are they going to deposit all the trash? it turns out that everything is mixed.* R1: *You say "what happened", don't you? What good did it do? (FG_Control_Administrative_2015)*

confusion– opted not to classify waste and treated all of it as trash (T14). In addition, it was recognized that change requires sustained action in order to become a lifestyle (T15).

(d) Pro-environmental behavior at home differentiated by group

Follow-up measurements corroborated what had been found at baseline. Research staff carried out pro-environmental actions at home prior to the EEI, and following this intervention began to implement recycling within the *INSP* (T16). For their part, administrative staff affirmed that they took home the knowledge acquired through the EEI on the separation of waste as a new practice (T17).

(e) SHW management

During the follow-up measurement, participants did not recognize an EEI impact with respect to SHW management, but SHW was nonetheless mentioned in their discourses (T18).

(f) Unintended positive externalities

Administrative staff stated that, as a result of the rejection of the use of disposables by EEI participants, people who had not received the intervention, such as street food vendors in the vicinity of the *INSP*, had stopped using and selling expanded polystyrene in their businesses. (T19).

3.3.3. Control group

In the control group, both research and administrative staff stated that the absence of EEI actions on their campus (T20) assured that no structure would be built for the separation of USW (T21) and affirmed that lacking an EEI as well as adequate infrastructure, no actions to protect the environment were taken (T20, T22).

3.4. Integrated results

The EEI had an impact on the reduction of the consumption of single-use disposables, presenting heterogeneous results by groups. Participants with a master's or doctoral level of education showed a significant reduction in the use of non-ecological materials (plastic packaging, disposable plastics and expanded polystyrene containers), while those with a high school education or less and working as administrative staff exhibited an increase in ecological behavior at home (Table 5).

For its part, the qualitative component allowed to better understand the relationship between pro-environmental behavior and the ability of actors within the social structure of the *INSP* to take action. On the one hand, researchers, generally possessing a master's or a doctorate degree, demonstrated a high capacity to act, grounded in knowledge and prior practice concerning environmental protection. Administrative staff with a bachelor's degree or less took additional actions at home as a result of the intervention; nonetheless, at baseline, they reiterated the barriers to taking similar actions within the *INSP* environment (Table 5).

With respect to the reduction in the generation of USW, we quantified a significant decrease in waste between the baseline and follow-up measurements. This reduction was reflected in the discourses of FG participants, who acknowledged having changed their consumption patterns as a consequence of the different EEI components, and even recognized the creation of what they called an "institutional culture" of protecting the environment. The qualitative component also allowed us to explain why the installation of the physical structure for classification of waste and recycling, as well as the incorporation of "green clauses" in institutional policies were recognized by participants as key EEI actions (Table 5).

4. Discussion

Our study presents, for the first time in Mexico, to the best of our knowledge, the results of an EEI impact evaluation of a case of study, using a mixed-method approach within a HEI, and contributes evidence for decision making in the area of waste management.

4.1. Reduction in consumption of single-use disposable materials

Overall, the pro-environmental behavior of participants modestly reduced the consumption and generation of non-ecological

Table 5
Integrated results using mixed methods: EEI indicators, response variables of the qualitative component, themes analyzed in the qualitative component and mixed results in contrast.

	Quantitative Findings	Qualitative Findings
EEI indicator 1: Reduced consumption of single-use disposable materials **Outcome variables:** Plastic wrapping Disposable plastics Disposable expanded polystyrene Multilayer packaging Non-ecological materials Non-ecological materials (frequent use) **Qualitative assessment:** **Theme 2**. Consumption and management of USW, SHW, water and energy.	■ **Global**: the EEI reduced the prevalence of the use of non-ecological materials (−14.98 pp*). ■ **1.1** Plastic wrapping: men (−26.94 pp*), participants with high school education or less (−28.79 pp*). ■ **1.2** Disposable plastics: women (−11.68 pp*); administrative staff (−16.42 pp*). ■ **1.3** Disposable expanded polystyrene: participants between 40 and 63 years (−10.58 pp*). ■ **1.4** Multilayer packaging: women (−15.57 pp**), participants with a master's or a doctorate (−13.99 pp*). ■ **1.5** Non-ecological materials: participants with a master's or a doctorate (−33.26 pp**). ■ **1.6** Non-ecological materials (frequent use): women (−17.58 pp**), participants with a master's or a doctorate (−27.60 pp***), researchers (−22.70 pp**).	• Changes in institutional behavior and culture regarding environmental protection derived from EEI activities and general perceptions (T9, T10). • Reduction in plastic wrapping and plastic disposables expressed primarily by administrative staff with high school education or less (T11). • Reduction in the use of expanded polystyrene reported by administrative staff (T11). • Special emphasis on awareness raising as regards the reduction in the use of expanded polystyrene (T12).
EEI indicador 2: Reduced USW generation **Quantification of USW:** Recoverable waste generation: hand towels, paper and cardboard, plastics, glass, aluminum and metal and multilayer packaging. Trash generation. **Qualitative assessment:** **Theme 2**. Consumption and management of USW, SHW, water and energy.	■ **2.1** Reduction of 60.1% in total generation of waste reported at baseline. ■ **2.1.1** Reduction in recoverable waste (15.7 t): waste showing the greatest reduction between both measurements: hand towels (7.2 t) and plastics (4.3 t); waste showing the least reduction: glass (0.4 t) and multilayer packaging (0.8 t). ■ **2.2** Trash reduction (3.4 t) at follow-up vs. baseline.	Participants recognized the difference that providing bins for waste separation made in regard to recycling actions (T13); this notwithstanding, they spoke of EEI challenges concerning the use of the infrastructure (T14, T15).
EEI indicator 3: Improved SHW management **Outcome variable:** **3.1** Improper disposal of SHW: cell phone batteries, alkaline batteries, ink cartridges, mercury flashlights, electronics, insecticide packages **Qualitative assessment:** **Theme 2**. Consumption and management of USW, SHW, water and energy.	**3.1** Without significant impact on the improper disposal of SHW: greater reductions were observed among participants with a master's or a doctorate (−13.51 pp) and researchers (−8.11 pp).	• Despite showing no effect regarding SHW, references to this type of waste emerged in the discourses of participants during the follow-up measurement. Contrarily, they were missing at baseline (T18).
EEI indicator 4: Improved pro-environmental behavior at home **Outcome variable:** **4.1** Pro-environmental behavior at home: separation of organic/inorganic waste, composting of kitchen waste and/or bringing their own bags when shopping. **Qualitative assessment:** **Theme 3**. Environmental behavior and willingness to change.	• **4.1** Pro-environmental behavior at home: women (5.61 pp*), participants with high school education or less (12.12 pp**), administrative staff (9.04 pp*).	• Researchers stated that they had adopted pro-environmental behavior in their homes prior to the EEI, but began to adopt this behavior at the *INSP* following the EEI (T16). • Administrative staff stated that they had begun to separate waste at home as a new practice (T17).
Emerging qualitative findings **Emerging themes:**	Positive externalities: Administrative staff recognized positive externalities in the reduction of disposables used by street vendors. (T19).	

Quantitative results expressed in percentage points (pp); Statistical significance: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.
Qualitative results: Testimonies (Ts) in Table 4.

materials; however, our results suggest that the EEI exerted greater statistically significant effects among women and individuals with higher levels of education.

The effect on women and their greater level of participation has been noted by authors such as Vicente-Molina et al. (2013) and Makrakis and Kostoulas-Makrakis (2016), who observed that pro-environmental behavior tends to be linked to altruistic motivations, more prevalent among women than men. Adogu et al. (2015) mention that being a woman significantly influences environmental practices, particularly as regards the management of waste. In this regard, our findings are in agreement that the women in our study reduced their consumption of frequently used non-ecological materials, plastic disposables and multilayer packaging to a greater extent than did their male counterparts. Conversely, men increased the level of their non pro-environmental behavior, albeit not to a significant extent; this phenomenon should be the subject of future studies.

No correlation between the age of participants and the outcome variables was found. However, the qualitative data showed specific patterns of behavior related to educational level and the function of participants within the *INSP*. Our findings demonstrate that job role, related to educational level, and the ability to take action on the part of participants in an EEI may condition the results of such an intervention within HEIs.

Some authors suggest that people with higher levels of education possess greater knowledge on the impact of waste management (Hammed et al., 2018), participate more than other populations (Kelly et al., 2006; Bailey et al., 2015), and are more motivated to adopt environmentally responsible behavior (Kelly et al., 2006; Lozano, 2006; Olli et al., 2001; Vicente-Molina et al.,

2013). The differentiated patterns of action within the institution to protect the environment indicate that researchers embraced pro-environmental behavior at home and expressed a desire to implement this approach within the *INSP*; this perspective was not found among administrative staff. Nevertheless, follow-up measurements of both groups show that the former constituting a clear presence within the HEI, with the latter beginning to implement actions at home.

In this respect, Velázquez et al. (2005) and Zhang et al. (2011) point out that HEIs are usually characterized by bureaucratic organizational structures with inefficient management, where support from leadership and a clearly defined environmental policy are critical components for the success of environmental strategies. For their part, Armijo de Vega et al. (2003) stress that education and motivation must be directed at the whole of the institutional community. Our study shows that the example provided by HEI leaders, as well as the involvement of different actors within the community, contribute to positive EEI results.

4.2. Behavior change

In the context of HEIs, there are few interventions that, in their design, address a conceptual model of behavior change (Makrakis and Kostoulas-Makrakis, 2016; Tiew et al., 2019b). In our study, the use of the PRECEDE-PROCEDE model contributed to reducing the consumption of non-ecological materials in infrequent and frequent users. Some authors point out that this model is suitable for modifying pro-environmental behaviors (Grol and Wensing, 2004; Moore and Boldero, 2017).

In our results, demonstration activities focused on raising awareness allowed participants to grasp the dimensions of the environmental problem caused by waste. Along the same lines, it has been shown that information can help people become aware of the consequences of their own behavior (Godfrey and Scott, 2011). In this connection, Kiran et al. (2015) showed that around 90.8% of those interviewed felt that they played an important role in solid waste management. Moreover, they affirmed that if people became aware of the fact that they were responsible for the problem of waste, then they would also perceive that they could do something to resolve it. Similarly in our study, participants showed interest in waste management, indicating that the EEI components that had most helped them understand the scale of the problem within the *INSP*.

4.3. Reduction in the generation of USW and SHW

With respect to the quantification of waste, our results are in agreement with those reported in the literature on the high potential for recycling waste generated by the HEIs (Armijo de Vega et al., 2008; Disterheft et al., 2012; Adeniran et al., 2017; Gallardo et al., 2016), rendering educational institutions ideal sites for environmental education aimed at waste separation and recycling.

We measured a reduction of 60.1% in waste generation, similar to other reported findings in a Mexican campus (67%) (Maldonado, 2006) and Canadian campus in Northern British Columbia, Canada (70%) (Smyth et al., 2010) after the implementation of a waste management program. In addition, the design of our evaluation allowed for observing the alignment between the reduction (17.9%) in the waste generation observed in the follow-up phase and the estimated impact of the EEI on reducing the generation of non-ecological materials among the population receiving intervention (−14.98 pp, $p < 0.10$).

Using the quartering method carried out during the baseline measurement, it was determined that 82.1% pertained to recoverable waste, information similar to that observed by Adeniran et al. (2017), whose classification of waste on a Nigerian university campus reported a recycling potential of 75%. In disaggregating the waste generated at follow-up, we observed that generation of paper and cardboard represented 44.9% of the total, consistent with figures reported by Armijo de Vega et al. (2008) in an HEI in northern Mexico (33.02%). While SHW management was not modified by the intervention, an awareness of its existence –absent during the baseline measurement– was incorporated into the discourses of participants at follow-up.

Our study enabled us to assess the role of the physical and administrative structure in pro-environmental behavior. It has been argued that the rate of recycling could be increased by as much as 33.5% with waste separation at the point of generation if separation bins were provided (Ikhlayel et al., 2016; Hammed et al., 2018). Our findings support the conclusion that adequate infrastructure and green clauses are central to the success of a recycling system (Abarca et al., 2013; Zhang et al., 2016; Ebrahimi and North, 2017). However, it must be stress that these types of strategies for separation and recycling of waste must enjoy economic support to assure their successful implementation (Mbuligwe, 2002; Ebrahimi and North, 2017).

Finally, one of the strengths of the present study is its robust design. Although educational interventions in the environmental area have been previously conducted, only few have been rigorously evaluated and when they have been evaluated, it has been done with quantitative methods only (Largo-Wight et al., 2013). This study contributes to the knowledge of the effectiveness of interventions in the framework of HEI's (Largo-Wight et al., 2013) while our mixed methods design allowed the understanding of the social mechanisms that explain the findings (Mason et al., 2003; Bailey et al., 2015; Makrakis and Kostoulas-Makrakis, 2016), going beyond the quantitative approach present in the literature (Ajaps and McLellan, 2015) and showing concordance between the findings.

4.4. Limitations

Our study has some limitations. On the one hand, the sample size was considered to have a significance level of 90% ($p\text{-value} \leq 0.10$). On the other hand, its findings can be generalized to other similar institutions and could be used to design larger studies, but several disadvantages limit the generalization and extrapolation of our results to other populations or settings: Because participation in the study was voluntary, participants may have had a self-selection bias with respect to pro-environmental behavior coupled with low response rates; the latter is considered common among surveys conducted electronically, owing to the lack of an interviewer to assist the interviewee in completing the questionnaire (Vicente and Reis, 2010; Ajaps and McLellan, 2015).

Given the transitory nature of the student population in the study, whose tenure in the *INSP* depended on the length of their study program (two years), our analysis was unable to determine the degree of change in their behavior, with the majority of students leaving the institution before our follow-up assessment. Finally, the quantification and composition of USW (quartering method and monitoring) was not carried out on the control group campus, making it impossible to compare the generation and reduction of waste at the group level in the study.

Finally, even when the study had with a small study population, our sample was self-representative, with the results internally valid in ensuring comparability among groups. Furthermore, the methods used allowed us to measure the changes in behavior attributable to the intervention, understand the perceptions of different groups of participants, quantifying the reduction in waste generation.

5. Conclusions

An intervention based on the principles of environmental education and designed under the PRECEDE-PROCEDE model, such as that carried out in our study, can enhance the pro-environmental behavior and sharpen the perceptions of participants while reducing the consumption of non-organic materials and reducing the production of USW sent to a final disposal within the framework of a HEI, as well as the promotion of pro- environmental behaviors at home. The creation of physical and organizational structures is key to cutting down waste and to its appropriate management.

In this first impact mixed-methods evaluation, positive effects were observed in the area of pro-environmental behavior, these impacts could continue as long as the EEI continues and orientate the design, implementation and evaluation of other interventions with a solid method and a model of behavior change in high educational contexts in developing countries.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We wish to express our gratitude to all the workers and students of the *INSP* who participated in each phase of the work. Our thanks to the authorities of the institution who allowed this study to develop, especially the leadership of the *INSP*, Dr. Alejandra Montoya and Alma Liriet Alvarez, MPH, for their collaboration.

Financing: Our work was supported by the National Institute of Public Health (INSP) (Protocol Number 1028-6905 and Project Number 1160).

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.wasman.2020.06.027.

References

Abarca, G.L., Maas, G., Hogland, W., 2013. Solid waste management challenges for cities in developing countries. Waste Manage. 33 (1), 220–232. https://doi.org/10.1016/j.wasman.2012.09.008.

Adeniran, A.E., Nubi, A.T., Adelopo, A.O., 2017. Solid waste generation and characterization in the University of Lagos for a sustainable waste management. Waste Manage. 67, 3–10. https://doi.org/10.1016/j.wasman.2017.05.002.

Adogu, P.O.U., Uwakwe, K.A., Egenti, N.B., Okwuoha, A.P., Nkwocha, I.B., 2015. Assessment of waste management practices among residents of owerri municipal Imo State Nigeria. J. Environ. Prot. 6 (5), 446–456. https://doi.org/10.4236/jep.2015.65043.

Ağdağ, O.M., 2009. Comparison of old and new municipal solid waste management systems in Denizli,Turkey. Waste Manage. 29 (1), 456–464. https://doi.org/10.1016/j.wasman.2008.01.012.

Ajaps, S., McLellan, R., 2015. "We don't know enough": Enviromental education and pro-enviromental behaviour perceptions. Cogent Educ. 2, 1–12. https://doi.org/10.1080/2331186X.2015.1124490.

Álvarez, P., Vega, P., 2009. Attitudes and sustainable behaviours. Implications for the environmental education. Rev. Psicodidáctica 14 (2), 245–260.

Armijo de Vega, C., Ojeda-Benítez, S., Ramírez-Barreto, M.E., 2003. Mexican educational institutions and waste management programmes: a University case study. Resour. Conserv. Recycl. 39 (3), 283–296. https://doi.org/10.1016/S0921-3449(03)00033-8.

Armijo de Vega, C., Ojeda-Benítez, S., Ramírez-Barreto, M.E., 2008. Solid waste characterization and recycling potential for a university campus. Waste Manage. 28, S21–S26. https://doi.org/10.1016/j.wasman.2008.03.022.

Bailey, J., Pena, M., Tudor, T., 2015. Strategies for improving recycling at a higher education institution: a case study of the University of the West Indies, Cave Hill Campus, Barbados. Open Waste Manag. J. 8, 1–11. https://doi.org/10.2174/1876400201508010001.

Bishop, F.L., Holmes, M.M., 2013. Mixed methods in CAM research: A systematic review of studies published in 2012. Evid. Based Complement. Altern. Med. 20, 1–12. https://doi.org/10.1155/2013/187365.

Corral, V.V., 2010. Psicología de la sustentabilidad: un análisis de lo que nos hace pro ecológicos y pro sociales. Trillas, Ciudad de México.

Creswell, J.W., Plano, C.V., Gutmann, M.L., Hanson, W.E., 2003. Advance mixed methods research designs. In: Tashakkori, A., Teddlie, C., Teddlie, C.B. (Eds.), Handbook of Mixed Methods in Social & Behavioral Research. SAGE Publications, Thousand Oaks, CA, pp. 209–240.

Creswell, J.W., Plano, C.V., 2007. Designing and Conducting Mixed Methods Research. SAGE Publications, Thousand Oaks, CA.

Creswell, J.W., 2015. A Concise Introduction to Mixed Methods Research. SAGE Publications, Thousand Oaks, CA.

Disterheft, A., Da Silva, Ferreira, Caeiro, S.S., Ramos, M.R., De Miranda Azeiteiro, U. M., 2012. Environmental Management Systems (EMS) implementation processes and practices in European higher education institutions – top-down versus participatory approaches. J. Clean. Prod. 31, 80–90. https://doi.org/10.1016/j.jclepro.2012.02.034.

De Young, R., 2011. Slow wins: patience, perseverance and behavior change. Carbon Manag. 2 (6), 607–611. https://doi.org/10.4155/cmt.11.59.

Del Cimmuto, A., Mannocci, A., Ribatti, D., Boccia, A.La., Torre, G., 2014. Impact on knowledge and behaviour of the general population of two different methods of solid waste management: an explorative cross-sectional study. Waste Manage. Res. 32 (6), 556–561. https://doi.org/10.1177/0734242X14536461.

DOF (Diario Oficial de la Federación), 2003. Ley general para la prevención y gestión integral de los residuos. Ciudad de México., Octubre 8.

DOF (Diario Oficial de la Federación), 1985a. Norma Mexicana NMX-AA-015-1985. Protección al ambiente-contaminación del suelo-residuos sólidos municipales-muestreo-método de cuarteo. Ciudad de México.

DOF (Diario Oficial de la Federación), 1985b. Norma Mexicana NMX-AA-019-1985. Protección al ambiente-contaminación del suelo-residuos sólidos municipales-peso volumétrico "in situ". Ciudad de México.

DOF (Diario Oficial de la Federación), 1985c. Norma Mexicana NMX-AA-022-1985. Protección al ambiente-contaminación del suelo-residuos sólidos municipales-selección y cuantificación de subproductos. Ciudad de México.

Ebrahimi, K., North, L.A., 2017. Effective strategies for enhancing waste management at university campuses. Int. J. Sustain. High. Educ. 18, 1123–1141. https://doi.org/10.1108/IJSHE-01-2016-0017.

El-Gilany, A.H., El-shaer, S., Khashaba, E., El-dakroory, S.A., Omar, N., 2017. Knowledge, attitude, and practice (KAP) of 'teaching laboratory' technicians towards laboratory safety and waste management: a pilot interventional study. J. Hosp. Infect. 96, 192–194. https://doi.org/10.1016/j.jhin.2017.02.007.

Erhabor, N.I., Don, J.U., 2016. Impact of environmental education on the knowledge and attitude of students towards the environment. Int. J. Environ. Sci. Educ. 11 (12), 5367–5375.

Espinosa, R.M., Turpin, S., Polanco, G., De laTorre, A., Delfín, I., Raygoza, I., 2008. Integral urban solid waste management program in a Mexican university. Waste Manag. 28. https://doi.org/10.1016/j.wasman.2008.03.023.

Fereday, J., Muir-Cochrane, E., 2006. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. Int. J. Qual. Methods 5 (1), 80–92. https://doi.org/10.1177/160940690600500107.

Gallardo, A., Edo-Alcón, N., Carlos, M., Renau, M., 2016. The determination of waste generation and composition as an essential tool to improve the waste management plan of a university. Waste Manage. 53, 3–11. https://doi.org/10.1016/j.wasman.2016.04.013.

Geng, Y., Liu, K., Xue, B., Fujita, T., 2013. Creating a "green university" in China: a case of Shenyang University. J. Clean. Prod. 61, 13–19. https://doi.org/10.1016/j.jclepro.2012.07.013.

Giusti, L., 2009. A review of waste management practices and their impact on human health. Waste Manage. 29 (8), 2227–2239. https://doi.org/10.1016/j.wasman.2009.03.028.

Glanz, K., Rimer, B.K., Lewis, F.M., 2002. Using the precede-proceed planning model to apply health behavior theories. In: Glanz, K., Rimer, B.K., Lewis, F.M. (Eds.), Health Behavior and Health Education: Theory, Research, and Practice. Jossey-Bass, CA, USA, pp. 409–436.

Godfrey, L., Scott, D., 2011. Improving waste management through a process of learning: the South African waste information system. Waste Manage. Res. 29 (5), 501–511. https://doi.org/10.1177/0734242X10382591.

Green, L., Kreuter, M., 2005. Health Program Planning: An Educational and Ecological Approach. McGraw-Hill, New York.

Grol, R., Wensing, M., 2004. What drives change? Barriers to and incentives for achieving evidence-based practice. Med. J. Aust. 180, S57. https://doi.org/10.5694/j.1326-5377.2004.tb05948.x.

Hammed, T.B., Wandiga, S.O., Mulugetta, Y., Sridhar, M.K.C., 2018. Improving knowledge and practices of mitigating green house gas emission through waste recycling in a community, Ibadan, Nigeria. Waste Manage. 81, 22–32. https://doi.org/10.1016/j.wasman.2018.09.044.

Hansmann, R., Scholz, R.W., Francke, C.-A., Weymann, M., 2005. Enhancing environmental awareness: ecological and economic effects of food consumption. Simul. Gaming. 36 (3), 364–382. https://doi.org/10.1177/1046878105279116.

Hernández-Berriel, M.C., Aguilar-Virgen, Q., Taboada-González, P., Lima-Morra, R., Eljaiek-Urzola, M., Márquez-Benavides, L., Buenrostro-Delgado, O., 2017. Generación y composición de los residuos sólidos urbanos en América Latina y el Caribe. Rev. Int. Contam. Ambient. 32, 11–22 https://doi.org/10.20937/RICA.2016.32.05.02.

Hoornweg, D., Bhada-Tata, P., 2012. What a waste. A global review of solid waste management. Washington, DC.
Ikhlayel, M., Higano, Y., Yabar, H., Mizunoya, T., 2016. Introducing an integrated municipal solid waste management system: assessment in Jordan. J. Sustain. Dev. 9 (2), 43. https://doi.org/10.5539/jsd.v9n2p43.
INEGI (Instituto Nacional de Estadística y Geografía), 2011. Censo Nacional de Gobierno 2011. Manual del Módulo Ambiental de Residuos Sólidos Urbanos. https://www.inegi.org.mx/contenidos/temas/medamb/res/metodologias/man_mod_6.pdf (accessed May 2019).
Kaza, S., Yao, L., Bhada-Tata, P., Van Woerden, F., 2018. What a waste 2.0: A global snapshot of solid waste management to 2050. World Bank Group, Washington, DC. https://doi.org/10.1596/978-1-4648-1329-0.
Kelly, T.C., Mason, I.G., Leiss, M.W., Ganesh, S., 2006. University community responses to on-campus resource recycling. Resour. Conserv. Recycl. 47, 42–55. https://doi.org/10.1016/j.resconrec.2005.10.002.
Khandker, S.R., Koolwal, G.B., Samad, H.A., 2009. Handbook on Impact Evaluation: Quantitative Methods and Practices. The World Bank, Washington, DC.
Kiran, K.G., Kini, S., Ravi, K., Santhosh, N.P., Kiran, N.U., 2015. KAP study of solid waste disposal of households in Kuttar & Manjanadi Panchayath covered under gramaskhema programme of K.S. Hegde Medical Academy. Nitte Univ J. Heal. Sci. 5 (3), 29–35.
Largo-Wight, E., Johnston, D.D., Wight, J., 2013. The efficacy of a theory-based, participatory recycling intervention on a college campus. J. Environ. Health 76, 26–31.
Lozano, R., 2006. Incorporation and institutionalization of SD into universities: breaking through barriers to change. J. Clean. Prod. 14 (9–11), 787–796. https://doi.org/10.1016/j.jclepro.2005.12.010.
Maldonado, L., 2006. Reducción y reciclaje de residuos sólidos urbanos en centros de educación superior: Estudio de caso. Ingeniería 10 (1), 59–68.
Mbuligwe, S.E., 2002. Institutional solid waste management practices in developing countries: a case study of three academic institutions in Tanzania. Resour. Conserv. Recycl. 35 (3), 131–146. https://doi.org/10.1016/S0921-3449(01)00113-6.
Makrakis, V., Kostoulas-Makrakis, N., 2016. Bridging the qualitative-quantitative divide: experiences from conducting a mixed methods evaluation in the RUCAS programme. Eval. Program Plann. 54, 144–151. https://doi.org/10.1016/j.evalprogplan.2015.07.008.
Mason, I.G., Brooking, A.K., Oberender, A., Harford, J.M., Horsley, P.G., 2003. Implementation of a zero waste program at a university campus. Resour. Conserv. Recycl. 38, 257–269. https://doi.org/10.1016/S0921-3449(02)00147-7.
Moore, H.E., Boldero, J., 2017. Designing interventions that last: a classification of environmental behaviors in relation to the activities, costs, and effort involved for adoption and maintenance. Front. Psychol. 8. https://doi.org/10.3389/fpsyg.2017.01874.
Noguera-Oviedo, K.M., Olivero-Verbel, J., 2010. Los rellenos sanitarios en Latinoamérica: caso colombiano. Rev. Acad. Colomb. Cienc. 34, 347–356.
Ojedokun, O.A., 2011. Attitude towards littering as a mediator of the relationship between personality attributes and responsible environmental behavior. Waste Manage. 31 (12), 2601–2611. https://doi.org/10.1016/j.wasman.2011.08.014.
Olli, E., Grendstad, G., Wollebaek, D., 2001. Correlates of environmental behaviors: bringing back social context. Environ. Behav. 33 (2), 181–208. https://doi.org/10.1177/0013916501332002.
Pooley, J.A., O'Connor, M., 2000. Environmental education and attitudes: emotions and beliefs are what is needed. Environ. Behav. 32 (5), 711–723. https://doi.org/10.1177/0013916500325007.
Rodríguez, A., Castrejón-Godínez, M.L., Ortiz-Hernández, L., Sánchez-Salinas, E., 2015. Management of municipal solid waste in Mexico, in: Proceedings Sardinia. Fifteenth International Waste Management and Landfill Symposium, At S. Margherita di Pula, Cagliari, Italy.
Saleem, M., Blaisi, N.I., Alshamrani, O.S.D., Al-Barjis, A., 2019. Fundamental investigation of solid waste generation and disposal behaviour in higher education institute in the Kingdom of Saudi Arabia. Indoor Built Environ. 28, 927–937. https://doi.org/10.1177/1420326X18804853.
SEMARNAT (Secretaría de Medio Ambiente y Recursos Naturales), 2016. Informe de la situación del medio ambiente en México. Compendio de estadísticas ambientales. Indicadores clave, de desempeño ambiental y de crecimiento verde. Ciudad de México. https://apps1.semarnat.gob.mx:8443/dgeia/informe15/tema/pdf/Informe15_completo.pdf.
Seng, B., Fujiwara, T., Spoann, V., 2018. Households' knowledge, attitudes, and practices toward solid waste management in suburbs of Phnom Penh, Cambodia. Waste Manage. Res. 36 (10), 993–1000. https://doi.org/10.1177/0734242X18790800.
Smyth, D.P., Fredeen, A.L., Booth, A.L., 2010. Reducing solid waste in higher education: the first step towards "greening" a university campus. Resour. Conserv. Recycl. 54, 1007–1016. https://doi.org/10.1016/j.resconrec.2010.02.008.
Sureda, J., Colom, A.J., 1989. Pedagogía ambiental. CEAC, Barcelona.
Tabash, M.I., Hussein, R.A., Mahmoud, A.H., El-Borgy, M.D., Abu-Hamad, B.A., 2016. Impact of an intervention programme on knowledge, attitude and practice of healthcare staff regarding pharmaceutical waste management, Gaza, Palestine. Public Health 138, 127–137. https://doi.org/10.1016/j.puhe.2016.04.001.
Tangwanichagapong, S., Nitivattananon, V., Mohanty, B., Visvanathan, C., 2017. Greening of a campus through waste management initiatives: experience from a higher education institution in Thailand. Int. J. Sustain. High. Educ. 18, 203–217. https://doi.org/10.1108/IJSHE-10-2015-0175.
Teddlie, C., Yu, F., 2007. Mixed methods sampling: a typology with examples. J. Mix. Methods Res. 1 (1), 77–100. https://doi.org/10.1177/2345678906292430.
Tello, E.P., Martínez, AE., Daza, D., Soulier, F.M., Terraza, H., 2011. Informe de la evaluación regional del manejo de residuos sólidos urbanos en América Latina y El Caribe 2010. http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=36466973.
Tiew, K.G., Basri, N.E.A., Deng, H., Watanabe, K., Zain, S.M., Wang, S., 2019a. Comparative study on recycling behaviours between regular recyclers and non regular recyclers in Malaysia. J. Environ. Manage. https://doi.org/10.1016/j.jenvman.2019.02.033.
Tiew, K.G., Basri, N.E.A., Watanabe, K., Zain, S.M., Er, A.C., Deng, H., 2019b. Higher educational institutions recycling management in Malaysia. Int. J. Bus. Soc. 20, 277–285.
Velázquez, L., Munguia, N., Sanchez, M., 2005. Deterring sustainability in higher education institutions. Int. J. Sustain. High. Educ. 6 (4), 383–391. https://doi.org/10.1108/14676370510623865.
Vicente-Molina, M.A., Fernández-Sáinz, A., Izagirre-Olaizola, J., 2013. Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university students from emerging and advanced countries. J. Clean. Prod. 61, 130–138. https://doi.org/10.1016/j.jclepro.2013.05.015.
Vicente, P., Reis, E., 2010. Using questionnaire design to fight nonresponse bias in web surveys. Soc. Sci. Comput. Rev. 28 (2), 251–267. https://doi.org/10.1177/0894439309340751.
Wismer, S., López de Alba, G.A., 2011. Evaluating the Mexican Federal District's integrated solid waste management programme. Waste Manage. Res. 29 (5), 480–490. https://doi.org/10.1177/0734242X10380493.
Wright, A., McGorry, P.D., Harris, M.G., Jorm, A.F., Pennell, K., 2006. Development and evaluation of a youth mental health community awareness campaign – the compass strategy. BMC Public Health. 6, 215. https://doi.org/10.1186/1471-2458-6-215.
Zhang, N., Williams, I.D., Kemp, S., Smith, N.F., 2011. Greening academia: developing sustainable waste management at Higher Education Institutions. Waste Manage. 31 (7), 1606–1616. https://doi.org/10.1016/j.wasman.2011.03.006.
Zhang, S., Zhang, M., Yu, X., Ren, H., 2016. What keeps Chinese from recycling: accessibility of recycling facilities and the behavior. Resour. Conserv. Recycl. 109, 176–186. https://doi.org/10.1016/j.resconrec.2016.02.008.

Articles

Dissonant health transition in the states of Mexico, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

Héctor Gómez-Dantés, Nancy Fullman, Héctor Lamadrid-Figueroa, Lucero Cahuana-Hurtado, Blair Darney, Leticia Avila-Burgos, Ricardo Correa-Rotter, Juan A Rivera, Simon Barquera, Eduardo González-Pier, Tania Aburto-Soto, Elga Filipa Amorin de Castro*, Tonatiuh Barrientos-Gutiérrez*, Ana C Basto-Abreu*, Carolina Batis*, Guilherme Borges*, Ismael Campos-Nonato*, Julio C Campuzano-Rincón*, Alejandra de Jesús Cantoral-Preciado*, Alejandra G Contreras-Manzano*, Lucia Cuevas-Nasu*, Vanessa V de la Cruz-Gongora*, Jose L Diaz-Ortega*, María de Lourdes García-García*, Armando Garcia-Guerra*, Teresita González de Cossío*, Luz D González-Castell*, Ileana Heredia-Pi*, Marta C Hijar-Medina*, Alejandra Jauregui*, Aida Jimenez-Corona*, Nancy Lopez-Olmedo*, Carlos Magis-Rodríguez*, Catalina Medina-Garcia*, Maria E Medina-Mora*, Fabiola Mejia-Rodriguez*, Julio C Montañez*, Pablo Montero*, Alejandra Montoya*, Grea L Moreno-Banda*, Andrea Pedroza-Tobías*, Rogelio Pérez-Padilla*, Amado D Quezada*, Vesta L Richardson-López-Collada*, Horacio Riojas-Rodríguez*, Maria J Ríos Blancas*, Christian Razo-Garcia*, Martha P Romero Mendoza*, Tania G Sánchez-Pimienta*, Luz M Sánchez-Romero*, Astrid Schilmann*, Edson Servan-Mori*, Teresa Shamah-Levy*, Martha M Téllez-Rojo*, José L Texcalac-Sangrador*, Haidong Wang, Theo Vos, Mohammad H Forouzanfar, Mohsen Naghavi, Alan D Lopez, Christopher J L Murray, Rafael Lozano†*

Lancet 2016; 388: 2386–402

Published Online October 5, 2016 http://dx.doi.org/10.1016/S0140-6736(16)31773-1

See Comment page 2330

*Authors listed alphabetically

†Corresponding author

Instituto Nacional de Salud Pública, Cuernavaca, Mexico (H Gómez-Dantés MSc, H Lamadrid-Figueroa PhD, L Cahuana-Hurtado PhD, B Darney PhD, L Avila-Burgos PhD, Prof J A Rivera PhD, Prof S Barquera PhD, T Aburto-Soto MSc, E F Amorin de Castro PhD, T Barrientos-Gutiérrez PhD, A C Basto-Abreu MPH, C Batis PhD, I Campos-Nonato PhD, J C Campuzano-Rincón PhD, A de Jesús Cantoral-Preciado PhD, A G Contreras-Manzano MSc, L Cuevas-Nasu MSc, V V de la Cruz-Gongora MSc, J L Diaz-Ortega MD, Prof M de Lourdes García-García PhD, A Garcia-Guerra MSc, L D González-Castell MSc, I Heredia-Pi PhD, A Jauregui MSc, A Jimenez-Corona PhD, N Lopez-Olmedo MSc, C Medina-Garcia MS, F Mejia-Rodriguez MD, J C Montañez MSc, P Montero MS, A Montoya MS, G L Moreno-Banda PhD, A Pedroza-Tobías MS, A D Quezada MS, H Riojas-Rodríguez PhD, M J Ríos Blancas MPH, C Razo-Garcia MSc,

Summary

Background Child and maternal health outcomes have notably improved in Mexico since 1990, whereas rising adult mortality rates defy traditional epidemiological transition models in which decreased death rates occur across all ages. These trends suggest Mexico is experiencing a more complex, dissonant health transition than historically observed. Enduring inequalities between states further emphasise the need for more detailed health assessments over time. The Global Burden of Diseases, Injuries, and Risk Factors Study 2013 (GBD 2013) provides the comprehensive, comparable framework through which such national and subnational analyses can occur. This study offers a state-level quantification of disease burden and risk factor attribution in Mexico for the first time.

Methods We extracted data from GBD 2013 to assess mortality, causes of death, years of life lost (YLLs), years lived with disability (YLDs), disability-adjusted life-years (DALYs), and healthy life expectancy (HALE) in Mexico and its 32 states, along with eight comparator countries in the Americas. States were grouped by Marginalisation Index scores to compare subnational burden along a socioeconomic dimension. We split extracted data by state and applied GBD methods to generate estimates of burden, and attributable burden due to behavioural, metabolic, and environmental or occupational risks. We present results for 306 causes, 2337 sequelae, and 79 risk factors.

Findings From 1990 to 2013, life expectancy from birth in Mexico increased by 3·4 years (95% uncertainty interval 3·1–3·8), from 72·1 years (71·8–72·3) to 75·5 years (75·3–75·7), and these gains were more pronounced in states with high marginalisation. Nationally, age-standardised death rates fell 13·3% (11·9–14·6%) since 1990, but state-level reductions for all-cause mortality varied and gaps between life expectancy and years lived in full health, as measured by HALE, widened in several states. Progress in women's life expectancy exceeded that of men, in whom negligible improvements were observed since 2000. For many states, this trend corresponded with rising YLL rates from interpersonal violence and chronic kidney disease. Nationally, age-standardised YLL rates for diarrhoeal diseases and protein-energy malnutrition markedly decreased, ranking Mexico well above comparator countries. However, amid Mexico's progress against communicable diseases, chronic kidney disease burden rapidly climbed, with age-standardised YLL and DALY rates increasing more than 130% by 2013. For women, DALY rates from breast cancer also increased since 1990, rising 12·1% (4·6–23·1%). In 2013, the leading five causes of DALYs were diabetes, ischaemic heart disease, chronic kidney disease, low back and neck pain, and depressive disorders; the latter three were not among the leading five causes in 1990, further underscoring Mexico's rapid epidemiological transition. Leading risk factors for disease burden in 1990, such as undernutrition, were replaced by high fasting plasma glucose and high body-mass index by 2013. Attributable burden due to dietary risks also increased, accounting for more than 10% of DALYs in 2013.

Interpretation Mexico achieved sizeable reductions in burden due to several causes, such as diarrhoeal diseases, and risks factors, such as undernutrition and poor sanitation, which were mainly associated with maternal and child health interventions. Yet rising adult mortality rates from chronic kidney disease, diabetes, cirrhosis, and, since 2000, interpersonal violence drove deteriorating health outcomes, particularly in men. Although state inequalities from communicable diseases narrowed over time, non-communicable diseases and injury burdens varied markedly at local levels. The dissonance with which Mexico and its 32 states are experiencing epidemiological transitions might

Gómez-Dantés H, Fullman N, Lamadrid-Figueroa H, Cahuana-Hurtado L, Darney B, Ávila-Burgos L, *et al*. Dissonant health transition in the states of Mexico,1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2016;388(10058):2386-2402. https://doi.org/10.1016/S0140-6736(16)31773-1

strain health-system responsiveness and performance, which stresses the importance of timely, evidence-informed health policies and programmes linked to the health needs of each state.

Funding Bill & Melinda Gates Foundation, Instituto Nacional de Salud Pública.

Introduction

Between 1990 and 2013, under-5 mortality in Mexico decreased by 76%[1] and disease burden rates from maternal disorders fell by 56%.[2] Nonetheless, this progress masked subnational disparities, particularly in the country's poorest areas (eg, Chiapas and Oaxaca) and richest areas (eg, Mexico City and Nuevo Leon).[3,4] Based on a widely accepted paradigm for epidemiological transitions,[5–8] such advances in maternal and child health outcomes would also be accompanied by a reduction in all-cause adult mortality rates. Yet Mexico has experienced a very different trajectory, recording rising death rates from interpersonal violence and chronic kidney disease, as well as increasing burden due to diabetes and obesity.[3,9] These trends, in combination with health disparities found across states,[3,10] necessitate a more detailed assessment of Mexico's current health challenges, particularly as the trends appear to contradict historical epidemiological transitions.[5]

Several burden of disease studies have been done in Mexico,[3,11,12] which have guided policy agendas and programme implementation[10,13] and facilitated intervention prioritisation.[14] With Mexico's long history of using disease burden research to inform policy decisions,[3,15] continued analytic updates and expanding assessments to more local geographies are in high demand. In this study, we focus on results from 1990 to 2013 and Mexico's rapidly shifting disease burden at national and state levels. These shifts in disease burden are of particular relevance for policy, as states control health-care delivery and administration in Mexico.[16] This study comes at a time when decision makers are assessing policy options to address the country's growing burden of non-communicable diseases and violence.[17–19] Furthermore, comparison of Mexico's performance with that of other countries in the Americas is of particular interest,[20] because a better understanding of Mexico's changing health landscape could have implications for Latin America as a whole. The pace and patterns of Mexico's health transition pose unprecedented challenges, and stress the need for timely, rigorously analysed data on the levels and trends of disease burden.

The Global Burden of Diseases, Injuries, and Risk Factors Study 2013 (GBD 2013) provides improvements in data and methods from previous iterations of the GBD,[1,2,21–23] including substantial advances for risk factor quantification.[23] The subnational analysis reported here supports the mapping of disease burden to potential socioeconomic factors that underlie or affect burden and risks across 32 states in Mexico. Our study not only offers improved methods for measuring Mexico's health landscape, but also builds on previous work and strengthens its applications to current policy priorities.

Research in context

Evidence before this study

Health statistics are routinely collected in Mexico and these data informed previous burden of disease studies, including the Global Burden of Disease Study 2010 (GBD 2010) for Mexico. Yet health data are infrequently aggregated in a systematic manner, and the full range of diseases, injuries, and risk factors are not consistently captured for every state over time. Mexico has done several nationally representative surveys during the past two decades, but survey-based health indicators are often measured in different ways, and information included in each survey can vary considerably. Because of the country's range and heterogeneity of data sources, assembling these data in a comprehensive analytic framework that covers numerous causes and risks is likely to improve population health measurement in Mexico.

Added value of this study

For the first time to our knowledge, GBD results are assessed at the state level in Mexico, using a range of routine and published data sources and by indices of marginalisation. Comprehensive subnational comparisons within Mexico, and with comparator countries, provide new insights into health trends and determinants, as well as areas for heightened policy attention.

Implications of all the available evidence

Despite reductions in the burden from several communicable and child health conditions, burden rates from several non-communicable diseases and interpersonal violence increased in Mexico, particularly since 2000. These dissonant trends underlie minimal gains in life expectancy for men and are associated with increasing burden attributable to behavioural risk factors, such as high body-mass index and high fasting plasma glucose. The scale of non-communicable disease burden and related risks in Mexico point to a need for strong health policies and programmes focused on prevention. In tandem with more integrated models of service delivery, an emphasis on early detection and prevention of non-communicable diseases might help alter the course of Mexico's growing epidemic of non-communicable diseases and related disability. Further, in states where mortality and health loss from interpersonal violence increased, locally led efforts to reduce access to firearms and address environmental factors associated with heightened risk for violence are of high priority.

T G Sánchez-Pimienta MSc, L M Sánchez-Romero PhD, A Schilmann MSc, E Servan-Mori MSc, T Shamah-Levy PhD, Prof M M Téllez-Rojo PhD, J L Texcalac-Sangrador MSc, Prof R Lozano MD); **Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA, USA** (N Fullman MPH, H Wang PhD, Prof T Vos PhD, M H Forouzanfar PhD, Prof M Naghavi PhD, Prof C J L Murray PhD, Prof R Lozano); **Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Mexico City, Mexico** (R Correa-Rotter MD); **Fundación Mexicana para la Salud, Mexico City, Mexico** (E González-Pier PhD); **Secretaría de Salud, Mexico City, Mexico** (M C Hijar-Medina PhD, C Magis-Rodríguez MD); **Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Mexico City, Mexico** (G Borges PhD, M E Medina-Mora PhD, M P Romero Mendoza MD); **Universidad Iberoamericana, Mexico City, Mexico** (T González de Cossío PhD); **Instituto Nacional de Enfermedades Respiratorias, Mexico City, Mexico** (R Pérez-Padilla MD); **Academia Nacional de Medicina, Mexico City, Mexico** (V L Richardson-López-Collada MD); **and Melbourne School of Population and Global Health, University of Melbourne, Melbourne, VIC, Australia** (Prof A D Lopez PhD)

Correspondence to:
Prof Rafael Lozano, Centro de Investigación en Sistemas de Salud, Instituto Nacional de Salud Pública, Buena Vista, 62100 Cuernavaca, Morelos, Mexico
rafael.lozano@insp.mx

Methods

Overview

We used data from GBD 2013 for 306 causes of death, disease, injury incidence and prevalence, and years lived with disability (YLDs) to measure the burden of diseases and injuries in Mexico and in the 32 states in Mexico from 1990 to 2013. Additional details on the GBD 2013 cause framework and analyses are provided elsewhere.[1,2,21–23] Unless indicated otherwise, we report results in terms of age-standardised rates, as derived from world population standards,[21] and provide 95% uncertainty intervals (UIs), which capture efforts to propagate levels of uncertainty throughout the GBD modelling process.

Here we focus on specific data and analyses used to quantify mortality, years of life lost (YLLs), YLDs, disability-adjusted life-years (DALYs), and healthy life expectancy (HALE) in Mexico. Additional findings from GBD 2013 are in the appendix, and can be explored online with dynamic data visualisations.

For **additional GBD 2013 data** see http://vizhub.healthdata.org/gbd-compare

See Online for appendix

Categorisation of Mexican states and comparator countries

We used seven national population censuses and national and state-level records on all-cause mortality derived from Mexico's national vital registration systems. Vital registration data were available from 1980 to 2013; however, we present results between 1990 and 2013 to align with the rest of GBD 2013. Additional detail on the full range of data sources can be found in the appendix (p 1).

To enable comparisons along a socioeconomic dimension, we categorised states by Marginalisation Index scores from the Consejo Nacional de Población.[24] The Marginalisation Index is a composite indicator based on educational attainment, housing conditions, development, and economic status. States were grouped into three categories based on index scores: very high and high, medium, and low and very low; additional details can be found in the appendix (pp 36–38).

We selected eight comparator countries to benchmark national and state-level health performance in Mexico: the USA, which represented potential similarities in health burdens to Mexican states along its border; and seven Latin American countries, five with similar demographic, economic, cultural, or social conditions to those in Mexico (Brazil, Chile, Colombia, Cuba, and Costa Rica) and two Central American countries (El Salvador and Guatemala), which share social profiles of southern Mexican states.

All-cause mortality and cause of death

Details on GBD 2013 estimation methods for all-cause mortality have been reported previously.[21,25] Briefly, we analysed under-5 and adult mortality rates with a multistage synthesis of all available data from surveys, censuses, sample registrations, and vital registration systems.[1]

As described previously,[21,26] an expanded cause-of-death database was constructed for GBD 2013. To generate cause-specific mortality rate estimates, we analysed state-level vital registration data from 1980 to 2013. We sought to account for vital registration data quality and completeness, which included adjustment of cause-of-death data from incomplete registration systems and standardisation of data to align with cause classifications and GBD cause hierarchies.[21] We then systematically identified causes of death that could not or should not be classified as underlying causes of death (so-called garbage codes), and applied standard GBD 2013 garbage-code redistribution algorithms.[21,26] We modelled causes of death using the Cause of Death Ensemble model (CODEm),[25] which uses an array of models, different measures of mortality, and varying combinations of covariates from a database containing more than 200 diverse country characteristics. The final ensemble model composition is determined by various tests of performance, including out-of-sample performance.

Based on standard GBD methods,[21] we computed YLLs by multiplying the number of deaths from each cause in each age group by the reference life expectancy at the average of age of death in those who died in the age group. This reference life table has a life expectancy at birth of 86·0 years; from this reference table, we computed YLLs for each age group based on reference life expectancies for each respective age group.

Incidence, prevalence, and YLDs

Data sources used for quantifying non-fatal outcomes in Mexico are detailed in the appendix (p 1). We used DisMod-MR 2.0, an updated Bayesian-regression analytic tool,[22] to synthesise consistent estimates of disease incidence, prevalence, remission, excess mortality, and cause-specific mortality rates. Following GBD 2013 methods,[22] prevalence of each sequela was multiplied by the disability weight for the corresponding health state to calculate YLDs for the sequela. The sum of all YLDs for relevant sequelae equated to overall YLDs for each disease. Details on disability weights for GBD 2013, including data collection and disability weight construction, have been described previously.[27]

DALYs, HALE, and attributable risks

Following GBD 2013 methods,[2] national-level and state-level DALYs were computed by summing YLLs and YLDs for each cause, age, and sex in 1990, 1995, 2000, 2005, 2010, and 2013. HALE was calculated for Mexico and each state using multiple-decrement life tables and estimated YLDs per person.[2]

To calculate risk-attributable fractions of disease burden by cause, we modelled the effects of risk exposure levels, documented relative risks associated with risk exposure and specific health outcomes, and computed counterfactual levels of risk exposure on estimates of national and state-level deaths, YLLs, YLDs, and DALYs.

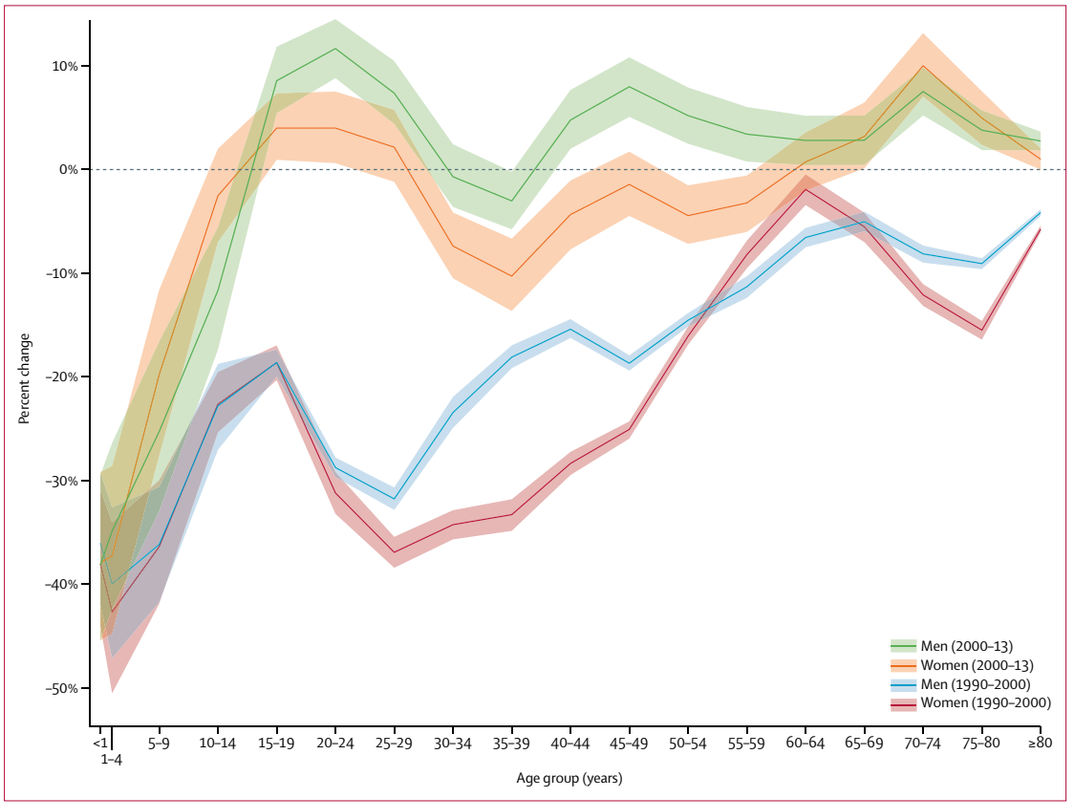


***Figure 1*: Percent change in all-cause mortality rates in Mexico by sex and age group in 1990–2000 and 2000–2013**
95% uncertainty intervals (UIs), as shown by shaded portions of the trend line, are derived from 1000 draws for each measure of all-cause mortality.

Detailed descriptions of the GBD 2013 methods for risk factor assessment and attribution are published elsewhere.[23]

Decomposition of variance and epidemiological transition

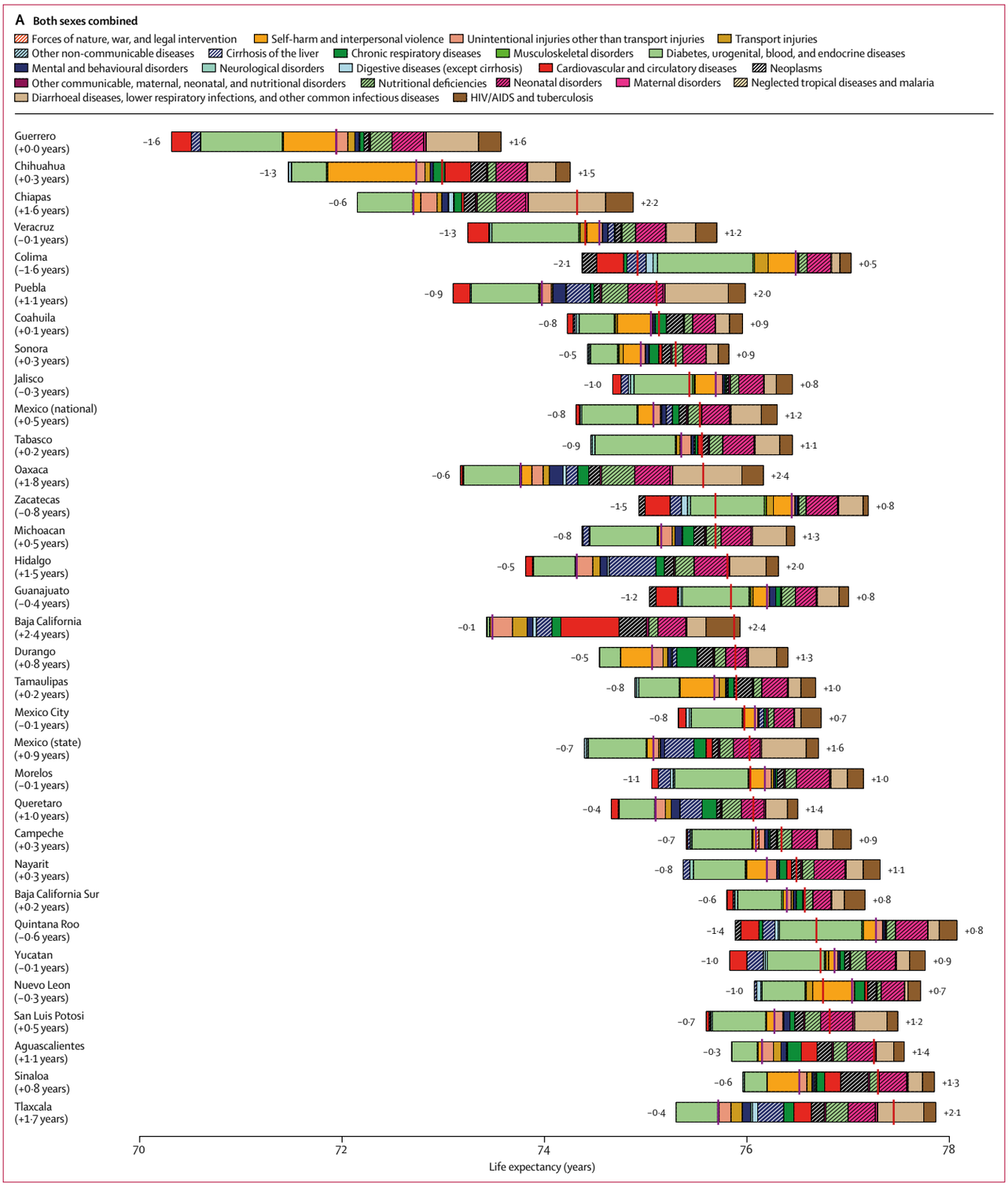
As an expanded analysis for GBD 2013,[2] we compared estimates of observed disease burden with expected burden, or a country's anticipated burden based on its development status. We constructed this summary measure using principal component analysis of four indicators: income per capita, average years of schooling in populations older than 15 years, total fertility rate, and mean population age.[2] Low total fertility rate and high income per capita, educational attainment, and mean population age corresponded with higher sociodemographic status, whereas high total fertility rate and low income per capita, educational attainment, and mean population age corresponded with low sociodemographic status. We then used a hierarchical regression to decompose variance in log DALY rates into components related to this sociodemographic status indicator, intercountry variation, year, and residual variance that could not be fully explained by the aforementioned variables. Results from this regression were then used to predict burden patterns as a function of sociodemographic status, which was binned into 20 equal intervals. These sociodemographic status-predicted estimates subsequently served as an indicator of expected burden.

Role of the funding source

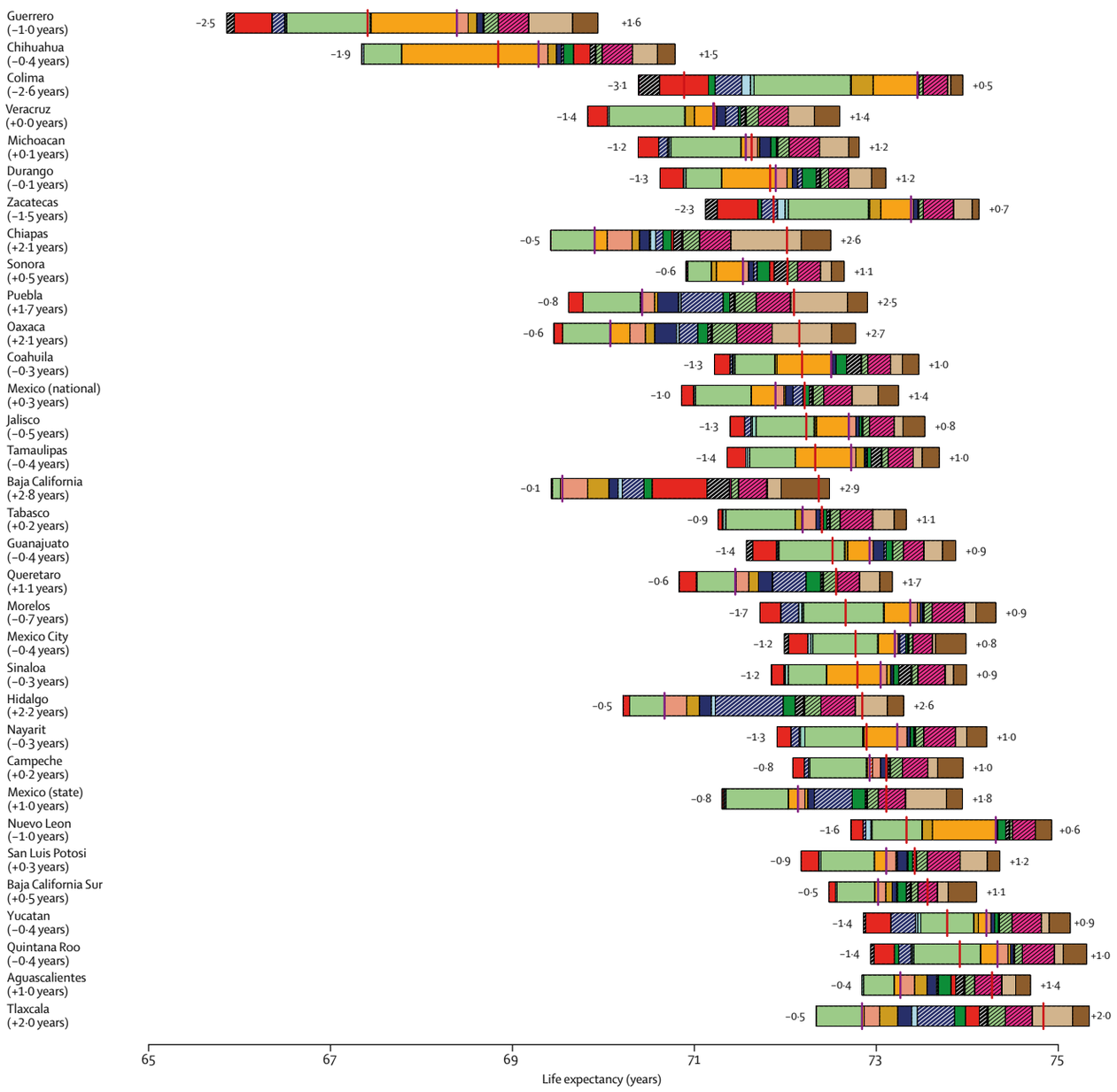
The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility to submit for publication.

Results

Between 1990 and 2000, under-5 death rates in Mexico fell by 39·2% (95% UI 32·2–45·3%), and a similar rate of reduction continued from 2000 to 2013 (38·5% [29·9–45·7%]; figure 1). Death rates in people aged 15–49 years decreased by 23·5% (22·4–24·6%) for women and by 18·8% (18·0–19·6%) for men from 1990 to 2000. However, death rates in adult men increased across age groups from 2000–13, diverging from anticipated trends given continued reductions in



(Figure 2 continues on next page)



(Figure 2 continues on next page)

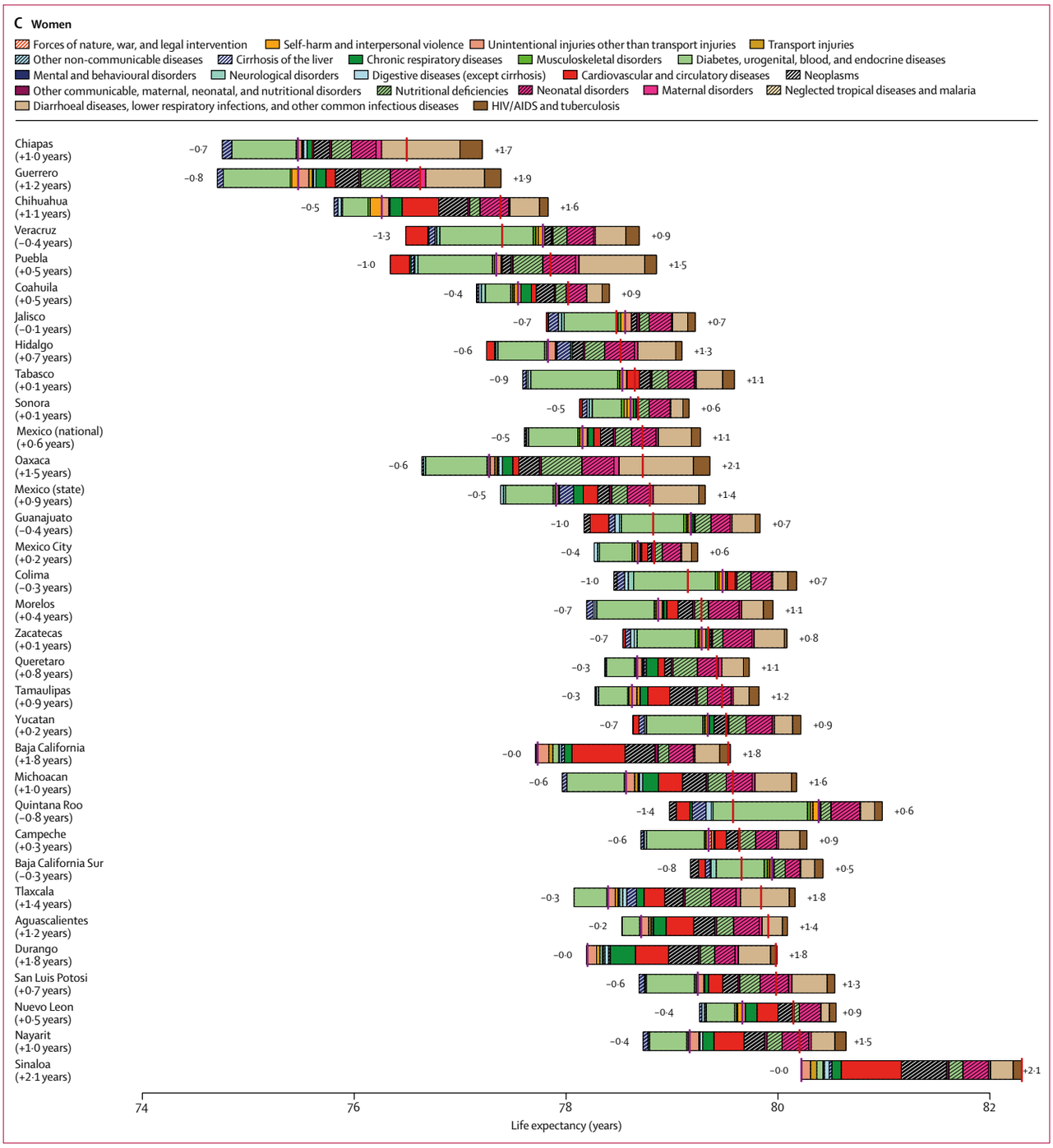


Figure 2: **Life expectancy at birth in Mexico and Mexican states from 2000 to 2013 by GBD Level 2 cause group**
(A) Both sexes combined. (B) Men. (C) Women. Mexico and Mexican states are ordered from the lowest to highest life expectancy in 2013. Purple bars indicate life expectancy at birth in 2000 and red bars indicate life expectancy at birth in 2013. Causes to the left of the 2000 life expectancy values reflect causes that contributed to reduced life expectancy between 2000 and 2013. Causes to the right of the 2000 life expectancy values reflect causes that contributed to increased life expectancy between 2000 and 2013. The overall change in life expectancy between 2000 and 2013 are shown in parentheses under each geography. GBD=Global Burden of Disease.

under-5 death rates. Although the mortality rate for adult women declined more slowly from 2000 to 2013 than from 1990 to 2000, age-specific death rates in women generally improved more than death rates in men at equivalent ages.

Nationally, age-standardised death rates decreased by 13·3% (95% UI 11·9–14·6%) between 1990 and 2013 (appendix p 17), falling from 848·6 deaths per 100 000 people (842·6–855·2) in 1990 to 736·2 deaths per 100 000 people (726·2–745·6) in 2013. State-level reductions in all-cause mortality varied from 6·3% (1·2–12·9%) in Guerrero to 25·1% (22·9–27·5%) in Oaxaca. Oaxaca and Hidalgo, states with high marginalisation, recorded faster rates of decline in all-cause mortality than the national average. However, Guerrero, also highly marginalised, reported minimal progress since 1990. In fact, death rates in Guerrero increased by 9·2% (1·1–17·0%) since 2005, rising to 906·9 deaths per 100 000 people (850·2–968·5) in 2013.

Between 1990 and 2013, a 3·4-year (3·1–3·8) increase in life expectancy from birth was recorded in Mexico, rising from 72·1 years (71·8–72·3) to 75·5 years (75·3–75·7; appendix p 17). Whereas female life expectancy gradually increased from 75·3 years (75·0–75·7) in 1990 to 78·7 years (78·4–79·0) in 2013, male life expectancy improved at a slower pace, particularly since 2000 (ie, 71·9 years in 2000 [71·6–72·1] to 72·2 years in 2013 [71·9–72·5]). Several states with high or very high marginalisation had the largest increases in life expectancy. In Oaxaca, for example, life expectancy increased from 69·3 years (68·8–69·7) in 1990 to 75·5 years (75·1–76·0) in 2013. Quintana Roo recorded the smallest improvement, only rising from 75·2 years (74·8–75·6) in 1990 to 76·7 years (76·1–77·2) in 2013. In 1990, a 6·2-year gap existed between states with the lowest and highest life expectancies; by 2013, this state longevity gap narrowed to 5·5 years (appendix p 17).

HALE, which reflects years spent in full health, rose from 63·0 years (60·3–65·4) in 1990 to 65·8 years (63·1–68·3) in 2013. Nationally, the difference between life expectancy and HALE was 9·1 years in 1990 and 9·7 years in 2013, though this difference was not statistically significant. In Quintana Roo the gap between life expectancy and HALE decreased from 10·4 years in 1990 to 10·2 years in 2013. All other states recorded minimal changes or widening disparities, with Oaxaca experiencing the largest increase in the gap between life expectancy and HALE (8·6 years in 1990 to 9·9 years in 2013).

Between 2000 and 2013, 15 of 32 states had life expectancy gains in men and 26 of 32 states had increased longevity in women (figure 2). In Guerrero, life expectancy in men decreased by 1·0 year (95% UI 0·6–2·7) whereas female life expectancy increased from 75·5 years (74·6–76·2) in 2000 to 76·6 years (75·5–77·9) in 2013. For both sexes combined in Guerrero, rising mortality due to interpersonal violence and chronic kidney disease were the main drivers of minimal life expectancy gains; mortality rates from interpersonal violence increased by 49·4% (8·3–80·6%) and mortality rates from chronic kidney disease increased by 74·6% (54·8–95·2%), from 2000 to 2013. A similar trend was found in 17 states, whereby negligible improvements in male life expectancy occurred in tandem with rising mortality from interpersonal violence, chronic kidney disease, ischaemic heart disease, and cirrhosis. In some states, such as Nuevo Leon and Zacatecas, a growing death toll from transport injuries contributed to minimal gains for male life expectancy. Increased mortality due to self-harm also accounted for reduced male life expectancy in Yucatan and Quintana Roo. In several states, such as Jalisco, increased mortality rates from breast and colon and rectum cancers negatively affected life expectancy for both sexes. Conversely, reductions in maternal mortality contributed to improved female life expectancy in Oaxaca, Tlaxcala, and Queretaro.

Considerable state-level heterogeneity was observed for several causes (appendix pp 3–6). Age-standardised YLL rates from breast cancer and ischaemic heart disease followed similar geographical patterns in 2013, with northern states recording higher YLL rates than southern states. Nonetheless, several states showed contradictory trends, particularly for breast cancer. For instance, some of Mexico's highest age-standardised YLL rates due to breast cancer were found in Jalisco and Mexico City (385·6 per 100 000 people [95% UI 342·9–433·4] in Jalisco and 374·8 per 100 000 people [338·9–415·6] in Mexico City). A number of states in central Mexico had the highest age-standardised YLL rates from chronic kidney disease, which formed a geographical cluster of areas with high YLL rates due to the condition from the Pacific Coast to the Gulf of Mexico. YLL rates from cirrhosis followed dissimilar geographical patterns to ischaemic heart disease, with northern states experiencing lower YLL rates due to cirrhosis than southern and southeastern states.

Notable differences were found between states with the lowest and highest age-standardised YLL rates in 2013. For ischaemic heart disease, Tlaxcala's age-standardised YLL rate—the lowest in Mexico in 2013—was 2·5 times lower than Chihuahua's, which was the highest (936·5 per 100 000 people [788·7–1023·6] and 2385·7 per 100 000 people [2145·2–2684·0], respectively; appendix p 5). State-level disparities were even larger for YLL rates from cirrhosis, with a 3·5-fold difference between the lowest YLL rates (Sinaloa; 487·0 per 100 000 people [444·1–536·3]) and the highest YLL rates (Puebla; 1713·9 per 100 000 people [1617·6–1811·8]). Age-standardised YLL rates due to breast cancer ranged from 161·3 per 100 000 people (143·8–183·3) in Oaxaca to 410·8 per 100 000 people (350·3–483·5) in Baja California Sur (appendix p 6). Notably, states with low marginalisation generally had higher YLL rates due to breast cancer (eg, Jalisco, Colima, and Mexico City).

	Ischaemic heart disease	Chronic kidney disease	Diabetes	Interpersonal violence	Road injuries	Congenital anomalies	Lower respiratory infections	Cerebrovascular disease	Cirrhosis alcohol	Neonatal preterm birth	COPD	Cirrhosis hepatitis C	Self-harm	Neonatal encephalopathy	Neonatal sepsis	Alzheimer's disease	Protein-energy malnutrition	Leukaemia	Foreign body	Diarrhoeal diseases	Cirrhosis other	Other neoplasms	Drowning	Stomach cancer	Falls
Costa Rica	1331·4	503·2	192·6	360·5	643·8	665·9	286·0	523·3	202·7	289·5	365·7	169·0	303·1	109·6	50·6	264·9	20·0	159·8	42·6	67·1	65·8	186·0	168·9	372·5	106·6
Chile	999·8	309·1	269·5	235·4	555·9	507·9	423·7	873·3	223·6	213·2	298·5	262·6	522·6	51·5	38·8	394·7	38·0	125·9	48·4	26·6	62·3	213·2	131·6	398·5	105·2
USA	1696·6	228·7	310·0	284·6	614·5	299·6	268·3	456·5	114·2	259·4	471·8	179·1	511·7	62·7	30·6	422·1	10·1	126·7	64·4	30·0	20·1	150·7	78·3	74·2	106·1
Cuba	2094·5	280·7	240·0	239·3	397·4	351·9	538·7	1030·8	111·5	90·2	335·7	69·2	416·7	85·5	67·4	265·1	10·7	128·0	42·8	40·4	41·6	194·0	120·8	112·7	196·5
Sinaloa	1783·2	849·1	992·5	1563·6	969·7	680·3	395·3	636·3	233·0	315·0	504·5	170·2	156·2	116·9	132·5	285·5	127·1	133·0	107·0	91·2	70·3	158·2	190·9	173·8	137·7
Tlaxcala	936·5	1597·0	1258·3	300·6	826·4	750·7	558·2	664·5	526·1	496·1	480·5	425·6	154·6	208·1	217·5	271·9	220·3	165·0	193·0	167·6	179·7	151·8	104·4	130·2	176·8
Aguascalientes	1236·2	1249·5	1097·5	257·0	934·4	859·0	357·0	658·7	356·0	439·6	685·3	261·0	239·2	177·7	194·4	283·0	172·4	174·2	222·3	156·2	119·3	187·9	143·6	149·9	191·4
Yucatan	1690·6	948·5	1034·6	153·8	814·1	664·3	576·6	820·8	733·8	216·0	376·3	606·5	423·3	159·9	154·8	278·1	182·2	172·0	139·4	167·6	244·2	157·8	99·8	210·9	143·4
Nuevo Leon	2028·9	1191·4	975·0	824·5	804·7	754·0	593·7	762·5	312·8	315·0	435·7	246·2	287·7	107·2	121·2	274·7	91·9	171·5	194·8	79·9	105·0	165·0	111·1	154·6	161·4
Quintana Roo	1380·0	1047·9	1235·4	548·9	854·4	643·5	423·6	714·5	573·6	312·6	494·0	459·5	439·4	220·8	195·8	293·2	163·6	148·3	231·1	140·7	176·3	140·0	192·3	203·7	185·5
Baja California Sur	1975·0	1058·7	1141·4	345·1	1078·5	712·5	358·0	664·6	340·2	360·4	432·5	250·3	332·3	134·8	148·0	289·4	165·9	168·9	162·6	115·4	109·9	179·0	162·9	197·2	142·5
San Luis Potosi	1438·0	1083·2	1077·1	586·3	866·6	904·0	585·0	719·5	400·7	382·7	548·4	304·5	262·5	221·0	185·0	286·7	199·9	146·2	139·8	164·2	126·4	162·6	163·2	171·2	171·7
Campeche	1563·8	1043·7	1210·2	467·5	828·5	700·6	429·0	749·1	584·6	398·8	476·0	485·0	420·5	267·7	205·4	287·7	195·6	177·5	148·3	154·3	189·8	162·4	227·4	238·0	162·0
Nayarit	1567·0	1046·8	1073·4	1058·8	1050·3	884·6	462·6	681·3	352·0	437·0	563·4	269·0	182·3	229·0	179·1	290·2	167·3	151·5	138·8	139·3	101·1	181·9	174·0	177·0	163·9
Queretaro	1528·7	1387·7	1129·9	352·4	1086·0	776·4	454·5	755·2	750·7	325·7	539·7	541·2	227·0	149·7	199·4	291·8	219·7	150·5	189·6	170·0	243·5	163·3	148·9	157·7	190·9
Morelos	1396·8	1425·3	1329·8	1056·3	728·6	686·0	407·9	714·1	596·1	327·8	543·4	479·5	187·9	147·4	220·2	287·9	228·2	154·6	147·9	144·0	185·6	156·5	128·6	212·5	185·5
Mexico City	1778·8	1430·5	1409·4	651·9	680·4	754·6	785·2	720·5	468·9	423·5	483·6	367·7	264·4	137·8	222·3	280·3	78·5	168·9	122·4	101·7	153·6	168·0	66·2	184·2	141·5
Guanajuato	1503·2	1651·6	1418·2	508·0	1097·5	737·9	558·9	760·5	483·6	424·1	602·9	363·5	266·5	169·0	201·2	282·0	213·2	151·0	131·3	146·9	160·0	162·7	148·9	174·5	153·5
Mexico (state)	1323·9	1591·5	1394·5	879·7	788·5	786·3	930·7	690·8	600·3	463·5	553·8	458·9	171·8	187·1	267·2	283·6	169·7	144·3	171·3	177·9	184·9	151·9	101·6	161·6	156·2
Baja California	2040·5	1031·7	1238·4	930·2	756·0	729·1	673·2	826·1	427·5	378·0	450·7	325·9	191·1	163·0	152·4	289·7	105·5	153·5	318·0	98·6	125·5	167·5	169·1	179·1	188·5
Tamaulipas	2071·5	1322·0	1287·7	1102·2	935·1	746·1	447·6	772·9	348·3	450·1	497·1	267·7	285·1	162·0	167·8	284·9	142·9	149·9	142·5	95·5	108·6	168·7	248·3	159·2	129·6
Hidalgo	1572·6	1399·4	1092·3	406·6	910·7	809·7	569·2	799·2	704·8	524·2	561·5	533·9	175·7	287·2	256·8	288·4	262·4	162·7	254·8	158·0	227·8	162·1	189·5	178·6	210·4
Colombia	1879·5	363·1	449·6	2294·4	886·2	684·1	654·3	1020·9	97·7	415·6	711·4	105·0	322·8	206·8	137·8	275·9	189·7	190·9	137·6	173·7	41·3	196·3	211·3	384·6	141·0
Zacatecas	1575·7	1187·5	1183·5	682·6	1319·1	703·0	644·1	840·1	322·4	420·7	710·7	240·0	210·4	232·1	205·9	290·5	214·4	163·8	201·1	150·5	100·6	166·8	143·6	219·2	202·6
Tabasco	1561·0	1526·3	1489·6	414·4	1100·3	777·4	429·7	851·6	401·0	352·1	536·2	308·8	449·4	301·2	224·3	287·7	217·5	178·0	132·8	159·4	130·1	170·2	317·0	189·1	160·2
Michoacan	1432·5	1342·2	1363·0	1012·1	1038·9	810·0	567·0	741·1	477·8	549·5	610·3	331·0	217·8	210·0	216·7	288·4	205·1	159·6	202·4	165·4	159·2	171·9	153·1	185·8	175·4
Mexico (national)	1651·5	1386·9	1301·4	869·1	892·7	788·5	672·3	772·2	524·7	449·0	547·4	400·5	245·9	203·7	212·4	287·7	204·3	162·4	172·5	172·6	169·4	168·3	151·4	190·9	170·3
Durango	1857·9	1124·2	1097·3	1387·6	985·2	1015·8	559·2	668·7	283·5	766·4	609·6	208·1	215·9	291·6	184·2	283·4	152·8	169·1	228·3	143·2	85·9	168·3	160·7	152·4	183·3
Jalisco	1589·1	1393·7	1221·2	742·7	1100·6	843·9	696·7	738·6	502·0	427·3	644·8	371·1	301·1	137·7	196·7	294·7	179·9	176·7	174·1	122·3	173·2	194·3	161·1	177·4	174·0
Oaxaca	1310·9	1306·1	1098·9	988·1	741·3	831·1	646·5	812·2	673·5	469·1	476·1	502·3	174·7	300·9	238·6	296·8	433·4	146·1	144·5	326·8	216·8	155·3	123·5	222·3	149·8
Sonora	2372·0	984·5	1182·5	803·1	1139·4	742·5	622·7	738·2	314·9	492·3	565·0	241·5	323·0	195·8	175·3	292·6	194·5	163·3	169·0	142·3	97·3	178·3	201·4	219·5	145·0
Coahuila	2133·9	1496·3	1459·1	906·1	913·6	749·0	510·7	879·8	377·6	528·1	494·1	277·3	307·0	181·7	199·1	294·2	139·9	161·6	183·9	121·8	125·1	182·4	138·1	163·7	170·1
Colima	1780·9	1435·1	1375·6	920·6	1115·3	738·6	364·0	777·3	633·9	294·6	561·3	422·9	289·5	118·9	136·3	299·9	240·3	160·0	146·1	158·0	184·4	181·5	232·8	198·7	200·1
Brazil	1894·6	366·0	594·9	1259·7	1026·3	653·4	850·8	1455·9	205·2	606·1	579·2	174·2	343·3	288·8	308·2	284·6	114·6	119·0	100·8	147·3	88·7	170·9	194·3	230·6	170·4
Puebla	1310·6	1684·3	1396·7	511·5	904·4	879·9	867·9	774·0	773·6	549·4	547·1	620·1	194·8	271·4	247·7	293·1	292·5	173·2	164·3	207·6	264·8	167·7	130·4	173·6	175·6
Veracruz	1694·1	1580·4	1443·6	677·4	802·8	864·5	579·0	941·4	744·3	500·4	557·3	521·9	281·7	251·7	204·4	289·3	301·3	187·5	142·8	166·4	233·0	169·7	226·1	211·1	179·8
Chiapas	1565·2	1366·8	1326·8	529·5	696·8	659·5	963·1	802·5	652·1	400·8	574·4	565·2	189·2	288·2	237·9	298·8	331·1	183·8	177·8	494·5	230·1	189·9	185·6	351·0	191·6
El Salvador	2082·4	1277·0	779·6	3411·9	1395·0	768·7	1041·7	691·6	296·8	366·4	460·6	279·7	464·8	110·9	149·0	276·6	151·0	148·4	44·4	169·3	127·7	114·5	185·6	394·7	178·7
Chihuahua	2385·7	1217·2	1396·2	2656·6	1097·4	674·9	708·0	843·0	443·4	510·5	646·1	325·5	349·6	165·9	175·8	291·6	177·3	156·5	246·6	140·9	139·4	188·0	151·9	205·7	221·4
Guatemala	1519·7	702·0	1115·6	2272·5	535·4	471·7	2684·8	776·7	466·5	628·1	445·6	413·4	573·0	245·6	233·6	285·5	929·7	180·2	211·9	1044·4	222·0	139·9	187·9	530·0	107·3
Guerrero	1873·6	1633·8	1707·1	2785·5	980·1	1089·5	707·0	1023·7	574·6	634·6	639·1	459·6	205·5	371·7	304·2	298·2	376·7	174·8	204·3	349·7	183·4	169·9	164·9	310·0	277·3

Significantly lower than the national average in Mexico | Indistinguishable from the national average in Mexico | Significantly higher than the national average in Mexico

By comparison with the eight comparator countries, Mexico had significantly higher age-standardised YLL rates from chronic kidney disease, cirrhosis due to alcohol use, and diabetes in 2013 (figure 3). Conversely, several Latin American countries recorded significantly higher age-standardised YLL rates due to interpersonal violence (El Salvador, Colombia, Guatemala, and Brazil) than Mexico. YLL rates from road injuries and lower respiratory infections were significantly higher in El Salvador, Guatemala, and Brazil than in Mexico (figure 3). A number of states with lower marginalisation scores, such as Sonora and Coahuila, recorded higher age-standardised YLL rates due to ischaemic heart disease. Some states, such as Guerrero, Chihuahua, and Durango, had significantly higher age-standardised YLL rates from congenital disorders, preterm birth complications, ischaemic heart disease, cirrhosis due to alcohol use, and interpersonal violence than the national average. The health profiles of these states more closely resembled the profiles of Guatemala and El Salvador than the national average in Mexico. Other states, such as Yucatan and Tlaxcala, had significantly lower YLL rates due to interpersonal violence, chronic obstructive pulmonary disease, and several communicable conditions; their health profiles were more similar to the profiles of Cuba, Chile, and Costa Rica (figure 3). In combination, these results show diversity in health outcomes across states.

Diarrhoeal disease burden substantially declined since 1990 (appendix pp 22, 31), including a 90·3% reduction in YLL rates (95% UI 89·0–91·6%). Age-standardised YLL rates due to road injuries decreased by 28·0% (20·8–30·9%), while YLD rates from road injuries fell by more than 50%. By contrast, age-standardised YLL rates and DALY rates due to chronic kidney disease sharply increased by 2013; YLL rates rose by 180·3% (80·0–191·8%) and DALY rates climbed by 135·9% (64·8–150·9%) since 1990. Whereas mortality indicators changed minimally for ischaemic heart disease, age-standardised YLD rates for ischaemic heart disease increased by 104·0% (85·2–124·6%). A similar trend was observed for diabetes, with negligible changes in age-standardised death rates and YLL rates, whereas age-standardised YLD rates rose by 48·0% (39·1–57·9%). Although age-standardised YLL and YLD rates from breast cancer and colon and rectum cancer increased between 1990 and 2013, age-standardised YLD rates, particularly from breast cancer, rose at a faster rate than YLLs.

Tracking shifts in cause-specific DALYs further illustrates Mexico's rapid health transition from 1990 to 2000, and the continued rise of non-communicable disease burden from 2000 to 2013 (appendix p 14). Nationally, age-standardised DALY rates from diarrhoeal diseases fell during both time periods, decreasing by 71·1% (65·6–71·6%) from 1990 to 2000 and 52·0% (45·9–57·5%) from 2000 to 2013. Similar trends were found for lower respiratory infections and preterm birth complications. Diarrhoeal diseases, lower respiratory infections, and preterm birth complications were the leading three causes of DALYs in 1990; by 2013, all three fell below the leading ten causes of disease burden. Since 1990, age-standardised DALY rates due to protein-energy malnutrition decreased by 63·5% (52·4–66·9%) and DALY rates from iron-deficiency anaemia declined by 27·9% (24·8–35·0%). By contrast, age-standardised DALY rates from chronic kidney disease increased by 54·8% (11·5–57·1%) from 1990 to 2000 and by 48·3% (38·2–55·2%) from 2000 to 2013. Notably, age-standardised DALY rates from interpersonal violence decreased by 39·3% (19·6–42·1%) between 1990 and 2000, but increased by 43·8% (4·8–51·6%) from 2000 to 2013. In absolute terms, DALY rates due to depressive disorders, as well as low back and neck pain, did not substantially change since 1990. In 2013, diabetes, ischaemic heart disease, and chronic kidney disease were the leading causes of burden in Mexico, accounting for 19·2% of total DALYs.

Observed and expected levels of burden, based on sociodemographic status alone, as measured by age-standardised YLL and YLD rates from broad cause categories in 1990, 2000, and 2013 are shown in figure 4. Observed age-standardised YLL rates decreased in Mexico, particularly between 1990 and 2000, bringing overall YLLs closer to expected rates given the country's sociodemographic status. From 1990 to 2013, the main discrepancies between observed and expected YLL rates were found for two cause groups in Mexico: cardiovascular and circulatory diseases, and diabetes, urogenital, blood, and endocrine diseases. Based on sociodemographic status alone, Mexico was expected to record higher YLL rates from ischaemic heart disease and lower YLL rates due to chronic kidney disease. By contrast, age-standardised YLD rates remained relatively unchanged over time (ie, 9833·9 per 100 000 [7207·5–12 826·8] in 1990 and 9624·9 per 100 000 [7090·8–12 448·2] in 2013), and thus by 2013, non-fatal health outcomes accounted for a larger proportion of total DALYs than in 1990.

Figure 3: **Age-standardised YLL rates per 100 000 for Mexico relative to Mexican states, the USA, and seven comparator Latin American countries for both sexes combined in 2013**
Geographies are ordered by age-standardised YLL rates due to all causes and for both sexes in 2013, from lowest to highest. The causes shown are the leading 25 causes of YLLs in Mexico. To facilitate comparison, Mexico and comparator countries are shown in bold. For illustrative purposes only, Mexican states have been included where they would rank if they were individual countries; this is not to suggest that the health system in a given Mexican state is equivalent to that of any of the countries to which it is adjacent in the list. Rates are colour-coded to denote statistically significant differences from Mexico's national mean. Green indicates significantly lower age-standardised YLL rates than Mexico, red indicates significantly higher age-standardised YLL rates than Mexico, and yellow indicates age-standardised YLL rates are statistically indistinguishable from Mexico's national mean. Alzheimer's disease=Alzheimer's disease and other dementias. Cirrhosis alcohol=cirrhosis of the liver due to alcohol use. Cirrhosis hepatitis C=cirrhosis of the liver due to hepatitis C. Cirrhosis other=cirrhosis of the liver due to other causes. COPD=chronic obstructive pulmonary disease. Foreign body=pulmonary aspiration and foreign body in airway, and foreign body in other body part. YLLs=years of life lost.

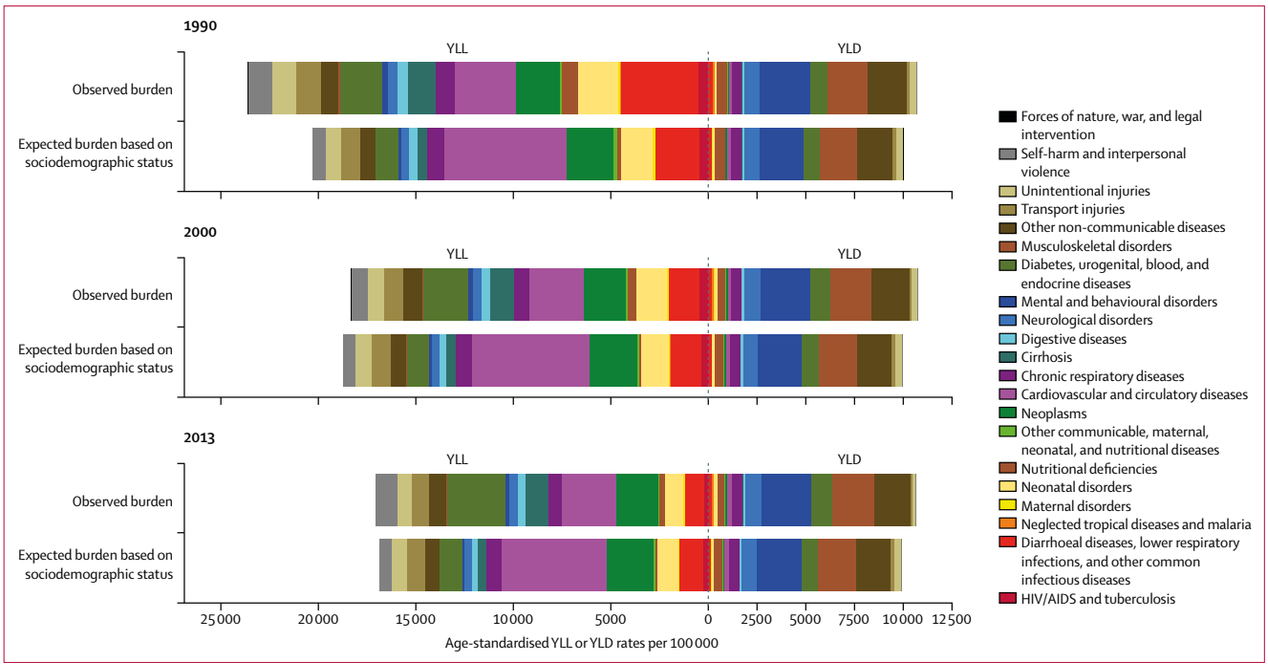


Figure 4: **Observed and expected age-standardised YLL and YLD rates (per 100 000) in Mexico, by GBD Level 2 cause group and for both sexes combined, in 1990, 2000, and 2013**
Expected YLL and YLD rates per 100 000 are functions of the level of Mexico's sociodemographic status. GBD=Global Burden of Disease. YLL=year of life lost. YLD=year lived with disability.

In 2013, 39·3% (37·7–40·8%) of total DALYs in Mexico were attributable to risk factors in 2013 (appendix pp 7–11). Behavioural risks accounted for the largest proportion of attributable risk (37·5%), followed by metabolic risks (24·7%) and the overlap of behavioural and metabolic factors (24·5%). Attributable risk was substantially higher for cardiovascular and circulatory diseases and diabetes, each with less than 15% unattributable burden. Diabetes burden in Mexico was fully attributable to metabolic risk factors (24·9%) and the combined effects of behavioural and metabolic risks (75·1%), whereas only 40·4% (37·2–43·6%) of DALYs from road injuries could be attributed to specific risks (appendix pp 9–10).

Nationally, leading risk factors for DALYs were similar for men and women in 2013 (figure 5). A number of metabolic risks, such as high fasting plasma glucose (11·7% [95% UI 11·0–12·6%]), high body-mass index (BMI; 11·1% [9·9–12·3%]), and high systolic blood pressure (6·8% [5·9–7·7%]), were among the five leading risk factors for attributable DALYs in both sexes combined. Dietary risk, including diets high in sugar-sweetened beverages and processed meat, was the third leading risk for DALYs in men (11·1% [10·0–12·3%]) and women (10·1% [8·8–11·5%]) in 2013. State-level risk factor results are detailed in the appendix (p 11).

Alcohol and drug use was the second leading risk factor for Mexican men, accounting for 11·4% (10·4–12·6%) of DALYs in 2013; such health loss was largely associated with interpersonal violence and transport injuries (figure 5). Undernutrition accounted for 4·0% (3·5–4·7%) of DALYs for women in 2013, decreasing 12·6 percentage points since 1990. This reduction corresponds with Mexico's shifting risk composition, because undernutrition and unsafe water, sanitation, and hygiene were associated with a large proportion of total DALYs in Mexico in 1990 (15·3% [13·9–16·7%] for undernutrition and 7·9% [7·1–8·8%] for unsafe water, sanitation, and hygiene). Tobacco smoke accounted for 47·4% (44·4–50·9%) fewer DALYs in 2013 than in 1990.

Discussion

From 1990 to 2013, Mexico experienced an epidemiological transition that, compared with traditional transition models documented in other countries,[5–7,9] is dissonant. Outside of the HIV/AIDS epidemic in sub-Saharan Africa and the rapid rise of alcohol-related deaths in eastern Europe and central Asia,[8,28] few places share Mexico's current epidemiological trajectory: an unexpected rise in age-specific mortality rates in adults, which threatens to reverse Mexico's health gains achieved in reducing under-5 mortality rates and communicable diseases. These trends are particularly dissonant in light of Mexico's relatively small HIV/AIDS burden and minimal changes in alcohol consumption over time, further defying hallmarks of traditional epidemiological transitions identified by Omran[5] and others.[6,7] Policy implications of such unusual health

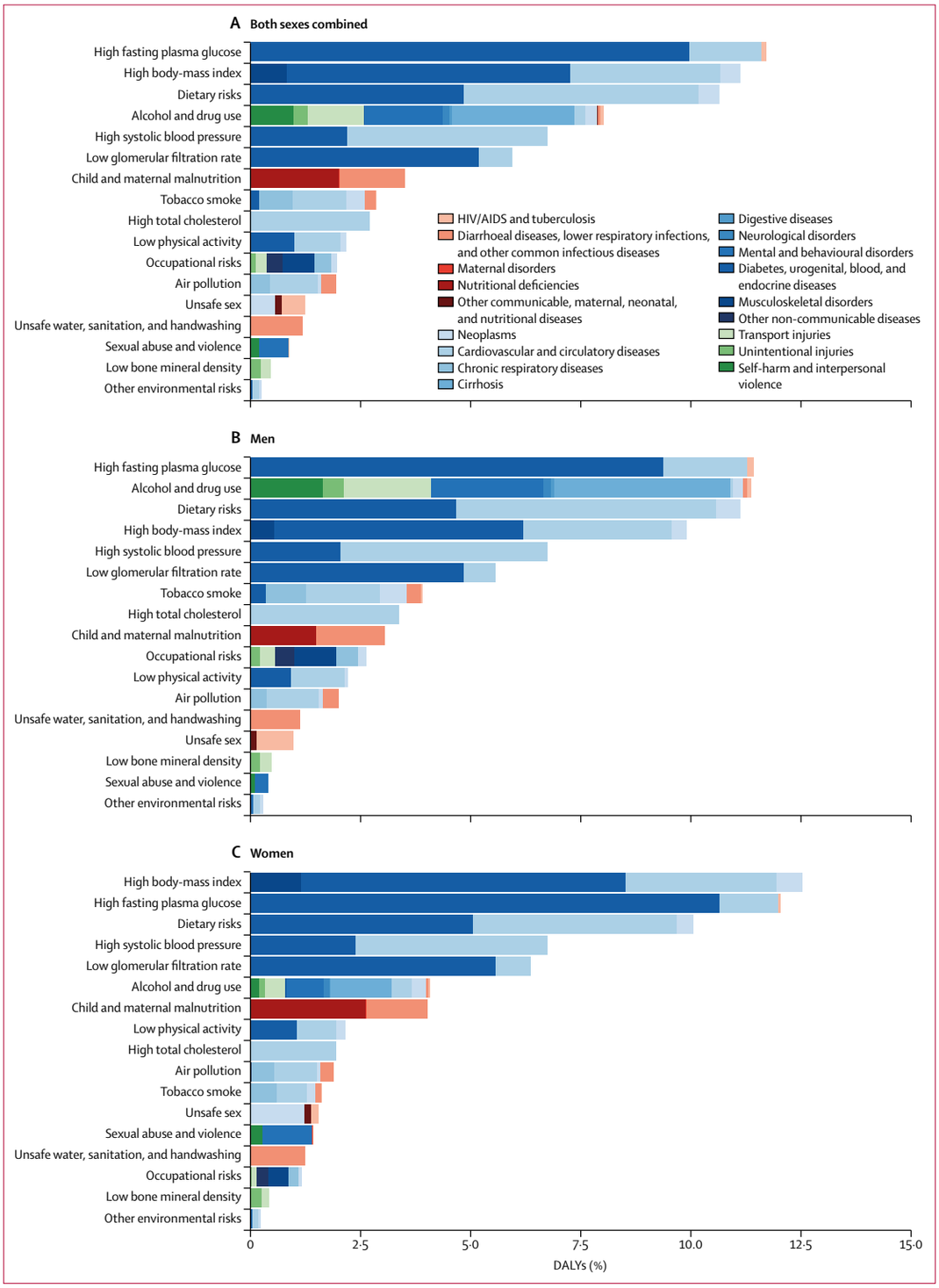


Figure 5: **Proportion of all age DALYs attributable to GBD Level 2 risk factors in 2013**
(A) Both sexes combined. (B) Men. (C) Women. GBD=Global Burden of Disease. DALYs=disability-adjusted life-years.

patterns are of crucial importance, particularly because our results show that sustained progress in reducing mortality across age groups is far from inevitable, even amid large gains in development. Prior to the present analysis, few studies considered the extent to which health trends in various countries and subnational geographies might differ from traditional epidemiological trajectories.[5] Through GBD 2013, we harnessed the strength of several types of health data in Mexico, which tracked Mexico's dissonant health patterns at both national and state levels over time.

Between 1990 and 2000, YLL rates due to communicable and child health conditions, such as diarrhoeal diseases, preterm birth complications, and protein-energy malnutrition substantially decreased in Mexico, and life expectancy steadily improved. This progress was found at both national and state levels, which contributed to narrowing health disparities between states. Such declines in cause-specific mortality probably underpinned large improvements in life expectancy for many states with high marginalisation scores. Burden from road injuries and interpersonal violence also fell during this time, advancing the potential for continued health gains in Mexico. Yet progress achieved from 1990 to 2000 was quickly disrupted from 2000 to 2013, as rising YLL rates due to chronic kidney disease and interpersonal violence hindered further improvements in life expectancy and HALE, particularly in men. The gap between life expectancy and HALE widened in several states, showing how gains in longevity do not inherently equate to more years lived in full health, particularly as non-communicable diseases and related disabilities escalate. By 2000, risks associated with non-communicable diseases, including high BMI and high fasting plasma glucose, replaced undernutrition and unsafe water, sanitation, and hygiene as leading risk factors, fuelling the rise of non-communicable diseases throughout the country. Of Mexico's 32 states, 20 documented similar changes in disease burden.

Mexico's health patterns since 2000 further emphasise its dissonant health transition. From 1990 to 2000, Mexico and other Latin American countries followed more traditional epidemiological transitions, experiencing sizeable reductions in communicable, neonatal, maternal, and nutritional diseases across age groups, while overall age-specific mortality rates decreased, albeit at a smaller magnitude. After 2000, rising age-specific adult mortality rates caused by diabetes, chronic kidney disease, and interpersonal violence drove a dramatic shift in Mexico's disease profile, whereas most other Latin American countries remained on more traditional trajectories. El Salvador emerged as the exception from 2000 to 2013, following a similar course as Mexico with climbing levels of adult mortality paired with continued progress in improving child survival.[21] For Mexico, and probably El Salvador, drawing attention to dissonant health transitions has important ramifications for policy design and resource allocation, because the optimal intervention packages and programme options for effectively addressing such unusual burden trends and composition might need to be revisited.

Mexico reduced under-5 mortality rates by 76% from 1990 to 2013, effectively achieving the fourth Millennium Development Goal before 2015.[1] Such progress has been linked to several health initiatives and government-led investments,[4] including enhanced sanitation facilities,[4,29] expanded vaccination programmes,[30] and facilitation of improved nutrition for the poor.[31] Increased access to affordable curative and preventive care, through insurance plans such as *Seguro Popular*,[14,16] is also associated with increased use of health services.[10] Nonetheless, gains in child survival have been uneven; 20 states failed to reduce under-5 mortality rates by more than two-thirds. We found that states, such as Guerrero and Puebla, still had high YLL rates from diarrhoeal diseases and preterm birth complications in 2013. These results highlight Mexico's progress in child health, but also underscore potential gaps in the country's health system at local levels and the importance of tracking subnational policy implementation and quality of care.

Mexico decreased its maternal mortality ratio by more than 50% between 1990 and 2013,[21] and several states, including Oaxaca, Tlaxcala, and Queretaro, recorded even larger reductions in their maternal mortality ratio since 1990,[32] which probably contributed to state-level improvements in female life expectancy. Leading causes of maternal deaths—haemorrhage during childbirth, maternal hypertension, and indirect causes—have decreased since 1990, though indirect causes increasingly account for a greater proportion of YLLs.[32] Additional gains against such maternal causes are crucial for further improvement of women's health in Mexico, particularly in states with high marginalisation. Nonetheless, other conditions, especially cancers, led to comparable, or even higher, DALY rates in women of reproductive age.[2] These results emphasise the continued need to further scale-up universal coverage of maternal health services and to strengthen the overall health system capacity to support women's health needs in Mexico.

Several non-communicable diseases emerged as some of Mexico's largest health threats. Diabetes was the leading cause of age-standardised DALY rates in 2000 and 2013, and Mexico has one of the highest diabetes burdens worldwide.[2] Although effective interventions and lifestyle modifications exist,[33,34] improvement of local health service access, appropriate diagnosis of diabetes and related risk factors, and ensuring treatment adherence remain substantial constraints to fully addressing the diabetes epidemic in Mexico.[18] The 2013 Mexican National Strategy on the Prevention and Control of Overweight, Obesity and Diabetes stresses a crucial need for intersectoral collaboration to "reverse the epidemic condition of non-communicable disease (in particular, diabetes)....[which] may compromise our

viability as a nation."[18] Scaling up programmes that support early detection and treatment of high blood glucose, as well as implementation of initiatives focused on diabetes prevention, are of increasing priority.

Mexico's growing chronic kidney disease burden is of serious concern, because Mexico recorded a 136% rise in DALY rates from chronic kidney disease since 1990 and the world's second highest DALY rate due to chronic kidney disease in 2013. Overall chronic kidney disease awareness is low,[35] which, combined with the need for more complex diagnostics and expensive interventions for late-stage chronic kidney disease, poses health system and financial challenges for Mexico. In some Latin American countries, very high chronic kidney disease rates are termed as Mesoamerican nephropathy, or chronic kidney disease thought to be associated with high exposure to agricultural toxins and chemicals, as well as other infectious agents and stressors (eg, dehydration, heat exposure).[36] However, given the steadily increasing chronic kidney disease burden in both rural and urban environments, agricultural production and related risks are not likely to account for all chronic kidney disease found in Mexico. Community-based screening efforts, such as the Kidney Early Evaluation Program, show promising results for high-risk populations.[37] Treatment of leading risk factors for chronic kidney disease, including high fasting plasma glucose and high systolic blood pressure, might also reduce chronic kidney disease severity and slow disease progression,[38] which could ease the high costs of late-stage chronic kidney disease.

The rise in YLL rates due to interpersonal violence was regarded as another primary factor in Mexico's dissonant health transition. After a 28% decline between 1990 and 2000, YLL rates from interpersonal violence increased by more than 75% since 2000 and improvements in male life expectancy stalled. States such as Guerrero and Chihuahua had YLL rates due to interpersonal violence that were comparable to levels in some Latin American countries known for widespread violence,[39] and many people attribute recent rises in violence to drug trafficking and organised crime.[40] These results highlight a need to reduce access to firearms and address environmental and societal factors related to heightened violence. For instance, policies restricting firearm sales and alcohol consumption in high-risk environments have been considered effective in reducing homicides in communities such as Cali, Colombia.[41]

Mexico had one of the highest burdens of cirrhosis in 2013 worldwide,[2] although DALY rates from cirrhosis markedly varied across states; this finding might be related to variable state-level risk patterns, including alcohol use.[23] Notably, per person alcohol consumption in Mexico is not particularly high, yet the burden of alcohol-related cirrhosis in Mexico far exceeds that of countries with high alcohol consumption such as Russia.[2] From 1990 to 2013, age-standardised DALY rates from colon and rectum cancer increased by more than 40%, and DALY rates from breast cancer increased by about 12%. Although highly fatal if untreated, these two cancers generally have favourable prognoses if detected early. By expanding cancer screening programmes, particularly in high-risk populations, and ensuring the implementation of a national cancer registry, Mexico could substantially improve the early detection and clinical outcomes of high-burden cancers.[42,43]

Depressive disorders accounted for nearly 10% of YLDs in 2013, and became a leading cause of disability in Mexican women. Although a combination of medical and psychological treatment can substantially improve mental health outcomes,[44] the availability of mental health care remains insufficient throughout Mexico.[45] Particularly large treatment gaps are observed in 18–29 year olds diagnosed with depression in Mexico, which might be associated with increases in suicide deaths in younger populations in several states.[46] Another leading cause of disability in Mexico, low back and neck pain, accounted for more than 11% of YLDs in 2013. These causes are related to work absenteeism and reduced quality of life.[47] When aggregated over time and in ageing populations, health loss from musculoskeletal conditions might have negative ramifications for overall economic productivity.

Underlying Mexico's dissonant health transition are dramatic shifts in leading risk factors and their contributions to disease burden. Age-standardised DALY rates attributable to tobacco smoke decreased by more than 47% since 1990, a result that might be linked to Mexico's widely lauded adoption and adherence to the WHO Framework Convention on Tobacco Control.[48] Led by the national government, Mexico implemented expansive prevention campaigns, banned smoking in public places, and enacted taxation policies on tobacco products.[49] Similar government-sponsored activities have sought to reduce alcohol-related injuries and mortality,[50] yet the effectiveness of such regulatory efforts often competes with transnational business expansion and trade agreements.[51]

Mexico's rapid nutrition transition,[52] as well as growing disease burden from metabolic and dietary risks, directly reflects the interplay of economic and sociocultural factors. Prevalence of overweight or obese adults in Mexico increased to 69% in 2013,[53] and by 2013, nearly 29% of children were overweight or obese. At the societal level, past studies view urbanisation, changes in Mexico's food industry, and the influence of global economic policies as drivers of these trends.[54] For example, sugar-rich foods became significantly less expensive—and thus more financially attractive commodities—as sugar prices fell amid the implementation of the North American Free Trade Agreement. Studies suggest that price reductions of sugar-rich foods could explain up to 20% of Mexico's increased rates of diabetes between 1996 and 2010.[55] In recent years, the Mexican Government enacted legislation to offset lowered sugar prices, such as a 10% tax on beverages containing added sugars.[56]

GBD analyses indicate that sugar-sweetened beverages could account for more than 30% of the burden of high BMI. Nationally representative surveys also show that the average caloric intake in Mexican women and children increased by 350 kilocalories between 1999 and 2012.[57] Health policies and programmes targeting risk factors related to poor diet and physical inactivity are regarded as promising approaches to address these risks and corresponding disease burdens. For instance, in 2013, the Mexican Alliance for Health Nutrition launched a high-profile media campaign against highly sweetened beverages, such as soda,[58] and various initiatives have sought to restrict school-based availability of sugar-rich and high-fat foods.[59] In tandem, government initiatives and local communities have advocated improving access to physical activity and expanding nutrition education.[59]

Our analyses are subject to the same limitations described for GBD 2013,[1,2,21–23] as well as specific limitations related to data availability for Mexico. First, our subnational results might be affected by variable completeness of state-level vital registration. Future analyses should incorporate additional national surveys to provide updated estimates of state-level under-5 mortality. Second, previous studies document tendencies to overassign diabetes as an underlying cause of death in Mexico.[60] Future GBD updates will aim to improve correction methods for this tendency. Third, we found few data on disease-specific causes in Mexico (eg, lower respiratory infections and hepatitis), and thus state-level estimates for these causes had particularly wide uncertainty. Fourth, for a subset of diseases, we borrowed strength from regional or global data and covariates to estimate subnational prevalence and incidence. Recent efforts to create individual-level registries with patient records for cancer, diabetes, hypertension, and other chronic diseases will substantially improve future analytic efforts.[43] Fifth, we experienced sparse data availability for a subset of risk factors, which might affect estimates' precision. We also had limited local data access for dietary risks, but additional surveys, such as the 2012 National Health Survey, will be incorporated into future GBD analyses. Sixth, without cancer and renal registries, our estimates for cancer, chronic kidney disease, diabetes, hypertension, glomerulonephritis, and other kidney diseases were dependent on vital registration data and thus could not fully account for comorbidities. Subsequent analyses of Mexico's cancer burden would markedly improve by the creation of a national cancer registry.[42] Seventh, data quality certification and prevalence of so-called garbage codes varied across years and states in Mexico, which resulted in difficulty in distinguishing between variance due to improved diagnosis and variance due to the implementation of automated coding in 2007. Eighth, we used hospital discharge records to estimate non-fatal outcomes due to injuries, but we only had data from one health provider in Mexico. Without additional records from social security and the private sector, injury burden might be underestimated. Last, we could not fully account for within-state heterogeneities. Future iterations of GBD will seek to expand subnational assessments to lower administrative levels as data and interest by country leadership permit.

A first of its kind, this study provides a comprehensive picture of disease burden and patterns in Mexico and its states since 1990. These results can help identify successful implementation of state-level policies and areas where more targeted policy attention might be required. We view the publication of these subnational results as a first step toward a greater understanding of state-specific health priorities amenable to local health policy and programme implementation. Programme implementation is of particular importance, as many state-level challenges related to Mexico's dissonant health transition are likely best addressed by direct recognition and redress from local health authorities. Strengthening the use of state-level burden results to inform decision making and onward evaluations of health programmes will require additional training and development of accessible visualisation tools tailored for local stakeholders. For the overarching GBD study and collaboration with Mexico, such initiatives are a priority, and so are efforts to support the formal integration of disease burden assessments as part of Mexico's health information systems and local policy processes.

Improved health system responsiveness, such as ensuring service provision corresponds with changing population health needs, is a crucial component to advancing Mexico's health outcomes. This study emphasises the importance of routinely tracking subnational health trends, which can support more efficient feedback response processes for health programmes. The rise of non-fatal, disabling conditions demands more integrated service provision, particularly for primary care, and a heightened emphasis on preventive measures. Creating cause-specific national registries and ensuring their uptake into Mexico's existing health information systems will also help improve responsiveness. Finally, coordinated multisectoral action is needed to successfully address the country's substantive burdens from mental health disorders, interpersonal violence, and behavioural risks.

Mexico's dissonant health transition places the country at a turning point. Immediate policy intervention is needed to halt accelerating burden from violence and non-communicable diseases, but long-term government investments and health-system planning are also vital to accommodate Mexico's new epidemiological profile. Persisting state inequalities currently hinder further health gains, but if addressed, Mexico could notably improve overall health outcomes and become one of the best-performing countries in Latin America. Implementation of policies focused on effective prevention and treatment is a likely catalyst for improved health, but policies designed to alleviate local inequalities also offer the potential for long-term, enduring advances in health for all populations in Mexico.

Contributors

HG-D, NF, HL-F, CJLM, and RL prepared the first and subsequent drafts, and finalised the manuscript based on feedback from reviewers and co-authors. LC-H, LA-B, BD, RC-R, and SB contributed to writing the first draft and content on specific conditions. HW, TV, MHF, MN, and ADL were involved in the initial generation of results and development of this manuscript. JAR, TB-G, GB, TGdC, MCH-M, CM-R, MEM-M, HR-R, ES-M, TS-L, and MMT-R provided data, reviewed results, reviewed the manuscript, and contributed to interpreting results for the GBD 2013 Mexico study. MJRB, PM, CR-G, and AM prepared and analysed data. EG-P, TA-S, EFAdC, ACB-A, CB, IC-N, JCC-R, AdJC-P, AGC-M, VVdlC-G, LC-N, JLD-O, MdLG-G, AG-G, LDG-C, IH-P, AJ, AJ-C, NL-O, CM-G, FM-R, JCM, GLM-B, AP-T, RP-P, ADQ, VLR-L-C, MPRM, TGS-P, LMS-R, AS, and JLT-S reviewed and interpreted results.

Declaration of interests

MdLG-G reports grants from the Mexican Council of Science and Technology, the Bill & Melinda Gates Foundation and Stanford University, and GlaxoSmithKline Biologicals. All other authors declare no competing interests.

Acknowledgments

This study was funded by the Bill & Melinda Gates Foundation and Instituto Nacional de Salud Pública (INSP). The authors received no additional compensation for their efforts. We thank the countless individuals in Mexico who have contributed to this study; the INSP, particularly managers and staff who supported the development and execution of this study; the Ministry of Health (Secretaría de Salud); the General Directorate of Health Information and the General Directorate of Epidemiology; and at the Institute for Health Metrics and Evaluation, Kelly Cercy and Megan S Coggeshall for generating figures and tables, Kelly Bienhoff and Kelsey Pierce for project management and efforts to oversee correspondence with co-authors, and Megha Arora, Adrienne Chew, Bethany M Huntley, Chantal Huynh, Kevin O'Rourke, Naris Silpakit, Joseph Wagner, and Amy VanderZanden for their contributions to fact-checking, editing, and proofing the manuscript.

References

1 Wang H, Liddell CA, Coates MM, et al. Global, regional, and national levels of neonatal, infant, and under-5 mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; **384:** 957–79.

2 Murray CJL, Barber RM, Foreman KJ, et al. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *Lancet* 2015; **386:** 2145–91.

3 Stevens G, Dias RH, Thomas KJA, et al. Characterizing the epidemiological transition in Mexico: national and subnational burden of diseases, injuries, and risk factors. *PLoS Med* 2008; **5:** e125.

4 Sepúlveda J, Bustreo F, Tapia R, et al. Improvement of child survival in Mexico: the diagonal approach. *Lancet* 2006; **368:** 2017–27.

5 Omran AR. The epidemiologic transition. A theory of the epidemiology of population change. *Milbank Mem Fund Q* 1971; **49:** 509–38.

6 Salomon JA, Murray CJL. The epidemiologic transition revisited: compositional models for causes of death by age and sex. *Popul Dev Rev* 2002; **28:** 205–28.

7 Santosa A, Wall S, Fottrell E, Högberg U, Byass P. The development and experience of epidemiological transition theory over four decades: a systematic review. *Glob Health Action* 2014; **7:** 23574.

8 Murray CJL, Bobadilla JL. Epidemiological transitions in the formerly socialist economies: divergent patterns of mortality and causes of death. In: Bobadilla JL, Costello CA, Mitchell F, eds. Premature death in the new independent states. Washington, DC: National Research Council (US) Committee on Population, 1997.

9 Rivera JA, Barquera S, Campirano F, Campos I, Safdie M, Tovar V. Epidemiological and nutritional transition in Mexico: rapid increase of non-communicable chronic diseases and obesity. *Public Health Nutr* 2002; **5:** 113–22.

10 Lozano R, Soliz P, Gakidou E, et al. Benchmarking of performance of Mexican states with effective coverage. *Lancet* 2006; **368:** 1729–41.

11 Lozano R, Gómez-Dantés H, Garrido-Latorre F, et al. La carga de enfermedad, lesiones, factores de riesgo y desafíos para el sistema de salud en México. *Salud Publica Mex* 2013; **55:** 580–94.

12 Frenk J, Lozano R, González-Block MA, et al. Economía y salud: propuestas para el avance del sistema de salud en México. Informe final. Mexico City: Fundación Mexicana para la Salud, 1994.

13 Frenk J. Bridging the divide: global lessons from evidence-based health policy in Mexico. *Lancet* 2006; **368:** 954–61.

14 González-Pier E, Gutiérrez-Delgado C, Stevens G, et al. Priority setting for health interventions in Mexico's System of Social Protection in Health. *Lancet* 2006; **368:** 1608–18.

15 Lozano R, Murray CJL, Frenk J, Bobadilla J-L. Burden of disease assessment and health system reform: results of a study in Mexico. *J Int Dev* 1995; **7:** 555–63.

16 Frenk J, González-Pier E, Gómez-Dantés O, Lezana MA, Knaul FM. Comprehensive reform to improve health system performance in Mexico. *Lancet* 2006; **368:** 1524–34.

17 Aburto JM, Beltrán-Sánchez H, García-Guerrero VM, Canudas-Romo V. Homicides In Mexico reversed life expectancy gains for men and slowed them for women, 2000–10. *Health Aff* 2016; **35:** 88–95.

18 Secretaría de Salud. Estrategia Nacional para la Prevención y el Control del Sobrepeso, la Obesidad y la Diabetes. Mexico City: Secretaría de Salud, 2013.

19 Barquera S, Campos I, Rivera JA. Mexico attempts to tackle obesity: the process, results, push backs and future challenges. *Obes Rev* 2013; **14:** 69–78.

20 Gómez Dantés H, Castro V, Franco-Marina F, et al. La carga de la enfermedad en países de América Latina. *Salud Publica Mex* 2011; **53** (suppl 2)**:** S72–77.

21 GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015; **385:** 117–71.

22 Vos T, Barber RM, Bell B, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015; **386:** 743–800.

23 Forouzanfar MH, Alexander L, Anderson HR, et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015; **386:** 2287–323.

24 Consejo Nacional de Población (CONAPO). Índice de marginación por entidad federativa y municipio 2010. Mexico City: CONAPO, 2011. http://www.conapo.gob.mx/en/CONAPO/Indices_de_Marginacion_2010_por_entidad_federativa_y_municipio (accessed Feb 17, 2016).

25 Foreman KJ, Lozano R, Lopez AD, Murray CJ. Modeling causes of death: an integrated approach using CODEm. *Popul Health Metr* 2012; **10:** 1.

26 Naghavi M, Makela S, Foreman K, O'Brien J, Pourmalek F, Lozano R. Algorithms for enhancing public health utility of national causes-of-death data. *Popul Health Metr* 2010; **8:** 9.

27 Salomon JA, Haagsma JA, Davis A, et al. Disability weights for the Global Burden of Disease 2013 study. *Lancet Glob Health* 2015; **3:** e712–23.

28 Kahn K, Garenne ML, Collinson MA, Tollman SM. Mortality trends in a new South Africa: hard to make a fresh start. *Scand J Public Health Suppl* 2007; **69:** 26–34.

29 Gutiérrez G, Pérez-Cuevas R, Levy S, et al. Strengthening preventive care programs: a permanent challenge for healthcare systems; lessons from PREVENIMSS México. *BMC Public Health* 2010; **10:** 417.

30 Richardson V, Sánchez-Uribe E, Esparza-Aguilar M, Esteves-Jaramillo A, Suárez-Idueta L. Contribution of Mexico's Universal Immunization Program to the Fourth Millennium Development Goal. *Rev Panam Salud Publica* 2014; **35:** 248–55.

31 Rivera JA, Sotres-Alvarez D, Habicht J, Shamah T, Villalpando S. Impact of the Mexican program for education, health, and nutrition (PROGRESA) on rates of growth and anemia in infants and young children: a randomized effectiveness study. *JAMA* 2004; **291:** 2563–70.

32 Hogan MC, Saavedra-Avendano B, Darney BG, et al. Reclassifying causes of obstetric death in Mexico: a repeated cross-sectional study. *Bull World Health Organ* 2016; **94:** 362–69B.

33 Tuomilehto J, Lindström J, Eriksson JG, et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 2001; **344:** 1343–50.

34 Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002; **346:** 393–403.

35 Obrador GT, Villa AR, Olvera N, Gutiérrez V, Contreras D, Reyes R. Longitudinal analysis of participants in the KEEP Mexico's chronic kidney disease screening program. *Arch Med Res* 2013; **44:** 650–54.

36 Wesseling C, Crowe J, Hogstedt C, Jakobsson K, Lucas R, Wegman DH. The epidemic of chronic kidney disease of unknown etiology in Mesoamerica: a call for interdisciplinary research and action. *Am J Public Health* 2013; **103:** 1927–30.

37 Gutierrez-Padilla JA, Mendoza-Garcia M, Plascencia-Perez S, et al. Screening for CKD and cardiovascular disease risk factors using mobile clinics in Jalisco, Mexico. *Am J Kidney Dis* 2010; **55:** 474–84.

38 Levey AS, Schoolwerth AC, Burrows NR, et al. Comprehensive public health strategies for preventing the development, progression, and complications of CKD: report of an expert panel convened by the Centers for Disease Control and Prevention. *Am J Kidney Dis* 2009; **53:** 522–35.

39 Briceño-León R, Villaveces A, Concha-Eastman A. Understanding the uneven distribution of the incidence of homicide in Latin America. *Int J Epidemiol* 2008; **37:** 751–57.

40 Heinle K, Molzahn C, Shirk DA. Drug violence in Mexico: data analysis through 2014. San Diego, CA: Justice in Mexico, University of San Diego, 2015.

41 Sánchez ÁI, Villaveces A, Krafty RT, et al. Policies for alcohol restriction and their association with interpersonal violence: a time-series analysis of homicides in Cali, Colombia. *Int J Epidemiol* 2011; **40:** 1037–46.

42 Gómez-Dantés H, Lamadrid-Figueroa H, Cahuana-Hurtado L, et al. The burden of cancer in Mexico, 1990–2013. *Salud Publica Mex* 2016; **58:** 118–31.

43 Leal YA, Fernández-Garrote LM, Mohar-Betancourt A, Meneses-García A. The importance of registries in cancer control. *Salud Publica Mex* 2016; **58:** 309–16.

44 Jacob KS. Depression: a major public health problem in need of a multi-sectoral response. *Indian J Med Res* 2012; **136:** 537–39.

45 Medina-Mora ME, Borges G, Lara C, et al. Prevalence, service use, and demographic correlates of 12-month DSM-IV psychiatric disorders in Mexico: results from the Mexican National Comorbidity Survey. *Psychol Med* 2005; **35:** 1773–83.

46 Borges G, Orozco R, Benjet C, Medina-Mora ME. Suicidio y conductas suicidas en México: retrospectiva y situación actual. *Salud Publica Mex* 2010; **52:** 292–304.

47 Kovacs FM, Abraira V, Zamora J, et al. Correlation between pain, disability, and quality of life in patients with common low back pain. *Spine* 2004; **29:** 206–10.

48 Reynales-Shigematsu LM. El control del tabaco, estrategia esencial para reducir las enfermedades crónicas no transmisibles. *Salud Publica Mex* 2012; **54:** 323–31.

49 Thrasher JF, Swayampakala K, Arillo-Santillán E, Sebrié E, Walsemann KM, Bottai M. Impacto diferencial de la legislación federal y local de espacios libres de humo de tabaco en México: un estudio longitudinal entre fumadores adultos. *Salud Publica Mex* 2010; **52** (suppl 2)**:** S244–53.

50 Pérez-Núñez R, Híjar M, Celis A, et al. Road traffic injuries in Mexico: evidence to strengthen the Mexican road safety strategy. *Cad Saúde Pública* 2014; **30:** 911–25.

51 Moodie R, Stuckler D, Monteiro C, et al. Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *Lancet* 2013; **381:** 670–79.

52 Rivera JA, Barquera S, González-Cossío T, Olaiz G, Sepúlveda J. Nutrition transition in Mexico and in other Latin American countries. *Nutr Rev* 2004; **62** (suppl 2)**:** S149–57.

53 Ng M, Fleming T, Robinson M, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; **384:** 766–81.

54 Clark SE, Hawkes C, Murphy SME, Hansen-Kuhn KA, Wallinga D. Exporting obesity: US farm and trade policy and the transformation of the Mexican consumer food environment. *Int J Occup Environ Health* 2012; **18:** 53–65.

55 Gracner T. Bittersweet: how prices of sugar-rich foods contribute to the diet-related disease epidemic in Mexico. Berkeley, CA: University of California, Berkeley, 2015. http://arefiles.ucdavis.edu/uploads/filer_public/2015/01/20/paper-3tgracner_0UHHUN9.pdf (accessed Feb 12, 2016).

56 Colchero MA, Popkin BM, Rivera JA, Ng SW. Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study. *BMJ* 2016; **352:** h6704.

57 Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barron V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *Lancet* 2010; **376:** 1775–84.

58 Alianza por la Salud Alimentaria. Campaña 12 cucharadas. http://alianzasalud.org.mx/12cucharadas/ (accessed Aug 3, 2016).

59 Barquera S, Campos-Nonato I, Rojas R, Rivera J. Obesidad en México: epidemiología y políticas de salud para su control y prevención. *Gac Med Mex* 2010; **146:** 397–407.

60 Murray CJL, Dias RH, Kulkarni SC, Lozano R, Stevens GA, Ezzati M. Improving the comparability of diabetes mortality statistics in the U.S. and Mexico. *Diabetes Care* 2008; **31:** 451–58.



Investigación en sistemas de salud
Evidencias para avanzar el conocimiento
y la toma de decisiones

Se terminó
en junio de 2026.
La edición consta de xx ejemplares
y estuvo al cuidado de
la Subdirección de Comunicación
Científica y Publicaciones
del Instituto Nacional de Salud Pública.