A comparative analysis between Mexican and Chinese health systems

Un análisis comparativo entre los sistemas de salud de México y China

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Abstract

Objective: The comparative network analysis of national health macrosystems is an area whose academic development has not reached due relevance if its influence on decision-making related to the design of public health policies is considered; the establishment of comparative elements between two socially, economically and culturally distant countries, such as Mexico and China, is a complex process given the difficulty of locating equivalent evaluation indicators among some of its elements.

Materials and methods: The present work reflects on the similarities and dissimilarities between the national health systems, with an impact on the care provided to the most vulnerable population segments, applying a comparative nodes and networks analysis considering social and economic factors.

Results: The network analysis shows that, for practical purposes, the nodes considered in the Mexican health system is superior to those nodes identified in the Chinese health system in terms of quality, mainly in nodes such as convenience of the location, using cutting-edge technology in health institutions and the skill and competence of medical personnel; conversely, the Chinese system is superior to the Mexican in terms of efficiency, mainly involuntary co-payment insurance systems to reduce the catastrophic health expenditure of the vulnerable rural population.

Conclusions: The conclusions drawn may serve for subsequent studies to identify opportunities for improvement, correlations and/or trends that could be implemented in the Mexican health system, once the pertinent feasibility studies have been carried out.

Keywords: Health Management; Population Health Management; Comparative studies; Mexico; China.

Resumen

Objetivo: El análisis de redes comparativo de macrosistemas nacionales de salud es un ámbito cuyo desarrollo académico no ha alcanzado la relevancia debida si se considera su influencia en la toma de decisiones relativas al diseño de políticas de salud pública. Así, el establecimiento de elementos comparativos entre dos países social, económica y culturalmente distantes, como México y China, es un proceso complejo dada la dificultad de ubicar indicadores equivalentes de evaluación entre algunos de sus elementos.

Materiales y método: El presente trabajo reflexiona sobre las similitudes y diferencias entre los mencionados sistemas nacionales de salud, con incidencia en la atención que se brinda a los segmentos poblacionales más vulnerables, aplicando un análisis comparativo de nodos y redes considerando factores sociales y económicos.

Resultados: El análisis de red muestra que, para efectos prácticos, los nodos considerados en el sistema de salud mexicano son superiores a los nodos identificados en el sistema de salud chino en términos de calidad, principalmente en nodos como conveniencia de la ubicación, utilizando tecnología de punta en instituciones de salud y la habilidad y competencia del personal médico; Por el contrario, el sistema chino es superior al mexicano en términos de eficiencia, principalmente sistemas de seguro de copago involuntario para reducir el gasto catastrófico en salud de la población rural vulnerable.

Conclusiones: Las conclusiones extraídas podrán servir a estudios posteriores para identificar oportunidades de mejora, correlaciones y/o tendencias que pudieran implementarse en el sistema mexicano de salud, una vez efectuados los estudios de viabilidad pertinentes.

Palabras clave: Gestión en Salud; Gestión de la Salud Poblacional; Estudio Comparativo; China; México.

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Introduction

Health system is understood as the set of organizations, institutions, resources and people whose objective is to improve health through interventions of a preventive, promotional, curative and rehabilitative nature, as well as the combination of public health actions and the of health centers in which public and private actors provide care and socio-medical-health care in terms of access, quality, coverage and health safety of a given population[1]; given the multidimensional nature of the systems, an adequate analysis requires a detailed analysis of their objectives, structure, stewardship, functions and historical evolution[2], since these systems are the result of the development of the technical, economic, financial and social dimensions of the countries, defined by national development policies on public health problems, population health needs, as well as political, scientific and technical response capacity to the aforementioned problems[3].

That is one reason why a comparative analysis favors the extraction of best practices applicable to the construction of equitable, efficient and effective public policies that provide decision makers in the matter with external elements of judgment for a better and deeper assessment of local health systems from of the identification of international equivalences in the construction and management of health indicators[4].

Expressed in other terms, international comparisons, regardless of the field to which they are oriented, facilitate the analysis of reality from a more open perspective, with a greater combination of resources, structures or forms of operation[5]; in the design of comparative studies, it is essential to consider that what is defined as a successful action, experience or program in one country may fail in another due to underlying political, social, economic or cultural variables.

From a perspective common to both nations, public health should necessarily translate into the reduction of social inequalities in health for vulnerable populations, the implementation of comprehensive medical and social welfare programs -health, universal access and coverage and the transformation of health systems from action frameworks aimed at the promotion, prevention and control of damage and health risks[6].

The sociopolitical context in Mexico and China

To understand better the socio-political context for each country which is intimately related to the design and implementation of health policies and the structure of such systems, it is relevant to mention that although China is still an authoritarian regime today, the political dimension started gaining an important public presence at the beginning of the decade of 1980s, a change mainly affected by Deng Xiaoping and the broad reforms implemented during his leadership; meanwhile, in Mexico, for most of the 20th century there was a highly centralized power base resulting in a lack of political and economic freedom, resulting in a situation where normative theories in Mexico are provided by foreign publications that do not fit the political, social, or cultural context, meanwhile in China, the public relations have tended to largely borrow from American theories and models based on a rational choice and managerial perspective[7].

An analysis of the social factors of each country shows that, for what it comes to the social factors, the deep driver of Chinese culture shows a society that fundamentally believes that inequalities amongst people are somehow acceptable, where there is no real defense against power abuse by superiors, individuals are influenced by formal authority and sanctions and that people generally should not have aspirations beyond their rank; meanwhile, in Mexico, people accept a hierarchical order in which everybody has a place, where centralization is popular, subordinates expect to be told what to do and the expected authority is represented by benevolent autocracy[8]. Given the fact that both nations have contrasting political and social dimensions, it is essential to consider an adequate structure to perform a comparison analysis for both national health systems.

Literature review of comparison methods applied to national health systems

A diversity of comparison methods applied to national health system analysis can be found in the literature; there has been an increasing trend in publication on the subject throughout the world, where scholars from many disciplines recognize the theoretical and practical insights regarding understanding of the relationship between cultural, social, political, and economic forces in national health care systems, including descriptive, quantitative economic approach, comparative in developing dynamics of science and technology, resource levels, patterns of morbidity, demography, and mass culture[9].

Additionally, the use of particular techniques including explanatory and dependent variables to study health and safety issues in Britain comparing problems of regulatory enforcement including the number of cases where regulations have been breached, the number of inspections, and the number of litigations[10].

In the other hand, there are studies that compares structures in England and Greece for achieving integrated people-centered health services using an analytical process of reviewing policy and legislation papers including general health policy and systems, patient and/or public involvement or patients' rights policy and legislation comparative or discussion papers[11].

Following that line of research, a review of scientific works that covers a broad specter of analysis of different nature, including a regional analysis comparing a set of public health policies in four European welfare states, presents a diversity of policy areas, private life dimensions and changes in national as well as sectoral policy making[12,13].

Furthermore, it is possible to find studies that tested three hypotheses in a research that includes the number and density of hospital beds have been decreasing due to cuts, the number and density of places, and the uniformity of such changes leading to increased quantitative inequalities between cities in terms of healthcare provision finding that reforms to healthcare provision in Russia and France since the 1990s follow comparable paths, including quantifying and pricing activities, reporting, and budget control[14].

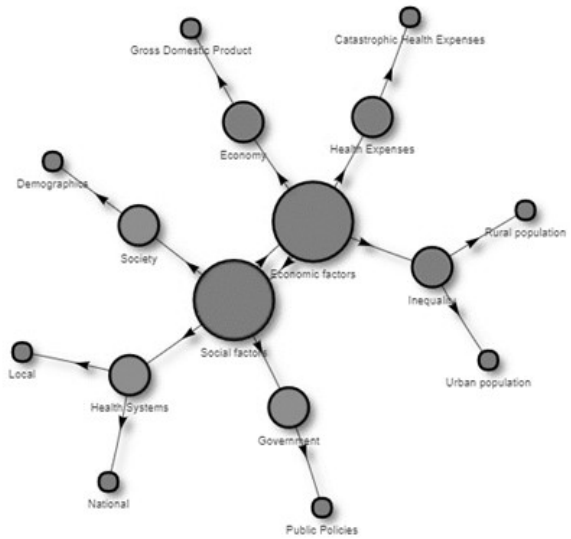
In the scenario previously described, the present work presents an analysis of two main nodes of factors between the national health systems of Mexico and China with the objective of identifying opportunities for improvement, given the complexity in defining elements of comparison between two socially, economically, and culturally distant countries, due to the difficulty of establishing equivalent evaluation indicators.

Materials and methods

The present research applies a comparative network analysis considering social and economic factors in terms of nodes and networks, comparing information related to each relevant factor of a given national health system, according to the literature in relation to the variables included in Figure 1, where the comparison analysis process takes into account the information regarding social and economic factors, divided in three elements each, which represents a variable model that guides the present research work.

As it can be seen on Figure 1, the network analysis that guides the present research is divided by two essential factors; in one side, the economic factors consider macroeconomic conditions of the health system environment such as the gross domestic product (GDP) of each nation, also the level of health expenses such as the considered as catastrophic health expenses, which is a guide for designing public policies on the matter, and finally the comparison between inequalities conditions considering both rural and urban population of each country. For this economic node, the information was collected from sources such as the official websites from World Bank, OECD stats, and governmental institutions from Mexico and China respectively.

Figure 1: Network analysis among the factors of comparison between national health systems



Source: Own elaboration (2022) using Rstudio.

In what it comes to the node related to social factors, this research considers society in terms of demographics, health systems in terms of tiers including local and national, and the Government in terms of public policies; given the fact that this neural network analysis presents social and economic factors, represented as nodes, this represented a graphic method that helps the comparison of both countries in terms of health systems, facilitating the analysis process on the matter, including information from Mexican institutions such as The Mexican Institute of Social Security (IMSS), Health Institute for Wellness (INSABI), and the Secretary of Health (SSA); from the analysis of the Chinese health system, the information was collected mainly in the official website from the State Council of the People's Republic of China.

The information was analyzed using a descriptive comparative approach, including contrast of trends over a period of time of 2010-2020 and the use of comparison tables for indicators related to training of health professionals, level of coverage for people with health insurance, degree of benefits, union intervention, care basis, supply, and the structure for health system designed for the uninsured population in both countries.

Results

The first node of analysis is the corresponding to social factors, which include basic health systems, social issues, and government structure; in this matter, for both countries the local health systems are made up of public and private, governmental, and non-governmental institutions, which

respond to the different health needs of the population according to particular social, political, economic, and historical circumstances.

Continuing with the analysis, to the Mexican health system, governed by the *General Health Law*[15], has the following objectives: to achieve universal health coverage, contribute to the harmonious demographic development of the country, collaborate in the social welfare of the population through social assistance services with special impact on vulnerable groups, improve the sanitary conditions of the environment, promote a rational system of administration and development of human resources in health matters and, finally, contribute to the modification of cultural patterns that determine habits, customs and attitudes related to with health and with the use of services provided for its protection[16].

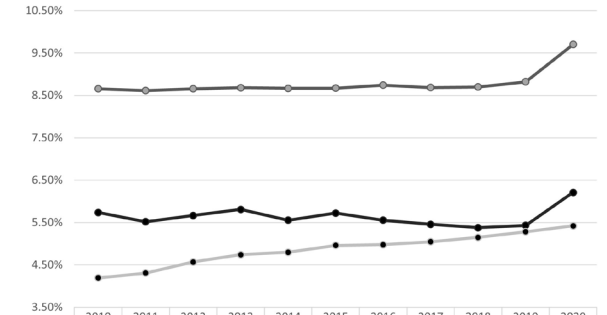
On the contrary, the Chinese health system relates to more specific objectives focused on the individual, such as universal coverage and access, the strengthening of primary care, the reduction of out-of-pocket expenses in health matters and the reform of public hospitals, among others[17].

In terms of coverage, the Mexican system, accessible and free for anyone not covered by another public/private health plan, is more equitable than the Chinese, which covers only the uninsured rural population through the payment of a premium, which becomes an exclusion criterion for those who, because they live in situations of very high poverty or extreme poverty, cannot exercise said payment; regarding the benefits package, the National Wellbeing Institute (INSABI for its name in Spanish) covers any primary or hospital intervention free of charge regardless of its cost, while the Chinese Scheme favors hospital intervention, with a higher copayment, over the primary one [13,14,18], as it shows in table 1.

For Mexican users, the convenience of the location is highly satisfactory —80.56%—, followed using cutting-edge technology in health institutions and the skill and competence of medical personnel. For Chinese users, the use of state-of-the-art technology in health institutions, the convenience of the location, and the speed to complete the filling of reports and the application of exams occupy the first three positions —78.98%, 73.2% and 71.02%, respectively—; in that sense, a comparative synthesis is reflected in Figure 2.

As we can see in figure 2, the OECD average is noticeable higher in comparison to China and Mexico, with an approximate 3% to 4% of higher percentage on expenditure on health; nevertheless, there is a relevant trend that shows a steady increment in the percentage used by China in this matter for two main reasons: first, the Chinese health system is strongly based on traditional medicine, and second, the Gross National Product of China, even is clearly higher than Mexico, also is the population, so the budget actually could fall short regarding the vast necessities of the population of that country[19].

Figure 2: Comparative analysis in terms of percentage on expenditure on health (Measure: Share of GDP among China,



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mexico	5.74%	5.52%	5.67%	5.81%	5.55%	5.72%	5.55%	5.46%	5.38%	5.43%	6.21%
China	4.19%	4.31%	4.57%	4.74%	4.80%	4.96%	4.98%	5.05%	5.15%	5.28%	5.42%
OECD	8.66%	8.62%	8.65%	8.68%	8.67%	8.67%	8.74%	8.69%	8.70%	8.82%	9.70%

* Data for years 2019 and 2020 from China data was imputed using a method based on average trend in relation to past years.

Source: Data obtained from OECD Stats (2022).

About the second factor regarding social issues, the implementation of numerous schemes for the development of socio-medical-health services linked to the different five-year plans and the reform, practically uninterrupted since 2009, of its national health system[20].

Contrary to what happens in China, where traditional medicine has been cared for and promoted by the state authorities[21], in Mexico the uses and customs of the autochthonous ethnic groups, which include ancestral therapeutics for the treatment of disease and are legally protected, continue to be reduced to indigenous communities[22]; also, Mexico, has raised health to the rank of constitutionally declared autonomous right[15].

In terms of demographic indicators, China's birth rate was unusually low due to the one-child policy while Mexico's *per capita* health spending was above average. However, even if neither public health spending as a percentage of total health spending nor total health spending as a percentage of GDP showed significative differences between the two countries, largely dependent on private out-of-pocket spending to finance health care before the creation of protection systems for the uninsured population[3,13,14,15,18,19];in that sense, in Mexico the social insurance schemes are managed by highly centralized national institutions while coverage for the uninsured is operated by both state and federal authorities and

providers[3], meanwhile in China, it is the state that develops social insurance, social assistance and health services where health laws and regulations can be grouped into legislation for health institutions, medical practices, public health and health services[20].

In the other hand, the third social factor based on government structures, Mexico manages a highly complex health system due to its decentralized, segmented and fragmented structure[3], deployed in five main subsystems and 12 minor subsystems, each of which attends to specific population groups[3,5,8] and mainly derived from a historical lack of definition of public policies, with isolated programs that were born from one or another six-year National Development Plan and whose continuity over time is never guaranteed, since the federal political structure, albeit democratic and interparty, host noticeable differences between parties affect the planning permanence and continuity over time; however, the current government has tried to guide the national health system towards a single, universal, public, supportive and free structure[23].

In comparison, the Chinese government has been applauded in international circles for its work in the design of flexible and lasting social public policies, among which those associated with health can be highlighted[15,23], being a vertical system with the Council of State supported by the Central Committee of the Chinese Communist Party and the People's Congress of China[24].

The second node of analysis include a node of economic factors, considering national economy, inequity in health (for rural and urban population) and Health expenses (including health expenditure and financing).

With reference to the national economy, is essential to consider that throughout the 21st century China's economic growth has exceeded the global average to reach a GDP per capita of 10,525 dollars in 2020[25], which meant the abandonment of the state of poverty for almost 800 million people, even when the magnitude of the figure does not imply the reduction of the country's lags in terms of structural opportunities favorable to social mobility with health, nutrition, education or housing, among other fundamental rights of the human being.

In that sense, in 2003, the year in which the New Cooperative Medical Scheme was created, Mexico's GDP *per capita* exceeded that of China by 5 times and, although 7% of the Chinese population lived below the poverty line while only 4% of Mexicans did, income inequality was more severe in Mexico, where the poorest 10% of households accounted for 1.8% of total consumption while the same percentage of the richest consumed almost 40%[25].

The second economic factor refers to inequity in health for rural and urban population; in this sense, a relevant data to understand the context is that in 2016 the Chinese State Council began the process of merging the basic medical insurance for urban and rural residents in order to reduce administrative costs[24] into a combined basic medical insurance plan for urban and rural residents, whose development is still ongoing. continues in process. The Chinese system reproduces and amplifies the pre-existing social inequalities between the rural and urban population and establishes differences based on the housing area, the position of the individual in the labor market, the sector of employability and the type of employment[26].

For Mexico, the largest population contingent is insured in one of the numerous public or professional health subsystems —Petróleos Mexicanos (PEMEX) or the Armed Forces, have their own health systems, for example—, while the uninsured have a health system for the uninsured population in the public system, which they can use even if they pay for private insurance out of the pocket[27].

Finally, in respect to health expenses considering expenditure and financing factors, we found that there is an exposure of more than 50% of the Mexican population to catastrophic health expenses, especially in terms of outpatient care and medication, led in 2004 to the creation of Seguro Popular, a social health protection system for uninsured people who contribute to mitigate the health problems of the economically vulnerable population; although the possibility of falling into the trap of medical poverty is less, the cultural dynamics, the uses and customs of the indigenous population, the lack of knowledge of the operation and sometimes of the existence of INSABI and the difficulties of access to its facilities in much of the country leave a large contingent of the population exposed to the disease[28,29].

As concerns to the Chinese government, they implemented the New Cooperative Medical Scheme, a voluntary co-payment insurance system, subsidized by national and provincial authorities, to reduce the catastrophic health expenditure of the vulnerable rural population. In 2009, the scheme had covered about 0.83 billion people, equivalent to almost 94% of the target population.

In certain regions with limited financing, the benefit package was restricted in terms of service coverage, and although it covered hospital care, the same did not happen with primary care, forcing the government between 2009 and 2012 to invest 125 billion dollars for system improvement[30]..

Table 1 . Comparison of national health systems Mexico and China.

Indicator	Mexico	China
Training of health professionals	Lack of updating in training programs	Lack of updating in training programs
Coverage	Apparent Universal Coverage	Apparent Universal Coverage
Degree of benefits	Wide, with logistical difficulties	Limited, with logistics and co-payment difficulties
Preparation for transition epidemiological demographic	Adaptation of programs Lack of long-term projects	Adaptation of programs Long-term projects
Union intervention	Complex bureaucratic system, with intervention in the system of Health	Complex bureaucratic system, with intervention in the system of Health
Care basis	Based in secondary and tertiary care	Based in primary care
Supply	System fragmented	Homogeneous system
Health system for the uninsured population		
Inscription	Volunteer	Volunteer
Eligible Population	Anyone who has not benefited from social security	All rural residents
Family contribution requirement	Theoretically yes, but practically no	Yes
Scope of benefits package	Explicit benefits package: 249 basic and 17 expensive interventions	More favorable to hospital services than to prevention and primary care; designed by local governments
Share costs with the patient	No	Yes
Eligible Population	Anyone who has not benefited from social security	All rural residents
Family contribution requirement	Theoretically yes, but practically no	Yes

Source: Authors based on literature review (2022).

To show the aforementioned comparison, table 1 includes the comparative analysis according to some indicators between countries, including those factors that have coincidence in both systems, showing that there are some convergences in both nations.

As it can be seen in table 1, the most relevant coincidences are focused on factors such as the lack of updating in training programs, the complexity of the bureaucratic system, with intervention in the system of health, the universal coverage and the volunteer inscription to the health system for uninsured population.

As respects to the differences, it is possible to observe that the degree of benefits is wide for Mexico compared to a limited coverage in China, but both of these countries are presenting logistical difficulties in the provided services for the uninsured population, practically is possible to find differences in all factors, focused mainly on the analysis is the care basis factor, since while the health system in Mexico is focused on secondary and tertiary care (specialists and highly specialized equipment and care, respectively), China is characterized by a focus on primary care (general practitioner or internist); this is relevant, since it shows the leaning approach of Chinese health care in traditional Chinese medicine, which is mainly preventive rather than reactive.

As regards to the factor related to the health system for family contribution requirement, scope of benefits package, share costs with the patient, eligible population, family contribution requirement, scope of benefits package and the factor related to the share costs with the patient.

Discussion

The social organization of health services has been a growing trend since the earliest times of humanity for any society, regardless of its location or organization. The approach to health is intrinsically linked to the social, political, and economic context of each country, as well as to the circumstances that take place at one point in time or another. However, it is possible to find that the basic principles of approaching public health policies close the gap of dissimilarity with greater depth than might apparently be perceived: the search for economic support to improve the services offered, the attempts to Rationalized provision, coverage and universal access to health care are some of those similar elements on which every health system is based in terms of prevention, diagnosis, treatment, follow-up and health management.

When analyzing the main factors that characterize the health systems based on social and economic factors, the graphical analysis based on a network analysis shows that using nodes to represent each dimension of a given analysis eases the process of understanding the core components of such systems.

Based on such graphical model, the most relevant differences were identified in subjects such as the supply for healthcare organizations, considering that Mexico is characterized by a fragmented system, meanwhile the Chinese health system is characterized by being homogeneous system only lend service to affiliates; this is one of the effects of having a public structure strongly centralized government, which also gives a higher level of certainty and continuity in the long run for China.

In terms of eligible Population, for Mexico, anyone who has not benefited from social security can have access to public health services, meanwhile China covers practically all rural residents; in that sense, the scope of benefits package includes an explicit benefits package covering 249 basic and 17 expensive interventions for Mexico, meanwhile in China is more favorable to hospital services than to prevention and primary care, following a design made by local governments and approved by the related centralized organisms.

This can represent an overall situation that is considered in the general trends for life expectancy for both countries, given the fact that in 2010 the life expectancy was practically the same for both genders in each nation (around 74.4 years approximately), in the recent years the trend has become a better indicator for China, specifically after 2015, where the difference in favor of the Chinese society was more relevant (a difference of 1 year in comparison), with a final positive difference in 2020 for China of around two more years[26].

In that sense, the overall characteristics that represent the most important differences between both systems are considered as follows; meanwhile China's health system is hospital-centric, fragmented and volume-driven, with a model focused in a strong bias related to service delivery, serving more people at hospitals rather than at grassroots levels, it is possible to find a shortage of qualified medical and health workers at the primary care level, affecting citizens' confidence in health care providers[31]; conversely, in Mexico, the voluntary coverage program funded by the federal and state governments, covered less than half of the population with a limited benefits package, where covered individuals have access only to limited providers and facilities unless they pay out-of-pocket for services[32], representing an important source of inequalities for the general population.

Conclusions

In the cases reviewed in this study, closing the social gap seems to be a determining factor for the construction of a solid health system, based on true and effective health policies, which can offer equally solid results, with an equitable distribution of resources and structure, logistics and coherent organization from a preventive and humanistic approach, efficient and refined information systems that strengthen decision-making in public policies aimed at achieving the well-being that the population, which is reduced, in the present case, to a healthy and informed population that can avoid risk situations. Only in this way, both Mexico and China, will achieve the utopia of social justice in health.

Conflict of interest

The authors manifests that they don´t have any conflict of interest with any organization or person; also, they did not receive support from any organization for the submitted work and have no competing interests to declare that are relevant to the content of this article. All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Contributions of the authors

Conceptualization and design, G.G.T.; Methodology, S.A.E.R.; Data and Software, S.A.E.R.; Analysis and interpretation of data, G.G.T. and S.A.E.R.; Writing—Original draft, G.G.T. and S.A.E.R.; Review and manuscript, S.A.E.R.; Visualization, S.A.E.R.

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