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Economic Impact of Family Medicine on Health Systems in Ibero-America

Impacto Económico de la Medicina Familiar en los Sistemas de Salud de Iberoamérica

Impacto Econômico da Medicina de Família nos Sistemas de Saúde na América Latina

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Abstract

There are few researches that address the economic and sanitary importance of the organizational model of a level of care or of the presence of certain professionals. The aim of this descriptive and transversal study is to explore and analyze the possible associations between the specialty of family medicine and economic and sanitary indicators in 16 countries of Ibero-America. The data processing was carried out through the program R, a programming language that shows "a set of functions that maintain some type of relation between them". It seems that there is a positive association between the number of specialists in family medicine with GDP, investment in health and life expectancy and in negative with the GINI index, anemia, mortality in children under 5 years, maternal mortality ratio and in traffic accidents. The GDP per capita is negatively related to anemia, mortality in children under 5 years of age, maternal and accident mortality ratio, and less intensely with cardiovascular mortality and suicide. There are no correlations between pocket expenses or investment in healthcare. Despite the different health and social realities of the countries studied, a favorable relation is found between the availability of specialists in Family Medicine and better health results, which suggests that it can be an efficient strategy for health services. More studies are necessary to analyze the statistical scope of this association.

Keywords: Family Medicine; Primary Health Care; Efficiency; Health Economics

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As it is a review without patient participation, no approval was requested from the Research Ethics Committee. The authors declare that the procedures followed were carried out in accordance with the ethical standards of the World Medical Association and the Declaration of Helsinki.

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Resumen

Son escasos los estudios que abordan la importancia, económica y sanitaria, que tiene el modelo organizativo de un nivel asistencial o la presencia de determinados profesionales. El objetivo del presente estudio, de carácter descriptivo y transversal, fue explorar y analizar las posibles asociaciones entre la especialidad de medicina familiar e indicadores económicos y sanitarios en 16 países de Iberoamérica. El procesamiento de datos fue realizado a través del programa R, un lenguaje de programación que muestra "un conjunto de funciones que mantiene algún tipo de relación entre ellas". Se observa una asociación en positivo, del número de especialistas de medicina familiar con el PIB, la inversión en salud y la esperanza de vida y en negativo con el índice GINI, la anemia, la mortalidad en menores de 5 años, la razón de mortalidad materna y la mortalidad en accidentes en tránsito. El PIB per cápita se relaciona negativamente con la anemia, la mortalidad en menores de 5 años, razón de mortalidad materna y por accidentes y menos intensamente con la mortalidad cardiovascular y el suicidio. No se observan correlaciones con el gasto de bolsillo o la inversión en sanidad. A pesar de las diferentes realidades socio sanitarias de los países estudiados se objetiva una relación favorable entre la disponibilidad de especialistas en Medicina Familiar y mejores resultados en salud lo que sugiere que puede ser una estrategia eficiente para los servicios sanitarios. Son necesarios más estudios que analicen el alcance estadístico de esta asociación.

Palabras clave: Medicina Familiar; Atención Primaria; Eficiencia; Economía de la Salud

Resumo

São poucos os estudos que abordam a importância, economica e a sanitária, que tem o modelo organizacional de um nível de atenção ou a presença de determinados profissionais. O objetivo do presente estudo, de caráter descritivo e transversal, foi explorar e analisar as possíveis associações entre a especialidade de medicina de família e indicadores econômicos e de saúde em 16 países da Ibero-América. O processamento de dados foi realizado através do programa R, uma linguagem de programação que mostra "um conjunto de funções que mantém algum tipo de relação entre elas". Existe uma associação positive em relação ao número de especialistas em medicina de família com o PIB, investimento em saúde e expectativa de vida e em negativo com o índice GINI, anemia, mortalidade em crianças menores de 5 anos, a razão de mortalidade materna e mortalidade em acidentes em trânsito. O PIB per capita está negativamente relacionado à anemia, mortalidade em crianças menores de 5 anos, taxa de mortalidade materna e por acidentes e menos intensamente com mortalidade cardiovascular e o suicídio. Não se observaram correlações com despesas reembolsáveis ou investimentos em assistência médica. Apesar das diferentes realidades sociais e de saúde dos países estudados, uma relação favorável é encontrada entre a disponibilidade de especialistas em Medicina de Família e melhores resultados em saúde, o que sugere ser esta uma estratégia eficiente para os serviços sanitários. Mais estudos são necessários para analisar o escopo estatístico desta associação.

Palavras-chave: Medicina de Família; Atenção Primária; Eficiência; Economia da Saúde

Introduction

The World Health Organization (WHO) in its World Health Report 2003 states that a health system based in primary care should incorporate the principles of the Alma Ata Declaration of "Equity, Universal Access, Community Participation and Intersectoral Action". It should take into consideration general sanitary issues of the population scope and will organize an integrated assistance that will connect prevention, care for the acutely ill and care for the chronically ill in all elements of the health system; it will continually assess the situation to try to improve performance".[1] However, today, 40 years later, primary care has not reached any country or sufficient development or the proposed objectives.

The challenges faced by sanitary systems throughout the world and specifically in the Ibero-American scope are formidable. The most important challenge is to adequate health services to the needs of citizens, which requires reducing inequalities in health results and, while ensuring sustainability, also seeking to increase the financing of health systems.[2]

These challenges obligate us to deepen the rigorous economic analysis by incorporating into the sanitary world economic instruments and indicators that compare the product of health services with its

costs. This results in cost-effectiveness, cost-benefit and cost-utility analysis of the interventions, which facilitate a better allocation of resources and therefore serve as a basis for accounting and evaluating the cost of the provisions, planning decision-making and analyzing the financing of health systems. There are several mechanisms and several types of economic analysis useful for the measurement of economic impacts, such as direct costing, default, absorption, normalized real, integrated real and ABC, among others. Each of these, however, can present great differences for the same illness or benefit; even if common age groups are analyzed, the variations can be very broad.[3]

Most of the studies related to economic evaluations have been carried out in specific processes or specific activities, so analyzing the economic implication of a level of care in a given health system is a complex process with indirect variables. An exploratory study was carried out on the association that Family Medicine (FM) specialists have in the health systems of the countries part of the Ibero-American Confederation of Family Medicine.

In previous studies, other authors such as B. Starfield and J. Macinko[4,5] in the United States (USA) demonstrated that the provision of primary care physicians was associated with better health results, in all-cause mortality, cancer, heart disease, stroke and infant mortality. It was also showed that in Europe, the GDP and the number of family doctors was associated independently, with reductions in the potential years of life lost and with mortality from all causes.[6]

Methods

This is a descriptive and cross-sectional study that explores the relation between health and economic indicators with the presence of family medicine specialists in the health systems of 16 countries in Ibero-America.

Based on the availability of indicators and reports from WHO[1] from the Ministries of Health of the different countries, evaluations of Scientific Societies, Eurostat[7] and the World Bank,[8] the following were elected:

Macroeconomic Indicators

Gross Domestic Product (GDP). It is the most relevant indicator to measure the economic activity and the economic evolution of a country and also serves as a reference to compare the economic situation of the country with the region. The percentage of the GDP destined for Health in each country is also included.

GINI index. It is the most widely used indicator worldwide to measure inequality of income (and for any other type of inequality). It can oscillate between the 0 (zero) that expresses the perfect equality and the value of 100 (a hundred) for the maximum possible inequality.[9]

Pocket expense. It is considered as such the disbursement made by the families in the last year for medical attention, medicines, complementary tests, etc.

Sanitary Indicators

- Number of Family Physicians per 100,000 inhabitants.
- Expectation of life or life expectancy.
- Tracer Diseases. For the Pan-American Health Organization (PAHO) there are tracer diseases that may be representative of the health level of a country. They are the following: prevalence of anemia in children under 5 years of age, maternal mortality ratio (number of maternal deaths per 100.00 live births); mortality rate in children under 5 years, mortality from cardiovascular diseases and mortality due to suicide and traffic accidents.

The relation between the economic indicators, the health indicators and the FM availability indicator for 16 countries members of the CIMF were explored: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Spain, Mexico, Nicaragua, Panama, Peru, Portugal, Paraguay and Uruguay.[6] The data correspond to the year 2015, being this the last year with complete data for all countries. The statistical processing was carried out with the programming language and R statistical analysis (R Core Team, 2017).[10] R is a programming language that is equipped with a set of tools for the calculation and generation of statistical graphs that show "a set of functions that maintain some type of relation between them".

As it is a review without patient participation, no approval was requested from any Research Ethics Committee. In any case, the procedures followed were carried out in accordance with the ethical standards of the World Medical Association and the Declaration of Helsinki.

Results

Table 1 includes 12 indicators that can allow us to compare the sanitary and economic situation among the different countries.

Before proceeding to the analysis of Figure 1, it is important to clarify that the size of the circle, the color and its intensity mark the relation between variables. And so the blue color indicates a direct relation and the red color indicates an inverse relation. The larger the circle, the greater the association, as well as the intensity of the color (the more intense the greater the relation). It is possible to see how the size of the circle, the intensity of the color and in this case the blue color are maximum when comparing the same variables (MF with MF, GDP with GDP, etc.). Considering the exploratory nature of this study and the methodological difficulties involved with this type of research, we evaluate that the main fact is not in the degree of association *per se*, but in the relation found that has content validity, considering previous studies.[4-6]

Figure 1 highlights the close relation between the number of positive number of family doctors with GDP per capita and life expectancy and negative with the GINI index, anemia, mortality in children under 5 years, maternal mortality ratio and traffic mortality. GDP per capita is also negatively related to anemia, mortality in children under 5 years old, maternal mortality ratio and traffic accidents, and less intensely with cardiovascular mortality and suicide. No correlations are observed or these are very, very slight in other indicators such as pocket expense or investment in health.

Table 1. Socio-sanitary indicators by country.

Country	MF	GDP(pp)	GBolsillo	GINI	InvSalud	ExpVida	Anemia	MorMen	MorCVD	MorTransito	RMM	Suicidio
ARG	14.3	13,467.1	30.7	42.7	4.8	78.3	21.4	11.6	17	14.1	52	14.2
BOL	5	3,077	23.1	45.8	6.3	68.7	47.5	38.2	16	23.3	206	18.7
BRA	2.7	8,757.2	25.5	51.3	8.3	75.2	24.3	15.7	17	22.6	44	6.3
CHL	5.6	13,653.2	31.5	47.7	7.8	79.2	19.5	8.4	11	11.6	22	9.9
COL	1.2	6,044.5	15.4	51.1	7.2	74.2	26.8	15.8	15	18.9	64	6.1
CRI	3.4	11,406.4	24.9	48.2	9.3	79.6	28.5	9.1	11	14.9	25	0.7
RDOM	0.1	6,468.5	21.1	44.9	4.4	73.7	27.7	31.5	19	27.8	92	6.8
ECU	6.2	6,150.2	48.4	46.5	9.2	76.1	27.9	21.5	13	20.7	64	7.5
ESP	74.8	25,787.9	24	36	9	83.4	12.4	3.4	10	3.6	5	8.5
MEX	34.2	9,152.9	44	48.2	6.3	76.9	27.7	15	15	11.8	38	5
NIC	1.7	2,096	37.5	46.6	9	75	28.4	20.3	16	14.9	150	9.5
PAN	2	13,134	22.3	51	8	77.8	28.6	6.9	14	10.7	94	5.5
PER	3.1	6,030.3	28.6	44.3	5.5	74.7	32.8	16	13	13.3	68	5.8
PRT	53.6	19,252.6	26.8	35.6	9.5	81.5	12.8	3.5	11	7.7	0	13.6
PRY	4.1	4,109.4	49.4	48	9.8	73	25	20.6	18	23.4	132	10.2
URY	14.6	15,524.8	15.6	41.7	8.6	77.1	22.4	9.3	17	17.4	15	17

Own elaboration from published data based on data obtained in WHO,[1] Eurostat[7] and the World Bank.[8]

ARG: Argentina; BOL: Bolivia; BRA: Brazil; CHL: Chile; COL: Colombia; CRI: Costa Rica; RDOM: Dominican Republic; ECU: Ecuador; ESP: Spain; MEX: Mexico; NIC: Nicaragua; PAN: Panama; PER: Peru; PRT: Portugal; PRY: Paraguay and URY: Uruguay.

MF: number of specialists in family and community medicine/100,000 inhabitants; **GDP(pp):** gross domestic product per capita (in dollars); **GBolsillo:** Pocket Expense (in dollars); **GINI:** GINI index; **InvSalud:** percentage of GDP destined to health expenditure; **MorIMen:** Mortality Under 5 years old; **ExpVida:** life expectancy; **MorCVD:** cardiovascular mortality; **MorTransito:** Mortality due to traffic accidents; **RMM:** Reason for Maternal Mortality.

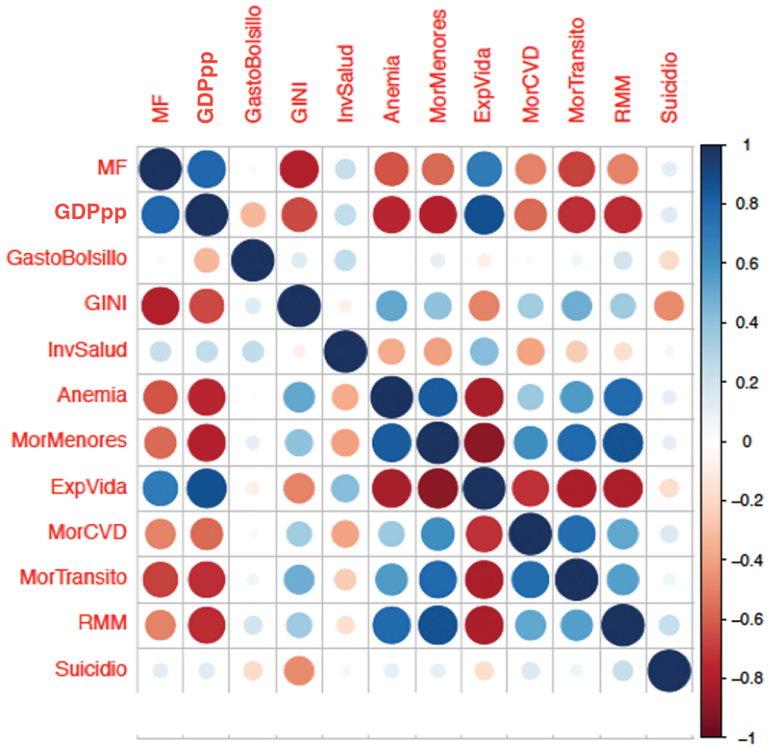

Figure 1. Relation between macroeconomic and sanitary indicators.

MF: number of specialists in family medicine/100,000 inhabitants; **GDP(pp)**: Gross Domestic Product per capita (in dollars); **GBolsillo:** Pocket Expense (in dollars); **GINI:** GINI index; **InvSalud:** percentage of GDP destined to health expenditure; **MorIMen:** Mortality Under 5 years old; **ExpVida:** life expectancy; **MorCVD:** cardiovascular mortality; **MorTransito:** Mortality due to traffic accidents; **RMM:** Reason for Maternal Mortality.

Figure 2 corresponds to the matrix of scatter plots of the availability of Family Physicians and economic indicators, allowing to explore the association between them, the scales of each of the indicators are indicated by the numbers located at the edges of the matrix. The tables in the first column show how the economic indicators vary according to the availability of Family Physicians. Reciprocally, the tables in the first row show how the availability of Family Physicians varies according to the economic indicators. The diagonal tables show distribution histograms of the data for each one of the indicators, the first diagonal table above shows that most countries have Family Physicians availability figures below 15 per 100,000 inhabitants; the second diagonal table shows for the GDP per capita around US$ 7,000; the third diagonal table shows for the pocket expense a mode around 20%; the fourth diagonal table shows that the GINI index has a mode around 45; finally for the histogram of the percentage of GDP invested in health mode is between 8 and 10.

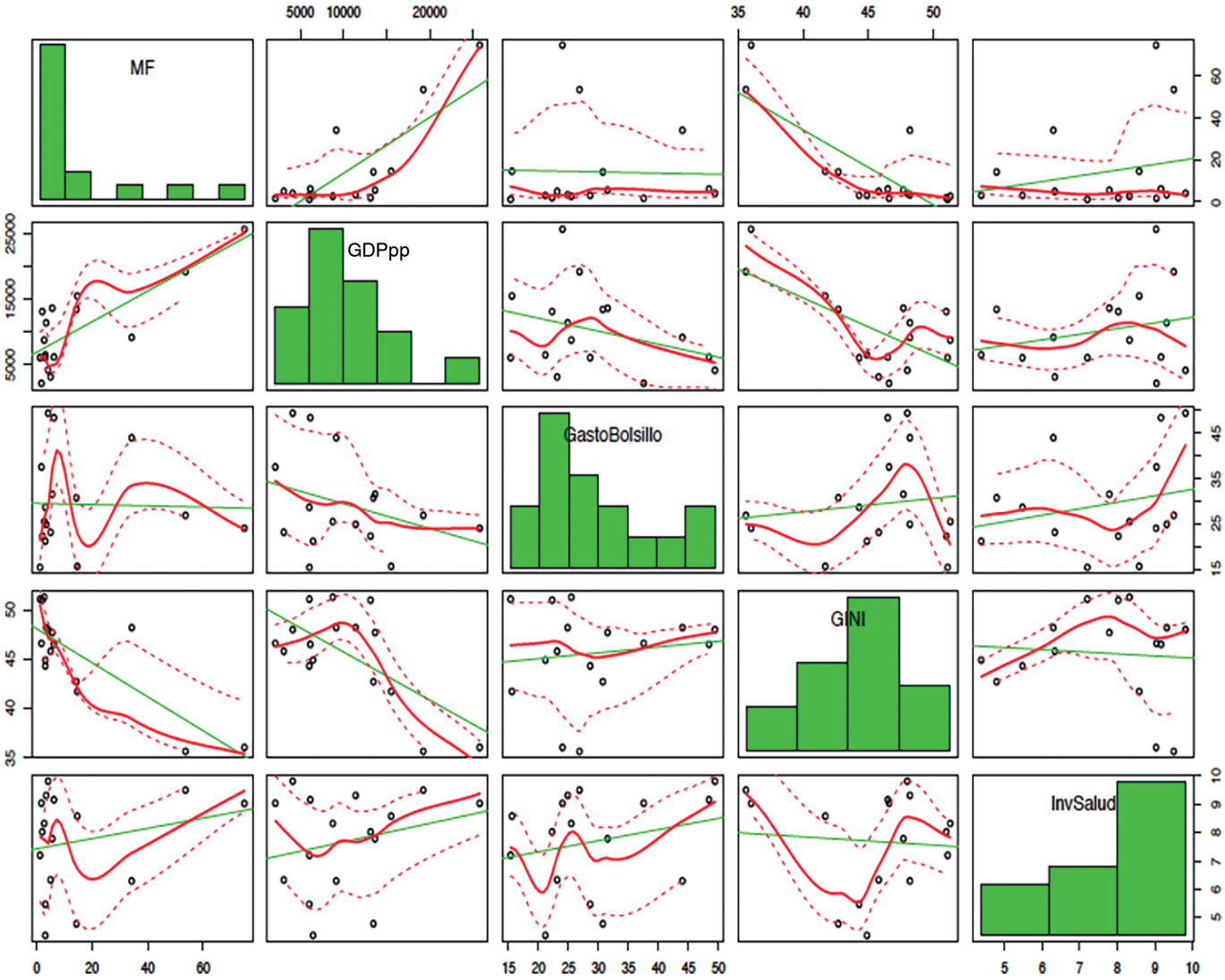

Figure 2. Matrix of FM scatter plots with economic indicators.
MF: number of specialists in family medicine/100,000 inhabitants; **GDP(pp)**: Gross Domestic Product per capita (in dollars); **GBolsillo:** Pocket Expense (in dollars); **GINI:** GINI index; **InvSalud:** percentage of GDP destined to health expenditure.

Figure 3 allows exploring the association between the quantity or availability of medical specialists in Family Medicine and the main socio-health indicators. The tables in the first column show in their order how the socio-health indicators vary according to the Family Physicians, the diagonal tables show the distribution of the data of each of the indicators.

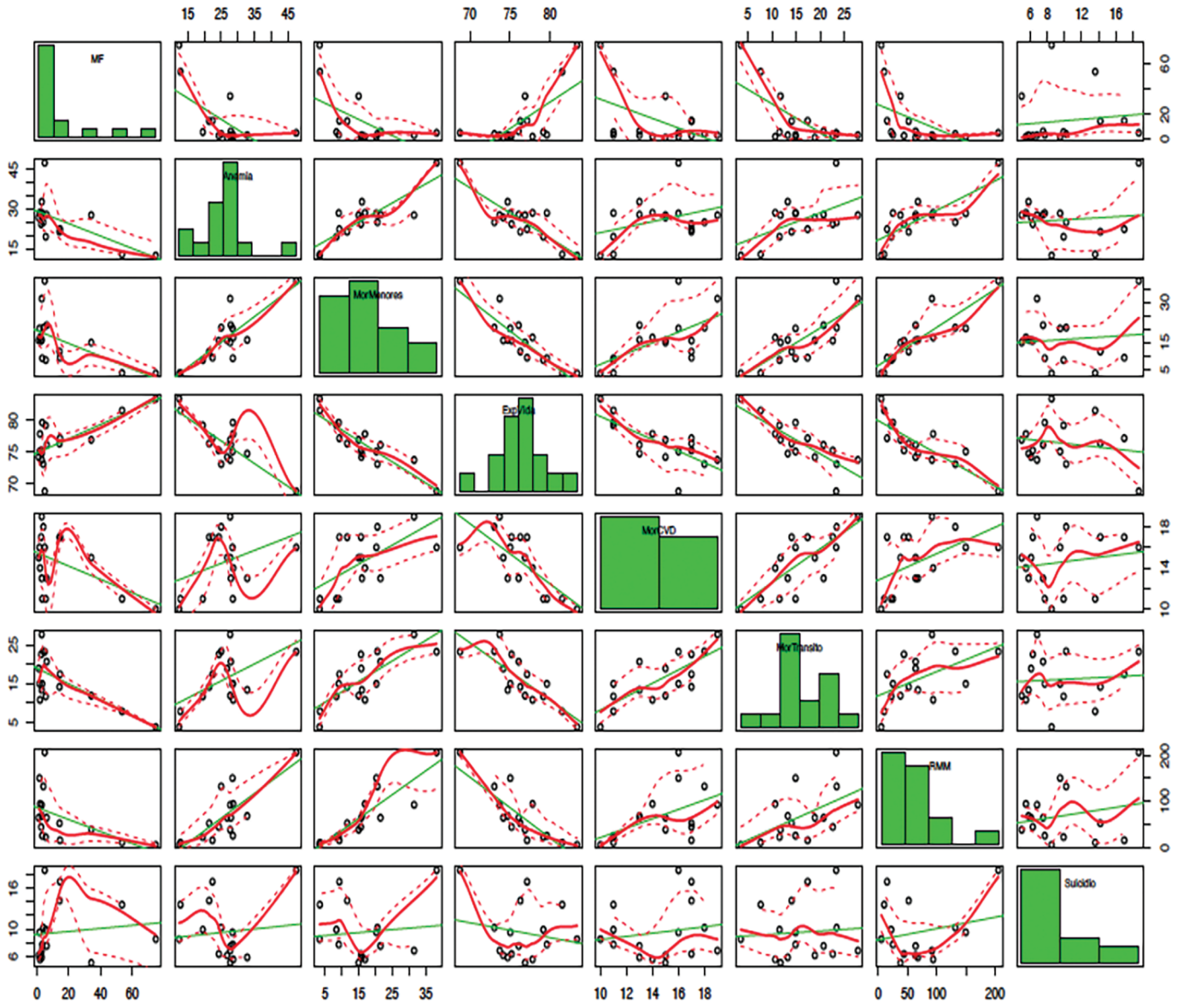

Figure 3. Matrix of scatter plots with economic indicators.
MF: number of specialists in family medicine/100,000 inhabitants; **GDP(pp)**: Gross Domestic Product per capita (in dollars); **GBolsillo:** Pocket Expense (in dollars); **GINI:** GINI index; **InvSalud:** percentage of GDP destined to health expenditure; **MorIMen:** Mortality Under 5 years old; **ExpVida:** life expectancy; **MorCVD:** cardiovascular mortality; **MorTransito:** Mortality due to traffic accidents; **RMM:** Reason for Maternal Mortality.

Discussion

The present work is the first analysis that explores the relation between the availability of specialists in Family Medicine, economic and health indicators among the countries that are part of the Ibero-American Confederation of Family Medicine (CIMF). A positive association between the availability of family doctors

and GDP per capita is suggested, which, in turn, translates into notable improvements in “hard” indicators (cardiovascular mortality, under-five mortality, life expectancy, among others) of public health.

If the analysis were limited only to the ratio between GDP per capita and number of family doctors, it could be mistakenly misinterpreted that the availability of Family Doctors is a “luxury good”, that is, only the countries with the highest GDP and therefore richer can afford to increase the number of family doctors. However, this relation is not linear since, given the GDP equality, it seems that a greater availability of specialists in Family Medicine is associated with an increase in life expectancy and a reduction in the rate of anemia and mortality in children below five years-old; cardiovascular mortality; mortality due to traffic accidents and maternal mortality.

As mentioned previously, the results found coincide with the results obtained by B. Starfield y J. Macinko.[4-6] in the United States (USA). They demonstrated that the provision of primary care physicians was associated with better health results, in all-cause mortality, cancer, heart disease, stroke and infant mortality. This relation was maintained regardless of the year (1980-1995) or the level of analysis (state, county, metropolitan statistical area). The combined results for all-cause mortality suggest that an increase of one primary care physician per 10,000 population was associated with an average mortality reduction of 5.3 percent. The same authors showed that also in Europe, the GDP and number of family doctors were associated independently, with reductions in the potential years of life lost and with all-cause mortality.

More recently, Chetty et al.,[11] also in the USA, describe that adding one more family doctor per 1,000 inhabitants (or 100 per 100,000) adjusted for sociodemographic factors, hospital characteristics, and mortality rates reduces income from pneumonia, acute stroke, of myocardium and heart failure by 7.5 and 8% respectively.

As for Europe, L. Vallejo[12] will publish this year an investigation based on the follow-up of a cohort of people over 50 years-old living in England, who were interviewed every two years. The data correspond to the periods 2004-2005; 2006-2007 and 2008-2009. The socio-demographic indicators added 35 quality indicators of processes that corresponded to 13 medical conditions. These indicators were chosen based on prevalence, possibility of prevention and/or treatment, importance in the elderly, the possibility of measuring it and the potential for improving its quality. They are very common clinical indicators in primary care (hypertension, diabetes, dyslipidemia) to which they added two indicators of resources: density of family doctors: number of family doctors per 1,000 inhabitants and distance to the health center. They concluded that a higher density of family doctors was associated with the quality of care and distance to the family doctor presents a negative association (at greater distance worse results). These effects were concentrated in cardiovascular diseases, osteoarthritis, diabetes, incontinence and hearing problems.[12]

Our work highlights a very intense negative relation between the GINI and the availability of family doctors. The relation between GDP and health, as well as the GINI index or other indexes of income inequalities, has been analyzed in many publications, but without relating them to the model of health organization in each country or the allocation of certain professionals. Jutz[13] compares the situation in 42

European countries and concludes that inequalities in income have more impact on health inequalities than social policies. Bergquvist et al.[14] found that social and health expenditures are associated with better health levels and lower inequalities, although they draw attention to the importance of health policies (like other authors).[15,16] A recent work done by Christopher, USA, assesses the effect of pocket expenses on income inequality. It describes that, in 2014, the GINI index was 47.84 and rose to 49.21 after deducting medical expenses. This pocket expense reduced the average income of the poorest decile by 47.6%, compared to 2.7% of the richest decile, pushing 7,013 million people into poverty.[17] In Brazil, Boing[18] analyzes pocket expenses according to the household expenditure survey for 2002-2003 and 2008-2009, using the World Bank poverty criterion (per capita income per day below US$ 2.34 in 2002-2003) and of US$ 3.54 in 2008-2009). The increase in poverty in the years 2002-2003 was 2.6 percentage points (6.8%) and 2.3 percentage points (11.6%) for the years 2008-2009. This increase occurred because of medicine expenses. In our case, no association was found between the number of family doctors and pocket expenses. This work does not analyze the health determinants and the relation between economic**,** social and health factors, especially when this relation is extraordinarily complex and does not depend on a single factor.[19,20]

This study presents some limitations to be taken into consideration:

1. The variability between the different countries, both in economic and health indicators, hinders comparability;
2. The indicators included were those available for the 16 countries and it was not possible to incorporate other social determinants that may explain better the differences in health results among the countries;
3. It is very difficult to measure the impact of family medicine on the health system when many countries of the Ibero-American region (CIMF) have less than 10 family doctors per 100,000 inhabitants;
4. The objective of this work is limited to exploring together the family, economic and health doctors indicators, for which graphic tools have been used, identifying some possible associations, however, considering that these are indicators at the national level, other statistical tools that allow to quantify the associations observed in future studies.

The VII CIMF Summit held recently in Cali concluded that although the availability of physicians was a rough indicator since it does not provide information on performance, functions or roles, the results showed that the best health results were obtained in countries with greater availability of specialists in Family Medicine and higher GDP per capita, so they recommended reaching the minimum figure in the short term (9-10 years) of all the countries of the Confederation of 15 FM per 100,000 inhabitants.

For future studies it is suggested to incorporate other indicators that help to analyze more accurately the role of family medicine in the health system: portfolio of services, resolution capacity, health expenditure in primary care versus other levels of care, organizational models of each country.

Conclusions

The social and health realities of the countries of the region are diverse and with political imprints that directly and indirectly impact the health of the populations. While the relationships between economic indicators such as pocket spending and the percentage of GDP of investment in health with health indicators show unclear trends, highlight the favorable relation between the availability of specialists in Family Medicine and health results, suggesting that this it is a concrete, efficient strategy and available to all countries to convert economic investment into health outcomes.

Clinical efficiency depends on the maximization of the quality of care and user satisfaction with the lowest possible social costs. The path to social efficiency goes through clinical effectiveness and that seems to be intimately related to the number and professional characteristics of family medicine.

It should be a reason for reflection in the circles where the policies and resources of the health sector are debated, established and evaluated that the availability of specialists in Family Medicine is a consistent and sensitive marker of quality, equity and efficiency of health systems.

More studies are needed, with more precise and homogeneous indicators that allow deepening the analysis of the family medicine specialists' contributions to the efficiency of health services and to the improvement of the health of citizens.

References

1. Sistemas de Salud: principios para una atención integrada. En Informe sobre la salud en el mundo 2003. Forjemos el futuro. Organización Mundial de la Salud; Ginebra. 2003. p. 115-146.
2. Atun R, de Andrade LO, Almeida G, Cotlear D, Dmytraczenko T, Frenz P et al. Health-system reform and universal health coverage in Latin America. Lancet 2015, 385(9974): 1230-1247. http://dx.doi.org/10.1016/S0140-6736(14)61646-9
3. Puig Junoy J, Pinto Prades JL, Ortún Rubio V. El análisis coste-beneficio en sanidad. Aten Primaria 2001; 27(6):422-7. http://dx.doi.org/10.1016/S0212-6567(01)78825-7
4. Starfield B, Shi L, Macinko J. Contribution of Primary Care to Health Systems and Health. Milbank Q. 2005; 83(3):457-502. http://dx.doi.org/10.1111/j.1468-0009.2005.00409.x
5. Macinko J, Starfield B, Shi L. Quantifying the health benefits of primary care physician supply in the United States. Int J Health Serv. 2007;37(1):111-26. http://dx.doi.org/10.2190/3431-G6T7-37M8-P224
6. Macinko J, Starfield B, Shi L. The Contribution of Primary Care Systems to Health Outcomes within Organization for Economic Cooperation and Development (OECD) Countries, 1970–1998. Health Serv Res. 2003; 38(3):831-865. http://dx.doi.org/10.1111/1475-6773.00149
7. Organization for Economic Co-Operation and Development. OECD-STAT[Internet]. Consultado 20 febrero 2018. Disponible en: https://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT#.
8. The World Bank [Internet]. Consultado 27 febrero 2018.Disponible https://data.worldbank.org/
9. Szwarcwald C L. On the World Health Organization's measurement of health inequalities. J Epidemiol Community Health. 2002;56(3):177-182.
10. R Development Core Team (2011), R: A Language and Environment for Statistical Computing. Vienna, Austria: The R Foundation for Statistical Computing. ISBN: 3-900051-07-0. Acceso 18 enero 2018. Disponible en http://www.R-project.org/.
11. Chetty VK; Culpepper L, Phillips RL, Rankin J, Xieral I, Finnegan S et al. FPs Lower Hospital Readmission Rates and Costs. Am Fam Physician. 2011;83(9):1054.
12. Vallejo-Torres L. Morris S. Primary care supply and quality of care in England. Eur J Health Econ. 2018;19(4):499-519. http://dx.doi.org/10.1007/s10198-017-0898-2

13. Jutz R. The role of income inequality and social policies on income-related health in equalities in Europe. Int J Equity Health. 2015 ;14:117. http://dx.doi.org/10.1186/s12939-015-0247-y

14. Bergqvist K, Yngwe MA, Lundberg O. Understanding the role of welfare state characteristics for health and inequalities – an analytical review. BMC Public Health. 2013; 13:1234. http://dx.doi.org/10.1186/1471-2458-13-1234

15. Navarro V, Shi L. The political context of social inequalities and health. Soc Sci Med. 2001; 52(3):481-91. Sociol Health Illn. 2011;33(6):946-64.

16. Muntaner C, Borrell C, Ng E, Chung H, Espelt A, Rodriguez-Sanz M, et al. Politics, welfare regimes, and population health: controversies and evidence. Sociol Healt Illn 2011;33(6): 946-64. http://dx.doi.org/10.1111/j.1467-9566.2011.01339.x

17. Christopher AS, Himmelstein DU, Woolhandler S, McCormick D. The Effects of Household Medical Expenditures on Income Inequality in the United States. Am J Public Health 2018; 108 (3):351-354. http://dx.doi.org/10.2105/AJPH.2017.304213

18. Boing AC, Bertoldi AD, Posenato LG, Peres KG. La influencia de los gastos de salud en el empobrecimiento de los hogares en Brasil. Rev Saude Publica. 2014; 48(5):797-807. http://dx.doi.org/10.1590/S0034-8910.2014048005113

19. Hu Y, van Lenthe FJ, Mackenbach JP. Income inequality, life expectancy and cause-specific mortality in 43 European countries, 1987–2008: a fixed effects study. Eur J Epidemiol 2015; 30(8):615-625. http://dx.doi.org/10.1007/s10654-015-0066-x

20. Paykani T, Rafiey H, Sajjadi H. A fuzzy set qualitative comparative analysis of 131 countries: which configuration of the structural conditions can explain health better? Int J Equity Health. 2018; 17(1):10.