How Can We Isolate and Measure the Personal Health Care Component?

¿Cómo aislar y medir el componente de atención personal de salud?

The good physician treats the disease; the great physician treats the patient who has the disease.

William Osler(1943-1970)

INTRODUCTION

The health of a nation's population is determined by multiple and complex situations, but it could be divided into three main groups, from the most general and comprising to individual personal health.

Salim Yusuf refers to this as exploring " the causes of causes (referring to which are the causes of risk factors). This means looking at the social determinants of health and environmental factors and their influence on health behaviors, risk factors, and disease." (1) Or what is called the a) *socio-economic determinants of health*. Health is also influenced by the b) determinants of the population health care policy adopted by each state within its historical socio-economic development conditions. And the final link in the chain depends on the (c) *determinants of personal health care policy*, on the one hand with regard to the level of accessibility to health care that depends on what the health care system provides, and on the other, but not less important, on the quality of care provided by health care professionals.

"Much debate exists concerning the relative contributions of personal health care, health initiatives at the population level, and social determinants of population health." (2)

Isolating and measuring personal health care from the rest of the health components would allow quantifying how much personal health care could improve population health and ultimately the health-system performance. This is a crucial undertaking to achieve the World Health Organization (WHO) target of "universal health coverage" (UHC) for all countries, in the Sustainable Development Goals (SDGs).

Over the past decades, to isolate personal health care results from the other determinants, national levels of personal health care access and quality were approximated by measuring mortality rates from causes that should not be fatal in the presence of effective medical care (tuberculosis, measles, maternal and neonatal disorders, several cancers as testicular, skin, and cervical cancers, and many non-communicable diseases such as cerebrovascular disease, diabetes, and chronic kidney disease).

During the late 1970s, Rutstein et al. developed an initial list of conditions from which, in the presence of timely and effective care, death is "unnecessary", a concept initially applied in England and Wales. Nowadays, the most widely used cause list of 33 conditions was developed by Nolte and McKee during the mid-2000s. Such analysis of health care access and quality, as approximated by amenable mortality, has been limited to highly developed countries, as the Organization for Economic Co-operation and Development (OECD) countries, Europe, USA, Australia, and New Zealand.

These studies acknowledged several methodological challenges that hampered the utility and applications of their results, as high heterogeneity in cause of death certification and misclassification errors, even in countries with complete vital registration systems. The other problem was that variations in measured amenable mortality rates might be more reflective of differences in underlying risk factor exposure rather than true differences in personal health care access and quality.

We shall analyze how the Global Burden of Disease (GBD) 2015 Healthcare Access and Quality Collaborators solved this problem. (2)

CONTRIBUTION OF THE GLOBAL BURDEN OF DISEASE TO AN INDICATOR OF PERSONAL HEALTH CARE

The Global Burden of Disease developed an appropriate analytical framework to address and neutralize the main confounders in the approximation to personal health care access and quality.

Firstly, the GBD provided comprehensive, comparable estimates of death rates for geographic causes, year, age, and sex through extensive data processing and standardization that allowed for the systematic identification and redress of cause of death certification errors or misclassification. These adjustments were conducted across all geographies and over time, accounting for known misclassification patterns and applying well established redistribution algorithms for causes designated as "garbage" codes, or causes of death that could not or should not be classified as underlying causes of death.

Secondly, to remove variations in death rates due to risk exposure rather than differences in personal health care access and quality, the GBD used the quantification of risk exposure and risk-attributable deaths due to 79 selected risk factors to build a mor-

tality rate for specific standardized causes. This approach allowed a similar global risk exposure across geographies and time, thus helping to isolate variations in mortality rates due to personal health care access and quality.

As a third step, the GBD developed the Healthcare Access and Quality (HAQ) Index based on cause-specific death rates over time and by geography for each of the 30 specific causes of disease in a scale from 0 to 100, with "100" being the best value (lowest observed mortality rate) and "0" being the worst value (highest observed mortality rate) between 1990 and 2015 in 195 countries.

The GBD also examined the relationship between the measures of health care access and quality, as defined by risk-standardized mortality rates amenable to health care, across development levels, as reflected by the Socio-Demographic Index (SDI) which indicates measures of development, as income per capita, education and birth rate.

Finally, they produced the HAQ Index frontier, to enable a better understanding of the maximum observed levels across the Socio-Demographic Index (SDI) and the possible potential improvement achieved in personal health care access and quality in a country or territory with similar resources.

Global Burden of Disease methodology

The GBD evaluated 30 causes of the Nolte and McKee cause list from 1990 to 2015 and used cause and age specific-standardized mortality rates obtained from the wide range of GBD Risk Factors normalized to the global level of risk exposure.

To build the HAQ Index, the age- and cause risk-standardized death rate was first rescaled from 0 to 100, such that the highest observed value from 1990 to 2015 was 0 and the lowest 100. To avoid the effects of fluctuations, populations of less than 1 million people were excluded from setting minimum and maximum values.

The GBD quantified the maximum observed levels of the HAQ Index across the development spectrum by geography and reported the maximum possible HAQ Index value based on SDI in 1990 and 2015 in order to evaluate how changes in health care access and quality are associated with the development of the country over the time.

This estimation process was expressed with 2.5 and 97.5 "Uncertainty Intervals" (UIs) accompanying each point estimate of death by geographic cause, year, age group and sex.

RESULTS OF THE GLOBAL BURDEN OF DISEASE

Andorra and Iceland had the highest HAQ Index in 1990, whereas most of sub-Saharan Africa and south Asia and several countries in Latin America and the Caribbean were in the first decile (the lowest, worst index). By 2015, nearly all countries and territories saw increases in their HAQ Index, but the gap between the highest and lowest HAQ Index levels was wider in 2015 (66.0) than in 1990 (61.6).

The tenth decile was the best and included many countries of Western Europe, Canada, Japan, and Australia, while surprisingly the UK and the USA were not in the highest decile but in the ninth decile.

The analysis of Latin American and the Caribbean countries had very different HAQ Index levels, spanning from Haiti (first decile) to Chile (seventh decile). By 2015, countries from different regions increased their HAQ Index. For example, Turkey and several countries in the Middle East and Eastern Europe improved to the eighth decile, China and Thailand rose to the seventh decile and Vietnam and Malaysia reached the sixth decile.

Different countries of Africa rose from their positions in 1990 and had the highest HAQ Index levels in 2015: in sub-Saharan Africa, Cape Verde (fifth decile), and Namibia, South Africa, Gabon and Mauritania (fourth decile). In turn, many sub-Saharan African countries remained in the first decile in 2015, including the Democratic Republic of the Congo, Niger, and Zambia. Moreover, in Asia and the Pacific, a number of countries also experienced relatively low HAQ index levels: Afghanistan and Papua New Guinea (first decile); Pakistan and India (second decile); and Indonesia, Cambodia, and Myanmar (third decile).

FINDINGS IN ARGENTINA

Argentina had a HAQ Index of 68 (in the seventh decile) in 2015.

Table 1 shows the "absolute HAQ Index" of Argentina for each 5-year interval from 1990 to 2015, the "potential index" if it were similar to frontier countries (with better HAQ for similar economic development) in 1990 and 2015 and the difference between observed and potential HAQ Index values in the same years (1990-2015), compared with what was globally observed worldwide and in different Latin American countries.

Argentina had a HAQ Index in 1990 that was similar to the global HAQ Index (-1.4; 57.4 to 58.8) and moved further and further away (-7.6; 68.4 to 76.0). In turn, the difference between the observed HAQ and the potential HAQ that was similar to the global index in 1990 (15.9 to 15.0) remained almost unchanged in 2015 (13.5) whereas it showed a drastic reduction worldwide (8.5).

Compared with 4 Latin American countries, the HAQ index had a lower value than Uruguay and Cuba (60.8 and 64.1, respectively) in 1990 and was significantly better than that of Brazil and Peru (50.1 and 45.9, respectively). In 2015 the difference with Uruguay and Cuba remained unchanged because these countries had a higher reduction between the observed and the potential index. Brazil reduced the difference with Argentina by 50% and Peru surprisingly improved the difference and overcame Argentina (from 11.5 in favor of Argentina to 1.2 against it)

Table 1. Evolution of the HAQ Index compared with the Global index and with different Latin American countries.

	HAQ Index					HaQ Index Frontier		Dif. Obs. and frontier	
	1990	1995	2000	2010	2015	1990	2015	1990	2015
Global	58.8	64.2	69.2	72.0	73.9	76.0	73.8	84.5	8.5
Argentina	57.4	60.3	63.5	65.3	66.6	68.4	73.3	81.9	13.5
Brazil	50.1	53.8	57.0	59.9	62.6	64.9	63.8	74.7	9.8
Uruguay	60.8	63.1	67.1	68.7	70.6	72.0	72.5	79.7	7.7
Cuba	64.1	65.2	67.7	70.5	72.1	73.5	74.8	81.5	7.9
Peru	45.9	49.8	57.1	62.7	65.9	69.6	66.7	76.8	7.2

We could now evaluate the HAQ index for each of the 30 amenable causes of disease, considering that "100" would be the best value (the lowest mortality observed) and "0" would be the worst value (the highest mortality observed) between 1990 and 2015 for the same Latin American countries (Argentina, Brazil, Uruguay, Cuba and Peru).

Health care access and quality for epidemic infectious diseases is the highest in the 5 countries for diphtheria and measles and almost the highest for tetanus. For whooping cough, health care access and quality is maximal in Cuba, high in Uruguay (97) and Brazil (93) and lower in Argentina (88) and Peru (87). Health care access and quality for tuberculosis treatment is high in Cuba (94), followed by Uruguay (80) and Argentina (76); it is inadequate in Brazil (65) and deficient in Peru (54).

Important deficiencies exist for the treatment of lower respiratory infections in Argentina (38) and Brazil (43), compared with the high index observed in Uruguay, Cuba and Peru (96).

Of importance, access and treatment of cervical cancer is in intermediate values (above 50) in the 5 countries, and probably this disease can be more prevalent in young populations living in poverty conditions.

Argentina is the country with the worst performance in personal health care of cardiac rheumatic disease (52) and testicular cancer (31).

Health care access and quality for chronic kidney disease is poor in the 5 countries (HAQ index around 50).

OBJECTIONS

In an editorial of this report, Goodyear-Smith and van Weel (3) state that: "This is a robust design that provides a novel way of looking at changes in personal health-care access and quality for high-resource and low-resource countries over time, and provides a snapshot of how personal health care improves as countries become more developed. We applaud a method that gives insight in how health care, public health, and socioeconomic development contribute to population health.

The HAQ Index shows great promise, but is a very broad brush for measuring personal health care, and its assessment of criterion-based validity will prove difficult. There is considerable heterogeneity, especially when deaths from infectious diseases and non-communicable diseases are combined. Most non-communicable diseases require a personal as well as a population approach to affect risk-enhancing lifestyles and customs. This is a core component of primary health care. In many countries, strengthening of primary health care has resulted in an increase of vaccination rates and safe motherhood care, resulting in a lowering of avoidable infant and maternal mortality, for example in Egypt (4) and Sri Lanka (5). Controlling for the effect of prevention in assessing the effects of personal health care, as the authors did in their calculations of the HAQ Index, might have ignored this important contribution of person-centered primary health care. This highlights the bridging role of primary health care between individual and population needs (6, 7) and the contribution individual health care makes to population health. As well as not distinguishing between population and personal health-care measures, the HAQ Index is not able to sufficiently differentiate mortality reductions due to primary versus secondary care...

... There is the danger of throwing out the baby with the bathwater, if the specific contribution of primary health care is ignored."

CONCLUSIONS

The researchers of the GBD conclude that: "Globally, most countries and territories recorded gains in personal health-care access and quality from 1990 to 2015, yet many still experienced levels that fell well below what has been achieved by geographies at a similar development status.

Amid calls to improve monitoring of universal health coverage and overall health-system performance, the HAQ Index provides a strong basis for benchmarking progress toward greater access and higher-quality personal health care alongside country-level gains in resources to achieve these aims." (2)

Argentina had a HAQ Index of 68 (seventh decile) in 2015.

Table 2. Performance of the HAQ Index; all causes presented in this table are scaled 0 to 100, with 100 being the best value (lowest observed age-standardized risk-standardized mortality rate by cause) and 0 being the "worst value" (highest observed age-standardized risk-standardized mortality rate by cause) between 1990 and 2015.

	HAQ Index	Tuberculosis	Diarrhoeal diseases	Lower respiratory infections	Upper respiratory infections	Diptheria	Whooping cough	Tetanus	Measles	Maternal disorders	Neonatal disorders	Non-melanoma skin cancer	Cervical cancer	Uterine cancer	Testicular cancer	Hodgkin's lymphoma
Argentina	68	76	80	96	38	100	88	99	100	69	53	57	49	82	31	56
Brazil	65	65	67	94	43	100	93	91	99	70	41	51	54	91	68	61
Uruguay	72	80	79	55	96	100	97	100	100	83	61	59	51	83	42	51
Cuba	74	94	85	57	96	100	100	100	100	78	70	47	57	61	77	41
Peru	70	54	72	33	96	99	87	96	100	70	50	68	51	82	70	74

	Leukaemia	Rheumatic heart disease	Ischaemic heart disease	Cerebrovascular disease	Hypertensive heart disease	Chronic respiratory disease	Peptic ulcer disease	Appendicitis	Inguinal, femoral, and abdominal hernia	Gallbladder and biliary diseases	Epilepsy	Diabetes mellitus	Chronic kidney disease	Congenital heart anomalies	Adverse effects of medical treatment
Argentina	50	52	59	66	62	79	75	76	74	59	91	67	48	52	41
Brazil	46	72	63	54	58	78	65	63	59	44	76	59	48	57	59
Uruguay	50	65	70	63	69	83	77	71	69	53	77	74	61	56	52
Cuba	56	67	57	59	55	88	69	68	65	65	85	77	51	68	77
Peru	40	82	85	77	83	75	71	62	71	57	89	73	47	61	53

Over the past 26 years, Argentina has deteriorated the HAQ Index as compared with the world and other Latin American countries.

In 1990 Argentina had a HAQ Index that was close to the global HAQ Index, moving further and further away by 2015. The difference between the observed HAQ and the potential HAQ that was close to the global index in 1990 remained almost unchanged in 2015 whereas it showed a drastic reduction worldwide.

The HAQ Index in 1990 was below Uruguay and Cuba and significantly better than Brazil and Peru. In 2015, the difference favoring Uruguay and Cuba remained unchanged because these countries had a higher reduction in the difference between the index observed and the potential index. Brazil reduced the difference with Argentina by 50% and Peru surprisingly improved rapidly and surpassed it in 2015.

Although the HAQ index for epidemic infectious diseases is practically maximal, access and quality of care is poor for the treatment of low respiratory diseases, cervical and testicular cancer, rheumatic heart disease and chronic kidney disease.

These results should be a wake-up call for our deteriorated access and quality for personal health care over the past 25 years, and encourage us to develop a health care system that will end the fragmentation of care and develop a truly universal health care coverage system with public financing, as it happens in the most developed countries.

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