

Analysis of Health and Drug Access Associated with the Purchasing Power of the Ecuadorian Population

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Abstract

Objective: To determine whether there is a relationship between access to health systems and out-of-pocket spending with socio demographic characteristics in Ecuador.

Methods: Retrospective analysis of national level data on household medical expenditure from the National Survey of Household Income and Expenditure in Urban and Rural Houses conducted by the Ecuadorian National Institute of Statistics and Census Databases as well as other scientific, institutional, technical-administrative datasets.

Results: Families in the lowest percentile of poverty spend proportionally more out-of-pocket on pharmaceutical drugs than wealthier families. Furthermore, the lowest income deciles have no access to private health coverage. Populations from the bigger cities have more access to health care services than smaller rural cities. In Ecuador, 71% of pharmaceutical products are imported and 8% of the total of drugs are generic.

Conclusions: Despite efforts by the current government, health access remains uneven, as indicated by drug access and out-of-pocket expenses per family. Poorer families have higher relative health expenditures for drugs than families with higher incomes, although poorer families have no access to private insurances.

Keywords: health care access, out-of-pocket expenses, generic drugs, social determinants of health

1. Introduction

Access to health care is a major issue in developing countries, especially for low-income populations that tend to have less access to health services (Peters et al., 2008). Thus, poverty is considered a determining factor for health access. Poverty is defined not only as the privation of incomes or material things, but also as the lack of freedom to have a satisfactory life. Moreover, access to public health services must be complemented with sanitation, access to food, water and education to assure good health (Peters et al., 2008).

Despite gains in global health care access over the last decade, major gaps in health care access remain, especially for those located in the poorer decil. Although in Ecuador, the Gini coefficient decreased from 0.54 to 0.47 in the last 8 years, improving the country inequalities, health access and out-of-pocket expenses have not been reported.

Ecuador being a small country, with approximately 16 million inhabitants distributed across 24 provinces, has deficiencies in the health care system at the regional and provincial level.

The Ecuadorian Constitution from 2008 and the Organic Health Law (Asamblea Nacional, 2008; MSP, 2010) established that access to health care, regardless of geographic location and income, is a basic right of the Ecuadorian population. Under the current administration, the Ecuadorian government has markedly increased investment in social programs over the last eight years, compared to previous governments (Figure 1) (The World Bank, 2014; Most Efficient Health Care, 2014: CountriesSingapore - Bloomberg Best (and Worst) n.d.). The government has more than doubled annual investments in health care, increasing from \$606 million in 2007 to \$1.6 billion in 2012 (Lucio, Villacrés, & Henríquez, 2011).

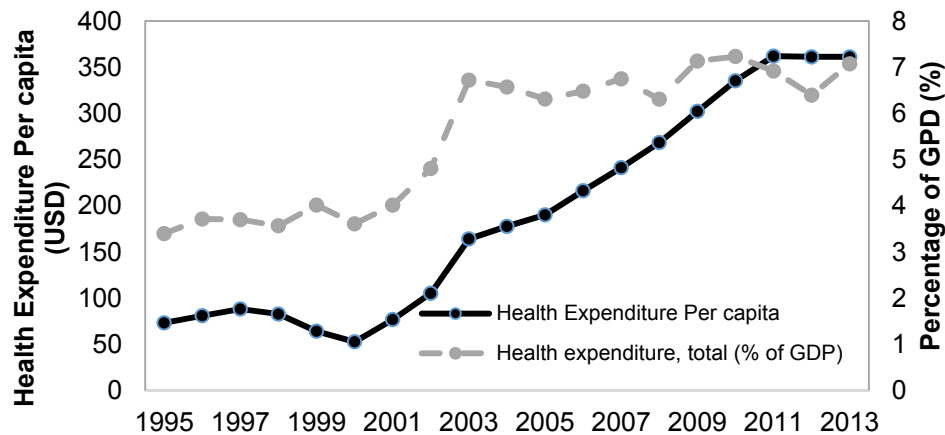


Figure 1. Annual public health sector expenditures by the national government in Ecuador

Health sector investments have focused on strengthening programs that address social welfare, nutrition, and catastrophic diseases, among others managed by the Ministry of Public Health (MSP). This investment is intended to ensure implementation of health public policies that guarantee that every citizen has access to high quality health and drug services.

It has been demonstrated that long-term public policies for education and health services can result in high levels of health services coverage and improved health status of populations in distinct countries (Peters et al., 2008).

The Ecuadorian health system is similar to systems from the other countries of the region where the government finances most of the public services. The government's Integral Public Health Network (RPIS) aims to serve 90% of the Ecuadorian population, regardless of its geographic location (Malo, 2013). The majority of the population (90%) use public services and only 10% use private health care services (Maceira, 2012; Giedion et al., 2010; Martínez et al. 2011). Despite significant gains in public health investment, out-of-pocket expenditures continue to account for the majority of total health care spending by Ecuadorian households (55%); the central government accounts for 19%, social security (IESS) accounts for 9%, and the private entities, local governments, and the army account for the remaining 17% (León, 2011). Comparing the data with other countries with well-known healthcare systems, the out-of-pocket expenses are higher in developing countries (The World Bank, 2014; Castano et al., 2002; Garner, 1993).

Domestic demand for drugs is determined by medical prescriptions in the private sector, by prescriptions in the Integral Public Health Network (RPIS), and by individuals who purchase prescription and nonprescription drugs (self-medication). Several factors influence the domestic demand for pharmaceuticals, including price, income levels, drug acquisition mechanisms, pharmacies regulation, regulations governing drug access, and the epidemiological profile of the society (Ortiz-Prado et al., 2014;-; Malo, 2013; MSP, 2010). Thus, it is necessary to analyze if drugs acquisition is in accordance with the epidemiological needs and the medical guidelines established by the national health authorities.

According to data from the Central Bank of Ecuador (BCE) the pharmaceutical budget of the government increased by 55% over the last 5 years (Banco Central Del Ecuador, 2013). In 2013, the annual pharmaceutical market reached \$1.4 billion USD. The amount of drugs sold in Ecuador has increased since 2006, due not only to a higher government investment, but also to an increase in the purchasing power of the citizens. In Ecuador, pharmaceutical expenditure accounted 74 USD per capita in 2013, although this number seems small, it represent an alarming 35% of total health care expenditure in Ecuador, being this percentage greater than the one

in Switzerland, Italy, Sweden, Spain and even the United States (Pavic, Pfeil, & Szucs, 2014; Ortiz-Prado et al. 2014). Nonetheless, there are no studies published regarding drug expenditure and its correlation with the epidemiological demand.

Given the high proportion of out-of-pocket expenses, lack of knowledge of current drug expenditure patterns, and high income inequality in the country, it is important to understand the health spending patterns by income groups in the country, and whether spending on pharmaceuticals in the public and private sector appropriately corresponds with the epidemiological profile of the country. The present study reviews the pharma market in the private and public sector of Ecuador and analyzes the concordance of the drugs used and the principal causes of morbidity and mortality in the country. The study also compares the out-of-pocket expenditures on health care and drugs according to income deciles of the population. The findings from this study improve our understanding of the public health system and health needs of Ecuador in order to contribute to the improvement of public health policies focused on primary care and pharma provision to the population.

2. Methods

Source: We reviewed national level data on household medical expenditure (by category) from the National Survey of Household Income and Expenditure in Urban and Rural Houses (ENIGHUR) conducted by the Ecuadorian National Institute of Statistics and Census (INEC) in 2010. We analyzed Ecuadorian drug expenditure annual data from the International Marketing Services (IMS), data from the Public Pharmaceutical Company (ENFARMA EP) and data from the Minister of Public Health of Ecuador.

Analysis: To compare health care expenditures by income groups, we calculated the proportion of all out-of-pocket household expenditures dedicated to health care and the proportion of out-of-pocket expenses by health expenditure category (pharma products, hospital services, outpatient services, private insurance) by income deciles (1 to 10).

We evaluated the association between the number of hospital beds and number of doctors per 1000 population, indicators of health care access, and the poverty index based on unsatisfied basic needs from INEC (NBI) for each province in the country ($n = 24$) (Pearson correlation coefficient).

Using hospital morbi-mortality data, we identified the top ten most prevalent causes of hospital discharges in Ecuador and compared this to the overall data from the most prevalent diseases in Ecuador in a ten years period (2001 to 2011) according to the ICD-10 code and the data available.

Using data from 2006-2014, we identified the most marketed prescription and nonprescription drugs in Ecuador and ranked the drugs based on the total market value of the drugs sold, in US dollars, in all dosage forms, according to data obtained from pharmacies and the Minister of Public Health.

3. Results

3.1 Epidemiological Profile

We found that births and perinatal complications were the most prevalent causes of hospital admissions in Ecuador from 2001 to 2011, however, when we exclude causes related to birth, the main cause of hospital discharges are chronic diseases which were not seen a decade ago (Table 1) (INEC, 2014a).

Table 1. Hospital discharges excluding causes related to birth (2001-2011)

	Cause	Number of cases	Rate
1	Diabetes Mellitus	4.455	29,18
2	Hypertensive Diseases	4.381	28,7
3	Cerebrovascular Diseases	3.930	25,74
4	Malignant Tumors of Digestive Organs	3.712	24,31
5	Traffic Accidents	3.351	21,95
6	Pneumonia	3.086	20,21
7	Heart Disease	2.378	15,58
8	Different Types of Aggressions	2.106	13,79
9	Ischemic Heart Disease	2.014	13,19
10	Liver Disease	1.997	13,08
11	Other Causes	25.053	164,11
12	Ill-Defined Causes	5.841	38,26

In 2011, the last available data demonstrate that Diabetes Mellitus Type II and Hypertensive Disease and its consequences are the leading cause of death in Ecuador (Figure 2).

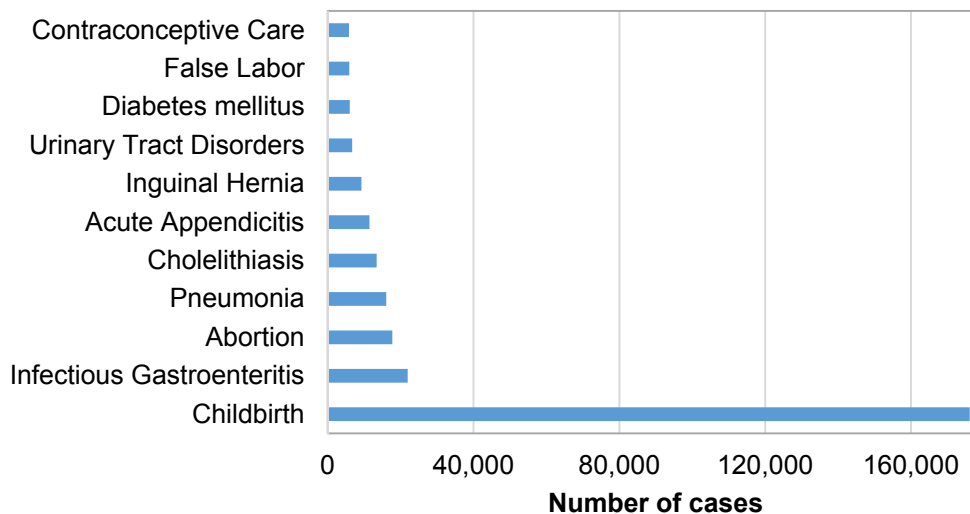


Figure 2. Top ten causes of hospital discharges in 2011 (Source: INEC)

Interesting differences between public and private medical attention were seen. The public sector receives more abortion and pneumonia cases than the private sector, whereas the private sector received more cases of arterial hypertension and abdominal pain. Another interesting finding for unpublished data showed the different approach to natural vaginal deliveries compared to C-sections, where the private system report up to 78% of the surgical procedure. Within the public system, 21% of births are through C-sections and 51% of them are justified by preclinical conditions, while in private settings C-sections account 54% of births although just 21% of them are justified by preclinical conditions (INEC, 2014a).

3.2 Access to Health Care Services

We found that on average there are 0.6 beds per 1000 inhabitants in Ecuador, lower than the 1.9/1000 minimum standard average established by the WHO (Organization and UNAIDS, 2010). On average there are 19 doctors per 10,000 people in Ecuador, as compared to European countries, which have 35 doctors per 10,000 inhabitants, and African countries, which have 2 doctors per 10,000 inhabitants (Organization and UNAIDS, 2010); The

World Bank, 2014).

Altogether, the data from INEC, WHO, World Bank and MSP demonstrate that in Ecuador the number of doctors and hospital beds per person have not reached yet the minimum desired (The World Bank, 2014; Organization and UNAIDS, 2010). The number of beds per 1000 inhabitants in each province of Ecuador is inversely correlated with the poverty level of the province defined by the unsatisfied basic needs (Figure 3).

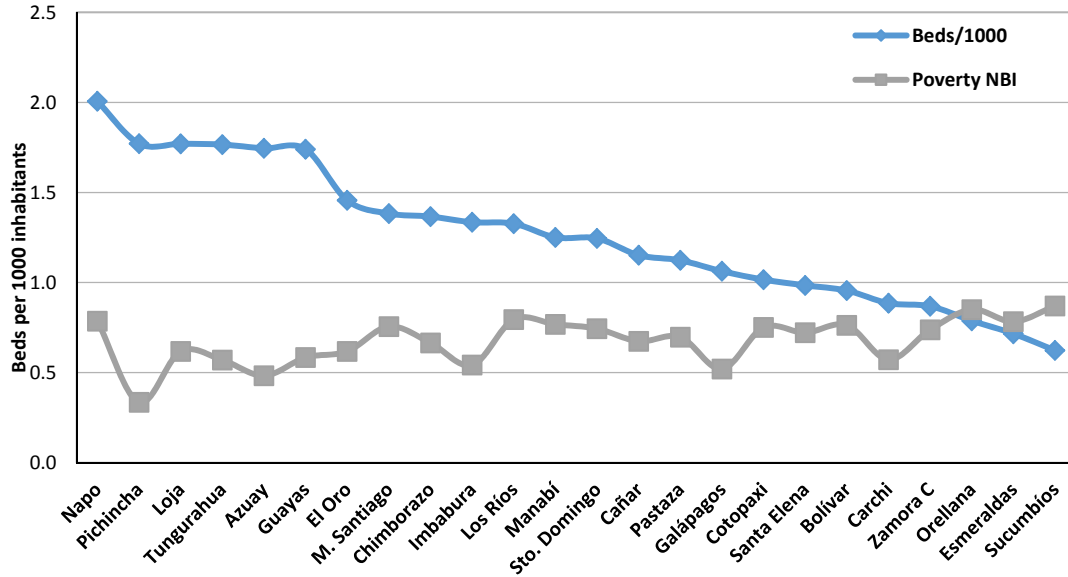


Figure 3. Number of hospital beds per 1000 inhabitants and poverty relationship. Analysis by Ecuadorian provinces in 2012 (Pearson correlation -0.5). NBI: Unsatisfied Basic Needs. Source: INEC

3.3 Household Expenditure on Health Care

Even though the Ecuadorian government investment in health care has increased, out-of-pocket expenses remain relatively high to the total investment in Ecuadorian health care. According to the national census bureau (INEC), the percentage of out-of-pocket expenditure on health is on average 7.2% of total family income and increases by income decile (range: 5.5 to 8.4%, Figure 4) (INEC, 2014b).

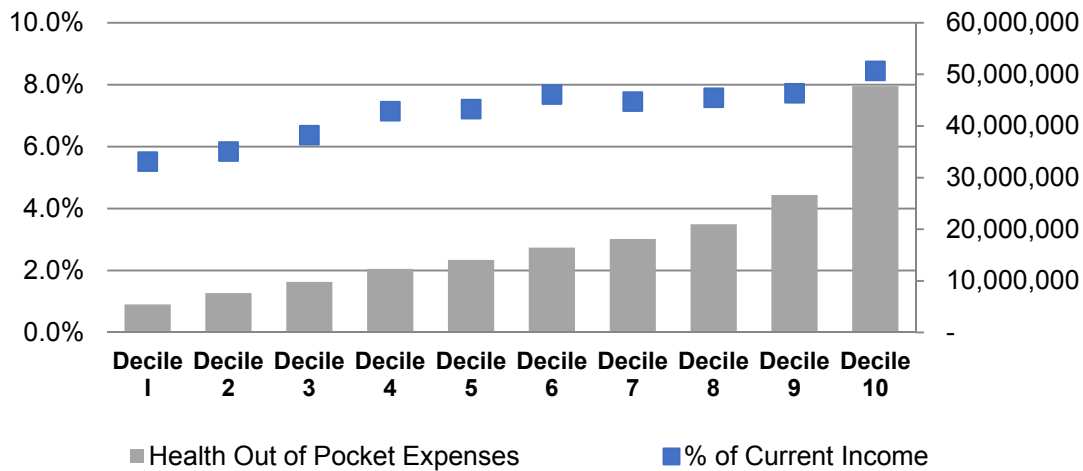


Figure 4. Total out-of-pocket Expenses health expenditures and health expenditures as a proportion of income by income deciles

We found that wealthier families spend more on external patient services and private insurance, which made up 71% of out-of-pocket health care expenses. However, poorer families spent proportionally more out-of-pocket money on drugs than wealthier families. In the lowest income deciles people spend 67% of the total out-of-pocket health care expenditures on drugs, compared to the 51% spent on drugs by the wealthiest population located within the highest decil (Figure 5).

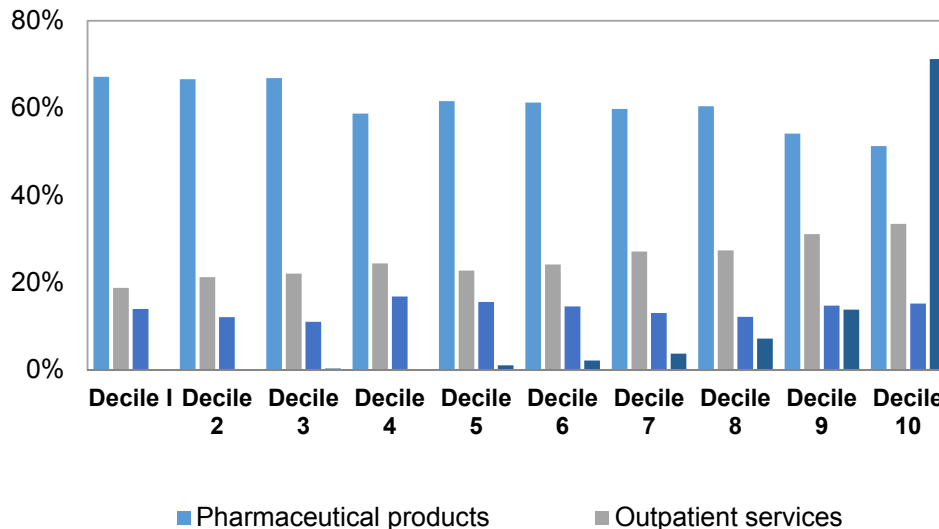


Figure 5. The proportion of out-of-pocket expenses on health services by income deciles

This finding suggests that poorer families have less access to private insurance and may self-medicate instead of seeking medical care (Delgado et al., 2002; Lim et al., 2013), a finding supported by prior community-based studies in coastal Ecuador (Ibarra et al., 2014; Lucio, Villacrés, & Henríquez, 2011).

3.4 Domestic Demand for Pharmaceutical Drugs

Ecuador's pharmaceutical market is bigger than other countries with similar populations (Ortiz-Prado et al. 2014; Gobierno de Chile, 2013). The pharmaceutical market depends on the public health system requirements (60%) and the private, out-of-pocket consumption (40%) (Ortiz-Prado and Ponce, 2013). Local population consume less than 10% of generic drugs, a significantly smaller percentage when compared with other markets.

Ecuador spends more than 36% from the GDP% designated to health expenditure, a considerable percentage when compared with the 9% of Switzerland, the 12% of Norway or the 20% of Spain (Pavic, Pfeil, and Szucs 2014).

3.5 Medicines Purchased versus National Epidemiology

Ortiz-Prado *et al.* reported that the annual pharmaceutical market in Ecuador is \$ 1.2 billion dollars in 2011 (Ortiz-Prado et al. 2014), which compared to other markets, should maintain a direct relationship between the national epidemiology and the public and private expense (Ezzati et al., 2002; MAJOR, 2004). Considering this basis, we studied the behavior of the public and private market health to determine what are drug expenses of the government and the private services used for.

Disaggregating these data we found differences between the amount of drugs acquired by the government and the drugs acquired by the private service in pharmacies in Ecuador (IMS, 2011). The public health service spent more than \$ 200 million USD on the 20 most sold drugs in Ecuador from 2010 to 2011 (Table 2).

Most of these drugs are oncologic, difficult to produce locally and are intended to treat chronic diseases.

The private sector on the other hand excluding ethical (prescription drugs) in Ecuador it is mostly led by vitamins, non-steroidal anti-inflammatory drugs (NSAIDs), analgesics, hepatic protectors and oral antibiotics (Table 2).

Table 2. Most marketed drugs in Ecuador from 2010 to 2011. The ranking indicates the total market value of drugs sold, in US dollars, in all dosage forms, according to data obtained from pharmacies

Most Marketed Drugs in Ecuador (USD)				
Prescription			Nonprescription	
	2010	2011	2010	2011
1	Avastin®	Mesigyna®	Apronax®	Apronax®
2	Neurobion®	Neurobion®	Pharmaton®	Pharmaton®
3	Mabthera®	Acrovastin®	Redoxon®	Redoxon®
4	Arcoxia®	Arcoxia®	Vitamin C	Vitamin C
5	Mesulid®	Unasyn®	Cebion®	Cebion®
6	Mesigyna®	Kuffer-Q®	Nestogeno 1®	Nestogeno 1®
7	Fluimucil®	Gloval®	Simepar®	Nestogeno 2®
8	Valixa®	Fluimucil®	Tempra®	Voltaren tópico®
9	Omezzol®	Rebif®	Asepsia®	Simepar®
10	Lipitor®	Lipitor®	Tempra®	Aspirina

Source: IMS 2011(20).

Nonetheless, contrary to the relation units/USD, when we analyzed the drugs by units, the most sold products are vitamins, NSAIDs, and analgesics.

Data from IMS in 2011 show that Atorvastatin (Avastin®) and Norethisterone enanthate (Mesigyna®), medicines used to control hypercholesterolemia and prevent pregnancy, respectively, were the most commercialized prescription drugs in Ecuador. The anti-inflammatory, Naproxen Sodium (Apronax®), was the most commercialized non-prescription drug (IMS 2011; Ortiz-Prado et al. 2014).

Another dramatically finding is the amount of money spent in infant milk formulas. From 2006 to 2014 Ecuadorians bought more than 44 million units of infant milk formulas, which represents approximately \$ 750 million of USD\$ in a country which is promoting breastfeeding (IMS, 2011; DataQuest, 2014; Ortiz-Prado & Ponce, 2013).

4. Discussion

Ecuador is a small country whose demand for pharmaceutical products is intended to satisfy the needs of the public and the private market. However, even though the state is the main trading partner of the industry, the expenses in millions of US dollars satisfies only a reduced part of the population according to epidemiological statistics of this country.

Herein we reviewed the available data from the Ecuadorian National Statistics Databases (INEC), International Marketing Services (IMS), and data from the Public Pharmaceutical Company (ENFARMA EP) and data from the MSP of Ecuador. However, some imprecisions about the epidemiological data must be considered for the interpretation of this research.

Analyzing the out-of-pocket expense, an Ecuadorian spends an average of 60% of their current spending on health, in purchasing medicines; emphasizing that poor people spend even more of their household expenses in buying drugs. Accordingly, in a meta-analysis from 39 low and middle income countries, expenditure on medicines represents the major component (57%) of the out-of-pocket spending as well (Saksena et al., 2012). Furthermore, we found in the decile analysis, that the decile representing the wealthier families is the one who spends more money on private health insurance, which is an exclusive benefit of the higher deciles to 3rd. This data agree with the OMS meta-analysis, which reported that the wealthier quintile spends more money on private health services than quintile 1 (Saksena et al., 2012).

Similarly, a wealthy person spends more proportion of his incomes to his health care. Poorer families in the lowest decile spend 5.5% of their current expenses in health; whereas, the highest decile spends more than the 8%. Although poverty is a risk factor for many diseases, poor people do not go to the doctor as many times as wealthy people. Concordantly, a study concludes that higher income is associated with frequent and intense use

of public and private services compared to lower income (Wagstaff, 2002).

The number of doctors and beds available depend on the province of residence. Besides of this variation, in Ecuador none province has 1.9 beds per 1000 population as recommended by the WHO. As mentioned by Wagstaf, inequalities in health access reflect unequitable conditions at the individual and community level of education, location and housing characteristics (Wagstaff, 2002). Thus, government health policies must be developed in complement with economic strategies to improve life quality of the Ecuadorian provinces.

The vast majority of high-cost medicines specifically designed to treat a variety of cancers or catastrophic illnesses are acquired by the public sector, which evidences that even wealthier families attend to the public services when they present a catastrophic disease.

Public hospitals treat more patients from infectious diseases and acute conditions. In the private sector are, some of these illnesses are treated as well, but they treat other diseases that are not catered in the public sector.

Despite of the significant increase of the government budget for drugs acquisition, the most marketed drugs in Ecuador are not fully correlated with the epidemiological profile of the population. Notably, the most sold non-prescription drugs are the anti-inflammatory, Naproxen Sodium (Apronax[®]) and the multivitamin Pharmaton[®], which are not the treatment for the most prevalent illnesses including perinatal and maternal diseases, and digestive tract disorders. Possible causal factors are the influence of the enormous pharmaceutical promotion (Spurling et al., 2010) and the easy access to pharmacy in terms of geographical localization and pharmacist counseling (Coelho & Costa, 2014).

It has been proposed that healthcare systems can even increase inequalities if they do not consider the needs and socioeconomic living conditions of their population (Loignon et al., 2015). Thus, this study aims to supply an analysis of the health access according to the incomes distribution of the population and their geographical localization. It also adds information about the pharmaceutical market and its concordance with the epidemiology of the population. This study should be considered by the government instances responsible for the elaboration of public health policies, in order to strengthen the great effort of the actual government to improve the Ecuadorians life status.

Limitations

Epidemiological data in Ecuador are represented in the data system from the Ecuadorian National Institute of Statistics and Census (INEC). However, we consider that some of them are not accurate enough due to a lack of methodologies standardization for data collection. For instance, when a patient dies because of traumatic brain injury, frequently the first improper diagnosis is cardiopulmonary arrest. In consequence, statistics and data analysis are altered by this imprecise diagnosis.

Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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