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Inequalities from mortality related to Infectious according to socioeconomic indicators in Risaralda - Colombia

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Abstract : The impact of mortality due to infectious sicknesses, cancer, cardiovascular, external and nutritional causes requires the measurements of the relationship between socioeconomic conditions and unsatisfied basic needs. Study with empirical analytical and retrospective approach belonging to an Ecological type of study, where it was compared the mortality from diseases in the municipalities of Risaralda, based on their socio-economic status and the range of unsatisfied basic needs. The data previously mentioned was obtained from vital statistics of the National Administrative Department of Statistics. The risk of dying from Acute Respiratory Infection was higher in municipalities with lower economical incomes and higher Index of Unsatisfied Basic Needs, different from HIV/AIDS that occurred to have relevant presence in municipalities with higher economical incomes and Index of Unsatisfied Basic Needs. Furthermore, it is evident that the behavior of Neoplastic Diseases is lower in municipalities with less socio-economic status. Cardiovascular diseases show a high incidence in municipalities with better socioeconomic conditions and higher Index of Unsatisfied Basic Needs. In the case of self-inflicted Injuries - Suicides, mortality was higher in municipalities with lower socioeconomic status and higher NBI. From a different perspective mortality produced by Diabetes Mellifluous did not show an increase, but it did occur in municipalities with higher Index of Unsatisfied Basic Needs. Finally, Nutritional Deficiencies and Anemia increased in the municipalities with lower economical income and higher Index of Unsatisfied Basic Needs. Finally, all components and characteristics found throughout this study, make the results to be coherent with the literature, in contrast to an article published in Barcelona, Spain in 2010, where it was found that populations with higher socio-economic deprivation had higher rating of mortality.

Keywords : Diseases, Mortality, Health Inequalities, Socioeconomic indicators.

Introduction

The World Health Organization (WHO) has considered the concept of *inequality in health* as the different opportunities and access to resources related to health that people have based on their social class, gender, ethnicity, education or social conditions of the place where you live or work. Making differences in matters of unnecessary, avoidable and unjust health; the definition includes a moral or ethical dimension that puts first the policies that are carried out from different sectors, such as the economy, work, housing, social services, health, among others¹.

One of the main goals of the WHO and the governments of the member countries is *to achieve health for all*, but this inequality still exists in developing countries as well as in industrialized countries². It is said that not only the countries with worse socioeconomic conditions suffer a greater burden of chronic and disabling diseases at younger ages, but also have less access to health services, for this the Pan American Health Organization (PAHO), facilitates the management of databases to identify inequalities and technologies for their reduction in the year 2020. It is necessary to decrease at least 25% of the differences between the socioeconomic groups of each of the member countries; by increasing the health levels of the poorest³.

In Colombia, the National Administrative Department of Statistics (DANE) calculates the Index of Unsatisfied Basic Needs (NBI), based on five simple indicators; the populations with the highest amount of NBI are considered poor⁴. In recent years, Colombia has made great efforts to reduce poverty, which reduced the Gini coefficient from 0.56 to 0.539 (DANE, 2013 figure)⁵; the poverty rate showed a reduction of 10 percentage points, from 39% to 29%. One effect of inequality is that Colombia is a diverse, multi-ethnic and territorially complex country. These characteristics make it a challenge to achieve equity and improve health.

The state has made a series of health reforms in order to achieve 100% coverage in the health system and through statutory law 1751 of 2015 *Fundamental right to health*⁶, aims to achieve this goal in the population without discrimination. Health services; they are not in themselves a major factor in the generation of inequalities in health, but they are a coadjutant in the exacerbation or mitigation of inequality. In factors such as accessibility, opportunity and quality of services for the most vulnerable populations⁷. According to Report number 3 of the National Health Observatory, avoidable mortality in Colombia 1998-2011, defines that more than half of the deaths that occurred in Colombia were due to causes of avoidable deaths and 68% of deaths occurred during, or before, the productive age⁸.

Risaralda is a small department in extension, but whose health problems not only affect the population at risk, but also increase or favor Inequalities in Health, due to the accessibility to services of this nature in terms of timely care and specialized, are related to determining factors, such as socioeconomic conditions, geographical location, availability and coverage of the population's health service, relating these factors to the reduction of the Gross Domestic Product (GDP) and the increase in the Needs Index Basic Unsatisfied (NBI), of each municipality of the Risaralda territory.

In the Department, each time the incidence of HIV / AIDS in young people is greater, as well as by Acute Respiratory Infection (IRA) in children under 5 years of age, Domestic Violence, Suicide and Suicide Attempted by Chemical Substances, without leaving aside the Non-Communicable Diseases such as Diabetes Mellitus and Cancer⁹.

Risaralda is divided into three sub-regions, which, due to their great extension, have different sociodemographic and socioeconomic characteristics, presenting different behaviors in terms of morbidity and mortality rates. For this reason, the measurement of inequalities in health is important because it allows comparing the health status between two or more population groups and observing those unjust and avoidable differences, determining how many deaths are attributable to the socioeconomic conditions according to GDP and NBI in each one. of the municipalities of the Department of Risaralda.

Reason for which it is necessary to highlight that in the Department there are few investigations that analyze in detail the possible patterns of inequalities in mortality in the municipalities, being the measurement of the inequality an indispensable condition to advance in the improvement of the health situation in the region. In this case it was considered necessary to carry out this investigation, with the purpose of giving intervention proposals to those in charge of implementing public policies and preventive measures in the territory, thereby facilitating the different authorities of the department of Risaralda the necessary information for the

implementation of plans and programs with the sole purpose of improving the quality of life of the Risaraldense community.

Experimental

Study design

An ecological study was carried out, with a retrospective analytical empirical approach, which allowed to observe, measure, verify and predict the mortality due to infectious diseases, cancer, cardiovascular diseases, external and nutritional causes, according to GDP and NBI, in the department of Risaralda. , during the period 2009-2013.

Population and sample

The population was constituted by the 14 municipalities of the Department of Risaralda: Apía, Balboa, Belén de Umbría, Dosquebradas, Guática, La Celia, La Virginia, Marseille, Mistrató, Pereira, Pueblo Rico, Quinchía, Santa Rosa de Cabal and Sanctuary.

The investigation used the technique of indirect observation, where the reality itself was not observed, extracted information from existing data, also called secondary information. Among them are: Web Pages of the Departmental, Municipal Secretariats, the National Administrative Department of Statistics (DANE), Situation Analysis in Health (ASIS) and books.

After having selected the codes, they were organized by sex and age ranges from 0 to 4 years, 4 to 14 years, 15 to 44 years, 45 to 64 years and 65 and over. Regarding the measurement of inequalities, the Program for the Epidemiological Analysis of Data (Epidat 4.0) was used to calculate the index based on two to two comparison, regression indexes and concentration index according to GDP and NBI. The exclusion criteria are based on municipalities that did not have enough information regarding previous diseases.

Results

Behavior of mortality due to cardiovascular diseases, Department of Risaralda 2009-2013.

The mortality that occupied the first place during the period of study (2009-2013), were the diseases of the cardiovascular system, among them the hypertensive ones for the years 2009-2013 in men and women, and the municipalities that excelled in this event, Apía and Mistrató respectively. In Mortality due to Ischemic Heart Disease, the municipality of Pueblo Rico stood out in both men and women. Followed by Cerebrovascular Disease Mortality the municipality of Dosquebradas for both sexes. (See tables 1 and 2).

Table 1. Quartile distribution of the adjusted rates (x 100,000 hbts) of mortality due to hypertensive diseases in men in the municipalities of the Department of Risaralda 2009 - 2013.

Municipio	Tasa 2009	Municipio	Tasa 2010	Municipio	Tasa 2011	Municipio	Tasa 2012	Municipio	Tasa 2013
Apía	54,96	Mistrató	25,35	La Virginia	21,25	Apía	150,05	Apía	54,96
Belén de Umbría	39,59	Santa Rosa de Cabal	19,86	Belén de Umbría	16,75	Quinchía	22,66	La Virginia	23,99
Mistrató	35,1	Pueblo Rico	14,17	Quinchía	15,86	Mistrató	22,58	Mistrató	23,63
La Virginia	31,09	Quinchía	13,88	Pueblo Rico	14,2	La Virginia	19,64	Pueblo Rico	13,66
Marsella	19,74	Marsella	12,27	Dosquebradas	12,58	Pueblo Rico	14,17	Marsella	11,37
Pueblo Rico	14,63	Belén de Umbría	10,95	Marsella	12,1	Pereira	11,84	Santa Rosa de Cabal	11,05

Quinchía	13,26	La Virginia	10,27	Santa Rosa de Cabal	11,75	Dosquebradas	8,02	Belén de Umbría	10,78
Pereira	11,86	Guática	8,28	Pereira	11,7	Guática	7,82	Pereira	10,15
Santa Rosa de Cabal	11,6	Apía	7,34	Mistrató	11,47	Marsella	5,87	Dosquebradas	7,66
Guática	8,25	Dosquebradas	6,6	Guática	7,65	Belén de Umbría	5,49	Guática	7,12
Dosquebradas	5,94	Pereira	6,43	Apía	7,48	Santa Rosa de Cabal	3,73	Quinchía	3,73

Source: DANE calculations (2005)



Table 2. Quartile distribution of the adjusted rates (x 100,000 hbts) of mortality due to hypertensive diseases in women in the municipalities of the Department of Risaralda 2009 - 2013.

Municipio	Tasa 2009	Municipio	Tasa 2010	Municipio	Tasa 2011	Municipio	Tasa 2012	Municipio	Tasa 2013
Mistrató	30,74	Quinchía	37,04	Mistrató	44,19	Mistrató	35,04	Guática	52,14
Guática	28,95	Mistrató	30,19	Apía	22,77	Apía	26,1	Mistrató	35,04
Belén de Umbría	27,09	Apía	22,77	Santa Rosa de Cabal	20,17	La Virginia	18,52	Apía	22,77
Apía	19,44	Belén de Umbría	20,03	La Virginia	19,04	Belén de Umbría	18,15	Pueblo Rico	17,54
Pueblo Rico	17,97	Pueblo Rico	17,97	Pueblo Rico	18,4	Pueblo Rico	17,97	Belén de Umbría	12,43
La Virginia	15,3	Pereira	12,13	Dosquebradas	14,8	Quinchía	12,78	Marsella	12,01
Quinchía	15,06	Dosquebradas	10,06	Quinchía	14,43	Marsella	12,33	Dosquebradas	9,9
Dosquebradas	9,66	Guática	9,37	Belén de Umbría	13,06	Dosquebradas	10,29	La Virginia	9,05
Santa Rosa de Cabal	7,29	Marsella	6,49	Pereira	10,76	Santa Rosa de Cabal	9,82	Pereira	7,18
Marsella	7,07	La Virginia	4,94	Marsella	9,47	Guática	8,87	Santa Rosa de Cabal	5,76
Pereira	6,14	Santa Rosa de Cabal	4,1	Guática	9,11	Pereira	6,32	Quinchía	4,61

Behavior of mortality rates due to Acute Respiratory Infection (ARI) and HIV/AIDS, Department of Risaralda 2009-2013.

The maximum rate of mortality due to acute respiratory infection (ARI) in both men and women during the study period was in the municipality of Pueblo Rico, followed by Guática and Sanctuary and the municipality with low mortality rates was Quinchía, throughout the observed period. In the mortality by HIV/AIDS, the municipality of La Virginia stood out, followed by Pereira and Belén de Umbría. The municipality with low mortality rates was the municipality of Dosquebradas.

Behavior of mortality rates due to external cause injuries, in the Department of Risaralda 2009-2013.

The maximum mortality rate for Other Accidents Including Sequelae and Self-inflicted Lesions-Suicides, both in men and women, occurred in the municipalities of Pueblo Rico and Quinchía, followed by Santa Rosa de Cabal and La Virginia, while the low mortality rates These events occurred in Pereira, Dosquebradas, La Virginia, Apía and Balboa. The highest rates of mortality due to self-inflicted injuries-suicides in men and women during the five-year period correspond to the municipalities of Marseille, followed by Guática and Belén de Umbría. Mortality rates for Assaults and Homicides were higher in the municipalities

of Virginia and Mistrato, followed by Pereira and La Celia. The municipalities that maintain the low mortality rates are Quinchía, Guática and Marseille, with similar behaviors during all the years.

Table 3.Indicators based on regression models, by disease and years, according to GDP per capita in men, Risaralda 2009 - 2013.

Diseases GDP / Years	2009	2010	2011	2012	2013
108 HIV/AIDS					
302 Hypertensive Diseases					
510 Other Accidents, Including Sequels					
602 Nutritional Deficiencies and Anemias					

Results and discussion

The health system is part of the Social Determinants of Health, although it is not the most relevant, its potential should not be underestimated in order to contribute to its reduction. For this reason, the WHO has been in operation since 20005 [10]; the commission on social determinants of health to correct inequalities between countries, in order to improve living conditions. The analysis of the mortality of a population is a basic tool to know their health status, which allows carrying out different types of studies and making comparisons between regions. The behavior of inequalities in mortality in the department of Risaralda due to diseases with

respect to the socioeconomic indicator, showed a main aspect, where the municipalities with greater poverty according to Unsatisfied Basic Needs and Per capita Gross Domestic Product, were related to higher mortality rates during the study period (2009-2013). Therefore, the municipalities of Pueblo Rico and Mistrató stand out, where the population has at least one Unsatisfied Basic Need, unlike the municipalities of Dosquebradas and Pereira that have better socioeconomic indicators, because their economy revolves around industry and commerce.

The characteristics found make the result of this study consistent with the literature and are contrasted with an article published in Barcelona Spain 2010, where it was found that, the greater the socioeconomic deprivation of the population, the relationship with mortality is greater. However, through studies it has been shown that, despite there being inequalities in mortality, these have decreased over time [11].

Regarding the behavior of mortality rates due to cardiovascular diseases, hypertensive and ischemic heart diseases stood out, especially in the municipality of La Virginia for the case of men and the municipality of Quinchía for women, during the entire study period (2009-2013). The aforementioned is related to the WHO data during 2012, where 17.5 million people died, which represents 31% of all the deaths registered in the world [12], it is also evident in the second report of the National Health Observatory in the 1998-2011 period, where mortality from this event went from a rate of 51.66 deaths per 100,000 inhabitants in the year of 1998 to a rate of 68.66 in the year 2011, which reflects an increase in this period. It is also important to highlight the article entitled "Inequalities in mortality from cardiovascular diseases in the municipalities of the Coffee Region, 2009-2011", where they report that the risk of dying from ischemic and hypertensive diseases was greater in the municipalities with greater poverty (higher NBI) and Lower GDP per capita) [13].

Likewise, there was a significant increase in mortality rates in the group of External Causes, specifically in the subgroup of Assaults and Homicides, highlighting the municipalities of Virginia and Mistrató for both men and women. According to the first report of the National Health Observatory (ONS) 2011; These lesions were found within the ten leading causes of death, in the departments of Risaralda, Arauca, Valle del Cauca, Caquetá, Meta, Putumayo, Antioquia, Quindío, Vaupés, Norte de Santander, Casanare and Caldas, with higher mortality in the male population, than the female population [14]. The aggressions in the country have been attributed to various factors such as political events, civil war, assassinations, poverty, historical, economic, cultural issues, the presence of groups outside the law (guerrilla and self-defense groups), drug trafficking, poverty and inequality. in the distribution of income, these factors contributing to the inequality and violation of fundamental rights [15].

External cause injuries have a great impact on Potentially Lost Life Years (YPLL) due to early mortality, especially between the ages of 20 - 29 years. For the year 2013 the AVPP were 959,612 years, compared to 2012, of 1,034,816 YLLP, had a decrease of 7.3%, due to the decrease in violent deaths, homicides occupy the first cause of death in YLLP with 58.55%, followed by deaths in transport accidents with 20.72% [16]. Another study that is contrasted with the results of the research was the one carried out in Brazil in the city of Fortaleza during 2007, where it was observed that there was a significant association between the socioeconomic level and the total mortality due to diseases caused by injuries from external causes. [17], and with a study conducted among the municipalities of Antioquia during the years 2000-2010, where they show that the risk of dying is greater in the poorest municipalities, especially affecting younger men [18].

Regarding the behavior of mortality rates caused by neoplasms in women, mortality was higher due to cervical cancer, followed by stomach and breast cancer, in the municipalities of Pueblo Rico Mistrató and Belén de Umbría, these being Events considered the second most common cause of cancer in the world in countries with medium and high income [19], in Colombia, this disease is emerging as a public health problem. While in the group of men, prostate tumors stand out with 15% in developed countries and 4% in developing countries [20].

The results obtained during the 2009-2013 period are consistent with those registered by the ASIS (2013) of each of the municipalities of Risaralda, where Cardiovascular Diseases stand out as the first cause of mortality, followed by Neoplasms and External Cause Lesions. .

To conclude, it is suggested to reinforce primary care strategies and promote Health Promotion and Disease Prevention in each of the municipalities of the Department, directing Public Policies according to the need of each municipality, to facilitate the control of diseases avoidable

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