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Income inequality and self-rated health status in Colombia

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Abstract

Background: The negative association between income inequality and health has been known in the literature as the Income Inequality Hypothesis (IIH). Despite the multiple studies examining the validity of this hypothesis, evidence is still inconclusive, and the debate remains unsolved. In addition, relatively few studies have focused their attention on developing or emerging economies, where levels of inequality tend to be the highest in the world. This work examines the statistical association between income inequality and self-rated health status in Colombia, a highly unequal Latin American country.

Methods: To explore whether this association is present in the general population or whether it is only confined to the bottom of the income distribution, we use data from the 2011–2019 National Quality of Life Survey. Multiple probit estimations are considered for testing the robustness of the IIH.

Results: Evidence favouring the IIH was found, even after controlling for individual income levels, average regional income, and socioeconomic characteristics. The link between income inequality and the probability of reporting poor health seems to be present across all income quintiles. However, the magnitude of such association is considerably smaller when using inequality measures with relatively greater sensitivity to income differences among the rich.

Conclusions: The association between regional income inequality and individual's self-rated health status in Colombia is not only confined to low-income individuals but extends across all socioeconomic strata. This association is robust to the income inequality measure implemented, the income-unit of analysis, and changes in the sample. It is suggested that reducing income disparities can potentially contribute to improving individual's health.

Keywords: Income inequality, Self-rated health status, Health inequalities, Colombia, Income

Background

The historically high levels of income inequality have been a matter of concern due to its moral dimensions and the impact on society's well-being. Income inequality has been shown to have adverse effects on social capital [1, 2], education attainment, and economic growth [3]. Some studies have also suggested a negative causal association between income inequality and health [4]. Such association -known as the Income Inequality Hypothesis (IIH)- states that an individual's health is affected not only by the individual's own level of income but also by the level of inequality in the area of residence [5, 6]. Although various scholars have reported evidence in favour of this hypothesis, others have documented a nil relationship between income distribution and health [7].

From a policy perspective, understanding the effects of inequality on health remains as a matter of concern: "*if inequality is shown to have a lasting impact on outcomes like health, then it may be beneficial and efficient to minimize inequality instead of designing policies to correct differences in outcomes. In contrast, if inequality has little or no impact on measurable outcomes, then it will be placed*

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in the realm of a social or moral issue rather than an economic one" [8]. Some scholars have suggested the existence of a threshold above which income inequality affects an individual's health, meaning that it is more likely to find a negative statistical association between income disparities and health outcomes in countries with highly unequal income distributions [9]. Nevertheless, most of the studies have focused their attention on industrialized countries, and relatively few research pieces have concentrated on developing or emerging economies, which tend to report very high levels of income inequality [10].

This study aims to examine whether there is a statistical association between income inequality and self-rated health status across Colombian regions for the 2011–2019 period. With an average life expectancy of 77.3 years, and a US $5,333 GDP per-capita (current US$), the Colombian society is in an advanced stage of the epidemiological and economic transition [11]. The country is one of the most unequal nations worldwide, reporting a Gini coefficient of 0.51 for 2019, by far more unequal than the United States (0.41) [11]. Up until today, no study has evaluated the association between rated-health status and income disparities in Colombia.

We use data from the 2011–2019 National Quality of Life Survey to test this association. Several probit estimations are considered for testing the robustness of the IIH. In general, after controlling for individual's income, regional average income, and other potential cofounders, a statistical association between income inequality and health status is observed. This association is not only confined to the lowest income quintile but extends across all socioeconomic strata. The marginal effect of income inequality was found to be weaker when income inequality was operationalised with indices with relatively greater sensitivity to income differences at the top end of the distribution.

The remaining of this paper is organized as follows: Sect. 2 summarizes the findings of previous studies. Section 3 describes the data used for assessing the IIH. Section 4 explains the empirical strategy and the main results, while Sect. 5 reports some robustness checks. Sections 6 and 7 discuss the results obtained, the limitations of this work, as well as the conclusions reached.

Relevant studies

Since the 90 s, multiple studies have been published aiming at exploring the relationship between income inequality and health [6, 7]. The first group of studies, which adopted a multiple aggregate-level approach, reported a strong association between income differences and aggregate health outcomes, favouring the IIH [12–15]. These ecological studies were however highly criticized due to their incapacity to disentangle the effects of individual income from the contextual effects of income inequality. Gravelle 1998 showed that the associations between income inequality and population health is a "*statistical artefact*" that results from the non-linear relationship between individual health and income levels [16]. In response to this critique, since 1997 multiple scholars have published multilevel-studies, based on individual-level data [4]. Findings have been however highly heterogeneous within and across countries.

Most of the IIH literature has been concentrated in the United States (US), but studies seem to be conclusive. Daly, et. al. 1998 used a Panel Study of Income Dynamics to test the association between individual mortality risk and various measures of income inequality [8]. Authors did not find any significant association, except in the case of those with middle-incomes between the ages of 25 and 64. Mellor and Milyo 2002 also failed to find evidence in favour of the IIH when using the data from the Current Population Survey (CPS). The authors explored the effect of income inequality on individual's health status for both the general population and low-income individuals [17]. This allowed them to test both the weak and strong versions of the IIH. The former postulates that income inequality negatively affects the health of all members of society, while the strong version posits that income inequality only affects the poor's health. The study controlled for both individual characteristics and regional variations in access to health services or social norms toward health. In contrast to these studies, Fiscella and Franks found that, after adjustment for age and sex, income inequality has an independent effect on the level of depressive symptoms, and on baseline and follow-up self-rated health [18].

Different explanations have been suggested to explain the discrepant results within the US. Some scholars have suggested that the apparent association between income dispersion and health might be driven by misspecification of individual income and residual confounding [19]. Some studies, however, have offered evidence in the opposite direction [4]. Other authors have also suggested the possibility of confounding by differences in educational attainment since some studies have failed to find a statically significant association when controlling for education. Evidence in this regard is, however, mixed [4]. Likewise, the possibility that racial composition confounds the income inequality-health relation has been suggested, but the literature is not conclusive [20]. The geographic scale at which income inequality is measured has also been suggested as a potential explanation. While U.S. multilevel-studies that measure income inequality at state-level tend to report a solid association between inequality and health, those that measure income inequality at lower

levels of aggregation are rather non-supportive of the IIH [4, 7, 10]. There are, however, some studies that fail to find a statistical association between state-level and metropolitan-area-level inequality and individual's health status [17]. Despite the very large literature examining the validity of the IIH, evidence is still inconclusive, and the debate remains unsolved.

Most of the multilevel studies conducted outside the U.S. have failed to find evidence in favour of the IIH [4]. For Britain, authors found limited evidence of the association between regional income inequality and worse self-rated health, especially among those with the lowest incomes [21]. Across European countries, using the longitudinal data from the European Community Household Panel Survey (1994–2001), authors found statistically significant evidence supporting the IIH, though the magnitude of such effect was very small [22]. Similar findings were obtained for Canada [23], and for Japan [24].

Interestingly, most non-US studies that report a nil association between income inequality and health correspond to industrialized economies with more egalitarian income distribution than the U.S., and stronger welfare regimes. The economic and social security policies in these countries, including the provision of comprehensive and universal healthcare, make income inequality smaller and are likely to reduce the potential impact of income inequality on individuals' health. Conversely, research pieces of countries with relatively high unequal income distributions tend to report a statistically significant relationship between income distribution and health [7]. In Chile, for instance, Subramanian and collages examined the cross-sectional multilevel associations between income inequality and self-rated poor health, finding evidence in favour of the IIH [25]. Similarly, for Brazil, another more unequal country than the U.S, authors identified a strong statistical negative association between income inequality and life expectancy, by using a panel dataset for the 27 Brazilian states over the period 2000–2009 [26]. Studies for Ecuador and for India also found a strong association between economic inequality and health [27, 28]. This has led some scholars to suspect the existence of a threshold above which income inequality affects health outcomes [4, 9].

Despite the few studies mentioned above, the IIH literature focused on low-middle-income countries is still minimal [29, 30]. More empirical studies in these countries are needed to understand under which conditions income inequality has a detrimental effect on population health. Further research could also provide a better understanding of the methodological aspects that drive the different results concerning the role of income distribution on individuals' health.

Methods

Data from the 2011–2019 Quality of Life National Survey (*Encuesta Nacional de Calidad de Vida* –ECV) was used to examine the income inequality-health association. Data from 2017 was not included since relevant questions for the research were not added to that year's survey. The ECV is a national, population-based survey that is carried out every year by the National Administrative Department of Statistics (DANE). The sampling information from these surveys is representative of the national total and nine big regions. Within regions (except for San Andrés, Orinoquía-Amazonas and Bogotá), the survey is representative of urban centres, hamlets and dispersed rural areas. For comparability purposes with past studies [17, 22], the sample is limited to individuals between the ages of 24 and 75. The resulting sample consists of 567,678 individual observations over eight years of the survey.

Health indicator

Self-rated health, an overall assessment by the individual of their health status, is the most common outcome variable in the literature that studies the relationship between inequality and health [7]. It is a common measure of an individual's health. Multiple studies have found it to be a robust predictor of subsequent morbidity and mortality [31–33]. In the ECV, the self-reported health variable is measured on a 4-point scale labelled very good, good, fair and bad/poor, and individuals respond to the question: "*In general terms, the health status of respondent's name is…*?". All household members are required to answer this question, which is formulated directly to individuals aged 18 or older. Following a study in the United States, among other previous studies, this health-indicator is dichotomized with 0 for "*very good or good*" and 1 for "*fair or poor*" [17]. Dichotomizing this 4-point scale variable is a useful strategy for increasing the reliability of self-rated health in the general population [34].

In the region-level sample, on average, 80.8% of men and 73.1% of women reported being in very good or good health. This observation is consistent with the "gender paradox in health"; women tend to report higher morbidity rates than men, even though they experience greater longevity than their counterparts [35]. Table 1 shows the distribution of self-reported health by region and gender. Fair or poor health prevalence ranges from 10.9%-8.0% in San Andres to 33.1%-42.3% in Pacífico, which is the most disadvantaged region in Colombia.

Individual income and regional measures of income inequality

The household gross income variable is constructed by the DANE. Household gross income data is expressed