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Wealth and inequality gradients for the detection and control of hypertension in older individuals in middle-income economies around 2007-2015

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Wealth and inequality gradients for the detection and control of hypertension in older individuals in middle-income economies around 2007-2015

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Abstract

Socioeconomic inequalities in the detection and treatment of non-communicable diseases represent a challenge for healthcare systems in middle-income countries (MICs) in the context of population ageing. This challenge is particularly pressing regarding hypertension due to its increasing prevalence among older individuals in MICs, especially among those with lower socioeconomic status (SES). Using comparative data for China, Colombia, Ghana, India, Mexico, Russia and South Africa, we systematically assess the association between SES, measured in the form of a wealth index, and hypertension detection and control around the years 2007-15. Furthermore, we determine what observable factors, such as socio-demographic and health characteristics, explain existing SES-related inequalities in hypertension detection and control using a Blinder-Oaxaca decomposition. Results show that the prevalence of undetected hypertension is significantly associated with lower SES. For uncontrolled hypertension, there is evidence of a significant gradient in three of the six countries at the time the data were collected. Differences between rural and urban areas as well as lower and higher educated individuals account for the largest proportion of SES-inequalities in hypertension detection and control at the time. Improved access to primary healthcare in MICs since then may have contributed to a reduction in health inequalities in detection and treatment of hypertension. However, whether this indeed has been the case remains to be investigated.

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Data Availability: Minimum replication scripts and data is avaialable at: https://github.com/androdri1/HBP_wealthgradient Full data is available at the SAGE project webpage: https://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/sage/about And upon request to Ministerio de Salud y Protección Social de Colombia: Dirección de Epidemiología y Demografía, which should be done through the webpage: https://tramites.minsalud.gov.co/tramitesservicios/.

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1 Introduction

The burden of non-communicable diseases (NCDs) in middle-income countries (MICs) is growing due to demographic and lifestyle changes. Already 85% of all premature NCDs deaths are in MICs [1]. This is a pressing concern for low-resourced economies which have yet to deal with transmissible diseases as well as the lack of adequate human capital and physical resources of their healthcare systems [2], therefore threatening to achieve the Sustainable Development Goal of universal healthcare coverage that most countries are committed to [3]. One condition that summarises this threat is hypertension or high blood pressure (HBP), a condition which affects 22% of the population aged 18 years or older [1] and about 60% of individuals aged 60 years or older worldwide [4]. Yet, it is preventable and treatable, making it a specifically useful measure of healthcare system effectiveness [5].

Besides universal coverage, another critical objective of healthcare systems is to improve health equity, thus reducing inequalities in health according to socioeconomic status (SES), and in particular to wealth [6]. There exist significant health disparities according to SES in most MICs, with an epidemiological transition occurring during which the disease burden of NCDs is shifting from individuals with higher SES to individuals with lower SES [7]. Inequalities in access are often associated with the source of health insurance funding, partly driven by the large informal sector of the economy in MICs.

Although the successful prevention and treatment of NCDs among individuals from all socio-economic backgrounds present a litmus test for health systems in MICs [8], evidence on inequalities in NCDs in MICs and the potential effectiveness of healthcare systems in reducing the latter has at least two crucial shortcomings. First, few studies use objectively measured prevalence of NCD in general and HBP in particular, mostly relying on self-reported prevalence. This is problematic for two reasons. On the one hand, as a result of often poor health literacy among individuals with low SES, self-reported prevalence often overestimate their health status and are thus not aware of existing health conditions [9]. On the other hand, self-reports of HBP prevalence mostly relies on questions asking about conditions diagnosed by a doctor. This may lead to significant under-estimations of HBP prevalence among individuals from lower SES groups due to well-documented barriers in access to healthcare services among these groups. Second, although some studies have assessed the magnitude of inequalities in objectively measured HBP in MICs [10–21], little evidence exists on the factors associated with those inequalities, and especially the question whether healthcare systems effectively reduce inequities in health.

In this study, we use information from a group of seven MICs (China, Colombia, Ghana, India, Mexico, Russia and South Africa), corresponding to the years between 2007–2010 (2015 for Colombia), to assess: 1) levels of SES-related inequalities in (undetected and uncontrolled) HBP, 2) the association between HBP with individuals' socio-demographic characteristics as well as health insurance coverage, and 3) the contribution of different socio-demographic characteristics in explaining existing SES inequalities in HBP.

While undetected and uncontrolled HBP represent two inter-related outcomes of great importance for assessing wealth-related inequalities, given their direct relevance for HBP prevalence in the population, several mechanisms may explain SES-related inequalities therein. On the one hand, differences in (access to) material as well as immaterial resources, including income, transportation, time and health literacy between wealth groups, likely leads to individuals with lower SES having lower chances of being successfully diagnosed with HBP as well as having controlled HBP compared to individuals with higher wealth. For example, individuals with lower SES may lack the income to pay for transportation to see a doctor, while—at the same time—may also face significantly longer transportation times to the nearest doctor, compared to individuals with higher wealth. On the other hand, features of the healthcare system may exacerbate such SES-related inequalities in various ways. For example, lack of health insurance and co-payments for doctor visits and medicines often represent a significant barrier for effective healthcare coverage among individuals with lower wealth. Compared with individuals with higher SES, individuals with lower wealth are therefore less likely to consult a doctor, i.e., be diagnosed with HBP and less likely to be successfully treated for HBP. For the aforementioned reasons, we hypothesise that—in all countries under study—lower SES is significantly associated with a lower likelihood of detected and controlled HBP.

2 Materials and methods

2.1 Data

The Study on Global Ageing and Adult Health (SAGE) project compiles studies on the population aged 60 and older. Countries included are China, Ghana, India, Mexico, Russian Federation and South Africa. We are using SAGE wave 0, which for China includes information for years 2007/08 and 2009/10; Ghana 2007/08; India 2007/08; México 2009/10; Russia 2007/08 and 2009/10; and South Africa 2007/08 [22]. Unfortunately, at the time of writing this study, we were not able to get access to the second wave studies collected at 2014/15. These surveys measure the determinants of active ageing through SES data, the physical and social environment, behaviour, cognition and affect, functionality, mental well-being, medical and health conditions, as well as use and access to health services.

For Colombia, the Healthcare, Welfare and Ageing Survey (SABE, for its acronym in Spanish) was collected in 2015, and its design is comparable to the other ageing population surveys [23]. Appendix A in S1 Appendix presents the main characteristics of the health systems of these countries.

One of the main characteristics of those surveys among older individuals is that they involve clinical measures such as blood pressure. Following a standardised procedure, nurses measured three times systolic and diastolic BP. After discarding the first BP measurement, we take as our objective measure of HBP whether the average of the measurements is above 140 mmHg for systolic BP (*SysBP*), or above 90 mmHg for diastolic BP (*DiasBP*). This is a standard procedure as the first BP measurement is usually higher than average because respondents tend to be nervous, a phenomenon known as the *white-coat effect*. In SABE, *SysBP* was measured in both arms (six measurements), while in SAGE it only was in one arm (three measurements). In Mexico, there were only two measurements, so we take the second one. Figure A1 in the S1 Appendix presents the densities of the final *SysBP* measure for each country. In this set of six countries, we observe an ample range of BP patterns: from the low levels of India to the high ones of South Africa.

We include in our analysis all observations of individuals aged 60 and older for whom there is available information in the following characteristics: SAGE studies include information for individuals 50 to 59 as well. We exclude them as SABE does not cover this age group. Nevertheless, online Appendix D in S1 Appendix presents the exercise using this sample, which are qualitatively the same as those presented in the main text. valid measurements of blood pressure, self-reported diagnosis of high blood pressure, gender, age, education, weight and height, smoking behaviour, assets, and health insurance (in all countries but Mexico). As a common limitation for using biomarkers data, the resulting sample is likely to be more educated, wealthier and care more for their health than the regular population [24, 25]. See Appendix B in S1 Appendix for further details, and the limitations under the discussion section for the implications of the selection pattern. Table 1 presents the means of the variables included, and sample sizes. In the rest of the document we explain the table and how variables are used. Individual sample weights are used in all exercises. These weights account for sample selection.