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Use of antihypertensive and antidiabetic medications in Brazil: an analysis of socioeconomic differences. National Health Survey, 2013

Utilização de anti-hipertensivos e antidiabéticos no Brasil: análise das diferenças socioeconômicas. Pesquisa Nacional de Saúde 2013

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ABSTRACT: Objectives: To analyze the socioeconomic and demographic differences in medication use to control hypertension and diabetes mellitus in Brazil. **Method:** Data from the National Health Survey (*Pesquisa Nacional de Saúde* – PNS) performed in Brazil in 2013 with a representative sample of the population aged 18 years old or older were analyzed. The use of medications for hypertension and diabetes according to income, education, race, possession of a private health insurance plan and region of household were estimated. The prevalence ratios adjusted for sex and age were also estimated using Poisson regression. **Results:** 81.4% of the hypertensive population used medication to control the disease. The use was higher among females, white/Caucasian individuals and those with a private health plan. In the case of diabetes mellitus, 80.2% of the population used medication to control the disease and the use was higher in elderly patients, patients with a higher level of education, patients with a private health plan, and patients in the Southeast region. Inequalities according to income and health plan were small even in the strata of sex, age and geographic region analyzed. **Conclusion:** We found a high use of medication to control hypertension and diabetes. Socioeconomic inequalities in use were not expressive, probably due to medication policies that promote greater and equitable access to medicines in Brazil.

Keywords: Diabetes mellitus. Arterial hypertension. Drug use. Equity. Health equity. Health surveys.

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RESUMO: *Objetivos:* Avaliar a magnitude de desigualdades socioeconômicas e demográficas da utilização de medicamentos para controle de hipertensão arterial e diabetes *mellitus* na população brasileira. *Método:* Foram analisados dados da Pesquisa Nacional de Saúde (PNS) conduzida no Brasil em 2013, com amostra representativa da população com idade de 18 anos ou mais. Foi estimada a utilização de medicamentos para hipertensão e diabetes segundo renda, escolaridade, raça, posse de plano de saúde e região de moradia. Também foram estimadas as razões de prevalência ajustadas por sexo e idade, por meio de regressão de Poisson. *Resultados:* Entre os hipertensos, 81,4% fazem uso de medicamentos para controle da doença, sendo a utilização maior entre as mulheres, os brancos e os que têm plano de saúde. No caso de diabetes *mellitus*, 80,2% fazem uso de medicamentos para controlar a doença e o uso foi mais elevado entre os pacientes idosos, com maior escolaridade, com plano de saúde e da Região Sudeste. As desigualdades segundo renda e plano de saúde foram de pequena magnitude mesmo nos estratos de sexo, idade e região geográfica analisados. *Conclusão:* Foi constatada utilização de medicamentos para controle da hipertensão e diabetes que pode ser considerada elevada, e as desigualdades socioeconômicas e regionais desse uso revelaram-se de magnitude não expressiva, em virtude da implementação de políticas farmacêuticas no Brasil, que visam promover maior e mais equânime acesso da população a medicamentos.

Palavras-chave: Diabetes mellitus. Hipertensão arterial. Uso de medicamentos. Equidade. Equidade em saúde. Inquéritos de saúde.

INTRODUCTION

The World Health Organization in 2011 launched the challenge of reducing mortality by 25% in chronic noncommunicable diseases (NCDs) by 2025, including diabetes mellitus and high blood pressure. To achieve this goal, access to and use of medicines are essential components^{1,2}.

In Brazil, diabetes mellitus and hypertension are considered priority diseases, because they represent the main cause of morbidity and mortality among adults³, constituting one of the most significant health problems today⁴.

The country has one of the most complex pharmaceutical care services in the world⁵. The National Pharmaceutical Assistance Policy (*Política Nacional de Assistência Farmacêutica* - PNAF) is a public policy aimed at ensuring full, equitable and universal access to medicines within the Unified Health System (*Sistema Único de Saúde* - SUS). The National Medicines Policy (PNM) and the PNAF have considerably expanded this type of access for the Brazilian population⁵. Among the policies and programs implemented for the same purpose, we highlight, at the federal level, the generic drugs policy and the Popular Pharmacy Program of Brazil (*Programa Farmácia Popular do Brasil* - PFPB), as well as state and municipal policies that remarkably expand access to medicines that control diabetes mellitus and hypertension.

Given the importance of medicine in the health system, it is necessary to analyze the use of these products to control highly prevalent diseases, such as hypertension and diabetes mellitus, and specifically the inequalities that persist while using them.

Research shows that social inequalities are present in various areas of health^{6,7,8} and particularly with regard to medicine use⁸. Some studies have analyzed inequalities in hypertensive

and diabetic patients' access to medicines⁹⁻¹⁴, however little is known about how socioeconomic disparities manifest themselves in specific subgroups of sex, age group and geographic regions on a national scale.

The present study aimed to analyze the use of medicines to control hypertension and diabetes mellitus according to demographic and socioeconomic characteristics of the Brazilian population, with special emphasis on income and health insurance inequalities.

METHOD

The present cross-sectional study used data from the National Health Survey (*Pesquisa Nacional de Saúde* - PNS), the largest home-based health survey in Brazil. The survey sample consisted of 60,202 respondents in 1,600 municipalities, and it was conducted by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE) in partnership with the Ministry of Health. The PNS sample was designed to be representative of the country, large regions, federal units, capital cities, and urban and rural areas.

The population interviewed included residents of private households in Brazil. The PNS sample is a subsample of the IBGE's Integrated Home Survey System (*Sistema Integrado de Pesquisas Domiciliares* - SIPD) master sample, a set of area units that are selected to serve various SIPD surveys. These units are considered primary sampling units (PSU) in the sample planning of each of these surveys.

PNS sampling was stratified into three stages. The first stage refers to the PSU subsample in each stratum of the master sample; the second is a simple random sampling selection of households in each PSU selected in the first stage; and the third stage is a simple random sampling of the adults (persons 18 years of age or older) among all adult residents of the household.

The total sample size was 79,875 households, and under the assumption of a 20% non-response rate, a sample of 63,900 households or individual interviews was expected. 60,202 individuals were interviewed. The non-response rate was 8.1%. The following losses were considered: a closed or empty home; residents' refusal to talk to the interviewer; the inability to interview the informant after three or more attempts, even with scheduled visits.

The PNS was approved by the Research Ethics Committee. A detailed description of the research is available in other publications^{15,16}.

In the present study, the dependent variable was the use of medications to control hypertension and the use of medications to control diabetes. The use of antihypertensive drugs was considered for the entire population who reported hypertension and answered yes to the question: "In the last two weeks, did you take medication for hypertension?" Antidiabetic medications were considered for the entire population that indicated having diabetes mellitus and answered yes to at least one of the following questions: "In the last two weeks, did you take any medications for diabetes?" and "In the last two weeks, did you use insulin for diabetes?"

The independent variables were gender, age, income (divided into quartiles, the first quartile was the poorest 25% and the last was the richest 25%), education, health insurance,

race/color and region (North, Northeast, Southeast, South, Midwest). The following variables were used as proxy of socioeconomic status: income, education level, and possession of health insurance.

Pearson's χ^2 tests were performed and Poisson regression analyzes were developed to estimate prevalence ratios and respective 95% confidence intervals (95%CI) to analyze drug use according to the demographic and social variables selected.

The analyzes were performed using Stata[®] software, version 15.0, considering the individuals' weight and the sample parameters (command *svy*).

RESULTS

Drugs to control hypertension were used by 81.4% (95%CI 80.1 - 82.7) of hypertensive people. Use was higher among females, the white population and those with health insurance. This use increased with age and was lower in the Northern Region. No differences were detected between the income and education level categories (Table 1).

In the case of diabetes mellitus, drug use was 80.2% (95%CI 77.9 - 82.3) for diabetics, and was higher in the Southeast Region, the elderly, the most educated patients and those with health insurance, and there was no difference in relation to income (Table 2).

No statistically significant differences were found in the use of antihypertensive and anti-diabetic drugs between income quartiles strata according to different gender, age group and region of residence categories (Table 3).

The use of antihypertensive drugs was higher in patients with health insurance compared to those without health insurance only in the elderly segment (6% higher) and in residents of the Northeast Region (9% higher), and there were no significant differences in the other categories analyzed (Table 4). Antidiabetic drug use was close to 10% among individuals with an insurance plan compared to those without one in almost all of the categories analyzed, with the largest difference (44%) found in the 30 to 59 age group (Table 4).

DISCUSSION

The observed use of drugs for hypertension and diabetes in the Brazilian population can be considered high (81.4 and 80.2%, respectively). The National Survey on Access, Use and the Promotion of Rational Drug Use also estimated high use of hypertension drugs: 94.6% (CI95% 93.5 - 95.5) were taking medication at the time of the interview⁹.

Differences in drug use were found according to the Brazilian regions. The use of anti-diabetic drugs was the highest in the Southeast Region, and the use of antihypertensive drugs was the lowest in the North Region. Similar results were estimated by the Surveillance of Risk Factors and Protection for Chronic Diseases by Telephone Survey (*Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico - VIGITEL*), in which the

Table 1. The use of medications to control hypertension according to demographic and socioeconomic characteristics of the population. National Health Survey (*Pesquisa Nacional de Saúde - PNS*), 2013, Brazil.

Variables	n	%	95%CI	p	PR* (CI)
Age range (years)					
18–29	141	35.1	27.9 – 43.2	< 0.001	1
30–59	4.897	76.8	74.9 – 78.6		2.16 (1.74 – 2.70)
60 or older	4.979	90.9	89.8 – 91.5		2.56 (2.06 – 3.18)
Sex					
Male	3.374	76.7	74.5 – 78.7	< 0.001	1
Female	6.643	84.6	83.2 – 85.9		1.09 (1.06 – 1.12)
Income in quartiles					
1 st quartile	2.310	81.3	78.7 – 83.7	0.02	1
2 nd quartile	2.241	79.7	77.1 – 82.1		0.98 (0.94 – 1.03)
3 rd quartile	2.679	82	79.7 – 84.1		1.01 (0.97 – 1.04)
4 th quartile	2.787	82.1	79.7 – 84.1		1.01 (0.97 – 1.05)
Education level					
Illiterate/ elementary school not completed	2.158	84.4	81.7 – 86.7	< 0.001	1
Elementary school completed / middle school not completed	3.730	83.7	81.7 – 85.5		1.04 (0.99 – 1.07)
Middle school completed/high school not completed	1.154	79.7	76.1 – 82.7		1.05(1.00 – 1.11)
High school completed /higher education not completed	1.883	75.4	72.3 – 78.3		1.00(0.96 – 1.05)
Completed higher education	1.092	81.6	77.5 – 81.2		1.05 (1.00 – 1.11)
Race/color					
White	4.435	84.5	82.8 – 85.9	< 0.001	1
Dark-skinned black	1.032	79.6	75.4 – 83.3		0.95 (0.90 – 1.00)
Light-skinned black	4.417	78.2	76.1 – 80.2		0.95 (0.92 – 0.98)
Health Insurance					
Yes	3.011	85.0	82.8 – 87.0	0.0001	1
No	7.006	79.7	78.2 – 81.2		0.94 (0.91 – 0.97)
Region					
North	1.359	71.4	67.5 – 74.9	< 0.001	1
Northeast	2.961	78.5	75.9 – 80.8		1.09 (1.03 – 1.51)
Midwest	2.859	83.4	81.3 – 85.3		1.15 (1.09 – 1.21)
Southeast	1.513	83.5	80.6 – 86.1		1.15 (1.09 – 1.22)
South	1.325	80.3	77.3 – 82.9		1.12 (1.06 – 1.19)

95%CI: 95% confidence interval; PR: prevalence ratio; *prevalence ratio adjusted for age and sex.

Table 2. Use of medications to control diabetes mellitus according to sociodemographic and socioeconomic characteristics of the population. National Health Survey (PNS), 2013, Brazil.

Variables	n	%	95%CI	p	PR* (CI)
Age range (years)					
18–29	36	59.5	41.0 – 83.7	0.0021	1
30–59	1.244	78.0	74.5 – 81.1		1.31 (0.98 – 1.76)
60 or older	1.614	83.1	80.0 – 86.5		1.40 (1.05 – 1.87)
Sex					
Male	1.004	81.2	77.4 – 84.4	0.5019	1
Female	1.890	79.6	76.5 – 82.3		0.96 (0.92 – 1.03)
Income in quartiles					
1 st quartile	681	78.5	73.1 – 83.1	0.11	1
2 nd quartile	631	79.1	74.3 – 83.2		1.01 (0.92 – 1.09)
3 rd quartile	752	82.3	76.9 – 85.1		1.04 (0.96 – 1.13)
4 th quartile	830	81.1	76.7 – 84.8		1.03 (0.95 – 1.12)
Education level					
Illiterate/ elementary school not completed	672	76.1	70.1 – 81.2	0.0073	1
Elementary school completed / middle school not completed	1.095	78.4	74.4 – 81.8		1.04(0.96 – 1.14)
Middle school completed/high school not completed	344	83.0	76.8 – 87.7		1.14(1.03 – 1.27)
High school completed /higher education not completed	501	81.8	76.5 – 86.2		1.14(1.03 – 1.26)
Completed higher education	282	90.8	86.2 – 94.0		1.23(1.13 – 1.35)
Race/color					
White	1.277	82.5	79.3 – 85.3	0.0588	1
Dark-skinned black	323	79.8%	72.3 – 85.7		0.97 (0.89 – 1.07)
Light-skinned black	1.246	76.8%	72.9 – 80.3		0.94 (0.89 – 1.00)
Health Insurance					
Yes	930	86.4	82.5 – 89.6	0.0002	1
No	1.964	77.2	74.2 – 79.9		0.89 (0.85 – 0.95)
Region					
North	386	74.1	66.4 – 80.5	0.001	1
Northeast	837	76.0	71.5 – 80.1		1.01 (0.92 – 1.13)
Midwest	898	84.6	80.8 – 87.7		1.13 (1.02 – 1.25)
Southeast	394	76.5	69.8 – 82.0		1.03 (0.91 – 1.16)
South	379	75.4	70.0 – 80.1		1.01 (0.90 – 1.13)

95%CI: 95% confidence interval; PR: prevalence ratio; *prevalence ratio adjusted for age and sex.

Table 3. Prevalence ratios of medicine use for the control of hypertension and diabetes according to income. National Health Survey (PNS), 2013, Brazil.

	Hypertension		
	Second quartile*	Third quartile*	Fourth quartile*
Sex			
Male	0.95 (0.90 – 1.00)	1.02 (0.98 – 1.06)	0.99 (0.95 – 1.04)
Female	0.98 (0.94 – 1.02)	1.00 (0.97 – 1.04)	1.01 (0.97 – 1.05)
Age range (years)			
18–29	0.88 (0.51 – 1.52)	0.60 (0.33 – 1.10)	0.77 (0.46 – 1.28)
30–59	0.97 (0.91 – 1.04)	0.99 (0.93 – 1.05)	0.99 (0.93 – 1.05)
60 or older	1.00 (0.95 – 1.05)	1.04 (1.00 – 1.09)	1.05 (1.00 – 1.09)
Region			
North	0.88 (0.76 – 1.02)	0.89 (0.76 – 1.05)	1.11 (0.99 – 1.24)
Northeast	0.98 (0.91 – 1.05)	0.94 (0.87 – 1.01)	0.94 (0.86 – 1.03)
Midwest	1.04 (0.95 – 1.15)	1.02 (0.93 – 1.13)	0.94 (0.85 – 1.06)
Southeast	0.98 (0.91 – 1.06)	1.02 (0.96 – 1.10)	1.01 (0.93 – 1.08)
South	0.94 (0.83 – 1.05)	0.98 (0.89 – 1.08)	0.98 (0.89 – 1.07)
Total	0.98 (0.94 – 1.02)	1.01 (0.97 – 1.04)	1.00 (0.97 – 1.05)
Diabetes	Second quartile*	Third quartile*	Fourth quartile*
Sex			
Male	1.02 (0.89 – 1.17)	1.03 (0.90 – 1.19)	1.03 (0.90 – 1.18)
Female	0.99 (0.89 – 1.11)	1.03 (0.93 – 1.14)	1.03 (0.94 – 1.15)
Age range (years)			
18–29	0.87 (0.29 – 2.54)	0.92 (0.35 – 2.38)	1.80 (0.89 – 3.60)
30–59	0.97 (0.85 – 1.11)	1.05 (0.93 – 1.20)	1.03 (0.91 – 1.16)
60 or older	1.04 (0.94 – 1.16)	1.04 (0.93 – 1.15)	1.01 (0.91 – 1.13)
Region			
North	1.04 (0.79 – 1.37)	1.24 (0.99 – 1.37)	1.25 (0.98 – 1.60)
Northeast	0.91 (0.80 – 1.04)	0.93 (0.80 – 1.09)	0.84 (0.69 – 1.01)
Midwest	0.97 (0.77 – 1.22)	1.05 (0.85 – 1.30)	1.06 (0.86 – 1.31)
Southeast	1.05 (0.91 – 1.22)	1.08 (0.94 – 1.23)	1.08 (0.95 – 1.24)
South	1.01 (0.76 – 1.32)	0.98 (0.74 – 1.29)	0.93 (0.71 – 1.23)
Total	1.01 (0.92 – 1.09)	1.03 (0.95 – 1.12)	1.03 (0.95 – 1.12)

*Reference category: 1st quartile (25% poorest).

percentage of hypertensive patients who use medicines in the capital cities of the country's regions ranged from 71.0% (95%CI 67.8 - 73.9) in the North Region to 85.3% (95%CI 82.8 - 87.5) in the Southeast Region. Among diabetics, this percentage ranged from 83.5% (95%CI 78.3 - 87.6) in the Southeast and 81.9% (95%CI 76.7 - 86.1) in the Midwest¹⁷.

SUS has increased coverage of health services and has been promoting increased access to medicines and other health supplies for the population. Worldwide, 3.5 billion people are excluded from access to essential medicines. Brazil is different, due to its public policies adopted, such as PNAF, PNM and PFPB. There has been an increased supply of drugs starting from the creation of SUS to the present day. As well as this research, other studies have also analyzed the use of medicines as a proxy for obtaining these inputs and have shown that the advancement of policies in the qualification of pharmaceutical care has had a positive impact on the Brazilian population's access to medicines.⁹⁻¹¹ There are many advances in the area of pharmaceutical care in the country, and the relentless pursuit of improved access to medicines to treat the most prevalent diseases in the population, including hypertension and diabetes. Controlling them these diseases in the population poses a challenge to the health system.^{14,18}

Increased coverage of the Family Health Strategy (FHS), one of the most important user contacts with the health service in Brazil¹⁹, is related to the high use of hypertension and

Table 4. Prevalence ratios of drug use for the control of hypertension and diabetes according to possession of a health insurance plan. National Health Survey (PNS), 2013, Brazil.

Category	Prevalence ratio and Confidence Interval (CI) adjusted for age and sex	
	Hypertension	Diabetes
Sex		
Male	1.05 (1.02 – 1.1)	1.08 (1.02 – 1.15)
Female	1.04 (1.01 – 1.06)	1.09 (1.02 – 1.15)
Age range (years)		
18–29	0.99 (0.78 – 1.1)	0.98 (0.88 – 1.15)
30–59	0.97 (0.87 – 1.07)	1.44 (1.25 – 1.66)
60 or older	1.06 (1.03 – 1.1)	1.12 (1.07 – 1.18)
Region		
North	1.06 (0.99 – 1.13)	1.11 (1.01 – 1.21)
Northeast	1.09 (1.06 – 1.12)	1.07 (0.98 – 1.15)
Midwest	1.03 (0.99 – 1.07)	1.10 (1.01 – 1.18)
Southeast	1.03 (1.00 – 1.06)	1.07 (1.02 – 1.12)
South	1.03 (1.00 – 1.07)	1.08 (0.98 – 1.18)
Total	1.05 (1.03 – 1.07)	1.08 (1.04 – 1.12)

*Reference category: no health insurance plan.

diabetes medicines, and has led to increased access to these services. The control of systemic arterial hypertension and diabetes mellitus is one of the goals of the FHS, which established the Basic Health Unit (BHU) as the population's main route of access to the public health system, with significant growth in the last few years. The strengthening of the FHS is one of the advances achieved with the creation of the SUS, which promoted increased access to health services at the primary, secondary and tertiary levels^{4,19}.

Medicine use was higher in the older age groups. Older people, in general, have more comorbidities and resort more to health services⁸, which may explain this greater use when compared to young people. According to Ramos et al.²⁰, drug use increases with age, possibly resulting in a complex therapeutic regimen, which enhances adverse drug effects and increases costs. In chronic patients whose treatment relies on pharmacotherapy, this adverse effect is even more complex.

The prevalence of medication taken for diabetes control was higher in individuals with higher levels of education, compared to illiterate individuals or individuals who did not complete primary school. The prevalence was also higher in the Southeast, a region with high rates of economic development.

The use of antihypertensive drugs was lower in the Northern Region, which has lower rates of development, and geographic microregions that may have higher barriers to access compared to the Southeast. The regional inequalities observed in this study may result from differences in coverage and access to health services, the quality of patient care, and the provision of medicine and other inputs.

Individuals with health insurance tend to have a higher prevalence of hypertension medication use. This inequality is present in the Northeast Region, but not in other regions. Regarding the consumption of diabetes drugs, inequality from insurance plans is more frequent and was observed in both sexes, in the elderly, in the North, Midwest and Southeast of Brazil. The literature reports underutilization of medicines due to the financial difficulty of portions of the Brazilian population. According to Nunes et al.²¹, equality in the right of access, one of the principles of SUS, does not, by itself, ensure equitable treatment, which includes medicine.

The Brazilian population has lived for decades with one of the highest income concentrations in the world²¹. Changes in the socioeconomic conditions of Brazilians since 2003, with economic growth and social policies, such as an increase in the minimum wage above inflation and income transfer policies, have reduced the picture of inequalities. Alston et al.²² argue that there was a significant process of social inclusion in Brazil that reduced poverty and inequality to unprecedented levels. The authors call this process dissipative inclusion and claim that this results in greater economic growth and well-being of the population. The importance of SUS in the process of building the national health system according to the premise of equity is emphasized. This can be supported by the results of the present study, which showed that there was no difference in the use of hypertension and diabetes medications between quartiles. The differences in the use of antidiabetic drugs according to education level and health insurance plans were small.

The magnitude of inequalities in the use of antihypertensive and antidiabetic drugs has been minimized due to the implementation of pharmaceutical care qualification policies,

which have an impact on providing access to medicines, and drug distribution policies implemented in Brazil. Antihypertensive and antidiabetic distribution programs reach the entire population and all income groups.

Programs such as the PFPB, which offers antihypertensive and antidiabetic drugs through user co-participation, and the Health Has no Price (*Saúde não Tem Preço* - SNTF) campaign, which offers them free of charge, have increased access to medicine for low-income people. Costa et al.¹¹ and Costa et al.¹⁴ reinforce the importance of PFPB for obtaining such medicines. In addition, the Generic Medicines Policy led to a drop in drug prices with the large increase in the supply of drugs to the population. There was a strong stimulus for the production and sale of generics, whose circulation in 2011 was 550 million units. In 2011, they were responsible for 24% of the country's drug market²³.

The implementation of these drug distribution programs and policies aimed at providing the population with greater and more equitable access to such products, such as the Generic Medicines Policy and the PFPB^{12,13,24}, strongly contribute to explain the study results, in which inequalities in use were found, but not of such magnitude as inequalities found in other areas of health services²⁵⁻²⁸.

In this research, small inequalities were observed according to education level and health insurance in the consumption of diabetes control drugs. For hypertension, the study found no inequalities according to income or education level, and a weak association with health insurance and between Brazilian regions was estimated. These results highlight the importance of drug policies in Brazil and warn that these strategies should be maintained and permanently evaluated. When considering the results of the investigation, it is necessary to take into account the information bias with regard to medicine use - self-reported information - however the interviewers were trained in an attempt to minimize this bias.

Among the strengths of the study are the scope and representativeness of the sample of the Brazilian adult population. The study provides a stratified analysis of inequalities in the use of medications for hypertensive and diabetic patients according to income and health insurance plan and according to population segments of sex, age and geographic region of Brazil, allowing for a more specific understanding of the effect of socioeconomic inequality in this regard. The estimates made will serve as a basis for monitoring these inequalities in the country.

CONCLUSION

The study results reinforce the importance of government initiatives seeking to improve access to medicines. The maintenance of all efforts to combat social inequalities in health in Brazil is necessary. Brazil has a privileged situation for the debate on social inequalities, mainly due to its commitment to health equity, stated in the 1988 Constitution, which defined the principles and guidelines for the organization of SUS. The present study enhances the small difference in the use of antihypertensive and antidiabetic drugs according to income,

education level and health insurance plan, and enhances the importance of maintaining and improving the qualification policies of pharmaceutical care that further expands access to medicines and ensures equitable use.

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