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Access to medication in the Public Health System and equity: populational health surveys in São Paulo, Brazil

Acesso a medicamentos pelo Sistema Único de Saúde e equidade: inquéritos de base populacional em São Paulo, Brasil

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ABSTRACT: ***Introduction:*** Since 2003, the access to medication has been increasing in Brazil and particularly in São Paulo. The present study aimed to analyze the access to medication obtained in the public sector and the socioeconomic differences in this access in 2003 and 2008. Also, we explored the difference in access to medication from 2003 to 2008. ***Method:*** Data were obtained from two cross-sectional population-based household surveys from São Paulo, Brazil (ISA-Capital 2003 and ISA-Capital 2008). Concentration curve and concentration index were calculated to analyze the associations between socioeconomic factors and access to medication in the public sector. Additionally, the differences between 2003 and 2008 regarding socioeconomic characteristics and access to medication were studied. ***Results:*** Access to medication was 89.55% in 2003 and 92.99% in 2008, and the proportion of access to medication did not change in the period. Access in the public sector increased from 26.40% in 2003 to 48.55% in 2008 and there was a decrease in the concentration index between 2003 and 2008 in access to medication in the public sector. ***Conclusions:*** The findings indicate an expansion of Brazilian Unified Health System (*Sistema Único de Saúde*) users, with the inclusion of people of higher socioeconomic position in the public sector. As the SUS gives more support to people of lower socioeconomic position in terms of medication provision, the SUS tends to equity. Nevertheless, universal coverage for medication and equity in access to medication in the public sector are still challenges for the Brazilian public health system.

Keywords: Healthcare disparities. Medication systems. Equity in health. Equity in access. Pharmaceutical services. Universal access to health care services.

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RESUMO: ***Introdução:*** Desde 2003, o acesso da população a medicamentos tem aumentado no Brasil e particularmente em São Paulo. O estudo visou analisar o acesso a medicamentos obtidos do setor público e as desigualdades socioeconômicas nesse acesso em 2003 e em 2008. ***Método:*** Os dados são provenientes dos inquéritos domiciliares de saúde ISA-Capital, realizados na cidade de São Paulo em 2003 e em 2008. Foi feita Regressão Logística para analisar os fatores associados ao acesso a medicamentos. A análise das desigualdades no acesso a medicamentos foi feita a partir da Curva de Concentração e Índice de Concentração. Adicionalmente, as diferenças entre os anos de 2003 e 2008 com relação às características socioeconômicas e ao acesso a medicamentos foram estudadas. ***Resultados:*** O acesso a medicamentos foi 89,55% em 2003 e 92,99% em 2008. O acesso a medicamentos pelo setor público aumentou de 26,40% em 2003 para 48,55% em 2008 e foi maior na população com menor poder aquisitivo, porém houve mudança no índice de concentração entre 2003 e 2008. ***Conclusões:*** Os achados indicam a expansão da clientela do Sistema Único de Saúde na cobertura de medicamentos, com a entrada da população com maior poder aquisitivo no setor público. O acesso continua maior na população com menor poder aquisitivo, o que sugere que o SUS tenta a equidade na provisão de medicamentos. Entretanto, a cobertura universal para gastos com medicamentos essenciais e a equidade no acesso a medicamentos pelo setor público ainda são desafios para o SUS.

Palavras-chave: Disparidades em assistência à saúde. Sistemas de medicação. Equidade em Saúde. Assistência farmacêutica. Acesso universal a serviços de saúde.

INTRODUCTION

The public health care system in Brazil is universal and aims to provide vaccination, pharmaceutical care, general practice, medical specialists, hospital care, dental care and others health care services to all[1]. The Brazilian Unified Health System (*Sistema Único de Saúde* – SUS) is a dynamic and complex health system which aims to provide comprehensive, universal, preventive and curative care through the provision of health services[1,2].

The pharmaceutical care system in Brazil is one of the most complex services in the world[3,4]. In 1998, the government approved the National Medicines Policy[5], based on Pharmaceutical Assistance Reorientation, in an attempt to promote access to, and the rational use of, medicines. The public sector covers medication that is listed as "essential medication", i.e. medication to treat the most prevalent diseases in Brazil and included in Ministry of Health pharmaceutical care list, the National Essential Medicines List (Rename)[4]. Medications included in Rename are considered basic and indispensable for most population health problems. Rename should also guide the standardization, prescription and supply of medicines, mainly within SUS[5,6].

Universal access to essential medication was standardized by SUS in 1998 and there has been an increase in the supply of medication for health care since this date[4]. Brazilian national pharmaceutical policies since 1998 include programs which aim to improve access to medication in Brazil such as the Generic Drug Policy[7] and the *Programa Farmácia Popular do Brasil* (Popular Drugstore program)[3,4], and also *Dose Certa*[8], *Remédio em casa*[9] and HiperDia[10].

Despite these public programs to improve access to medication, guaranteeing access to essential medicines is still a challenge in Brazil[6]. Access is influenced by sociodemographic and socioeconomic factors[11]. Among the socioeconomic factors, cost is one of the main barriers to obtaining medication[12]. Within the health care budget in Brazil, around 30% of health care expenditure is on medication[12]. The proportion of medication expenditure on the low income population is significantly higher than that spent on the high income population[12,13]. This may reflect the socioeconomic and health inequalities in Brazil generally and particularly in São Paulo, which has considerable and persistent inequalities, with a Gini Coefficient[14] of 0.57 in 1991, 0.62 in 2000 and 0.65 in 2010[13].

There has been an increase in the provision of medication in the public sector due to the programs mentioned above and income disparities in access to medication[3,5,6]. It is important to analyze medication coverage in the public sector in relation to socioeconomic inequalities. The present study aimed to analyze access to medication and socioeconomic differences in access to medication covered by the public sector in São Paulo in 2003 and in 2008. In addition, the study explored the difference in access to medication from 2003 to 2008.

METHODS

Data comes from two cross-sectional population-based household surveys *Inquéritos de Saúde no município de São Paulo* (ISA-Capital) 2003 and ISA-Capital 2008, that investigated the living conditions, health status and access to health care services of non-institutionalized residents of São Paulo, Brazil.

The methodologies used in the two surveys were based on probability samples[15,16]. In 2003, 60 sectors were randomly sampled from the 264 census tracts, previously selected by the *Instituto Brasileiro de Geografia e Estatística* (IBGE)[17] for the Brazilian Household Survey. In 2008, 70 sectors were randomly sampled from the 267 census tracts selected by the IBGE[18] for the Brazilian Household Survey.

In 2003, the census tracts were stratified according to education level (lower, middle, higher), defined by the educational level of the head of each household. The desired number of tracts was then selected. In the second stage, households were sampled from the selected tracts in order to obtain an adequate sample size for each domain. The domains were based on gender (male, female) and age group (< 1 year, 1 – 11 years, 12 – 19 years, 20 – 59 year, > 60 years). In 2008, the census tracts were stratified according to age and gender.

A stratified sample of 420 respondents in each domain was approached for interview. The response rate was 78.62% in 2003 and 76.41% in 2008. In 2003, 3,357 people were interviewed, and 3,271 were interviewed in 2008. Strategies to ensure the quality and consistency of data included close supervision of interviewers in the field, review of all questionnaires, and re-interviewing of 5% of participants.

The surveys were financed by the Municipal Health Secretary of São Paulo. Researchers from three universities in São Paulo state (*Universidade de São Paulo, Universidade Estadual de Campinas* and *Universidade Estadual Paulista "Júlio de Mesquita Filho"*) participated in the surveys. The Research Ethics Committee of the University of São Paulo approved the design and conduct of the study.

The design and characteristics of ISA-Capital 2003 and ISA-Capital 2008 are described in detail at: http://www.fsp.usp.br/isa-sp

The following demographic factors were examined: age (0 – 11 years, 12 – 19 years, 20 – 59 years and 60 or more) and gender.

The socioeconomic factors studied were: ethnicity (Caucasian when respondents reported white and non-Caucasian when respondents reported black/mixed/other), housing condition, education (0 – 3, 4 – 11 and 12 or more years of study), income (monthly family income per head), classified as ≤ 2.00, > 2.00 to 4.99 and ≥ 5.00 minimum legal wage (mlw), in 2003 and in 2008. In 2008, the variable "having a private health plan" was also studied.

We did not adjust the variable monthly family income per head (income) for inflation. The minimum legal wage in 2003 was R$ 240.00, and in 2008, R$ 415.00. Housing condition was divided into adequate or inadequate; it was considered adequate when the house had piped water from the public network, had electric lighting, was connected to the sewer system and had an internal lavatory. When any of these factors was not present, the housing was considered inadequate.

The outcomes considered in this study were:

- Access to medication prescribed in the health care service – respondents who had used health care services in the last two weeks were asked whether they had been prescribed medication and whether they had had access to medication. Respondents were categorized as "had access to medication prescribed in health care service" and "did not have access to medication prescribed in health care service". If more than one medication was prescribed and the respondent had access to at least one of them, it was categorized as "had access to medication prescribed in health care service".
- Access to medication in the public sector – we are interested in whether the prescribed medications were financed by the public sector (SUS) or by the private sector (e.g. private health insurance). Respondents who had used health care services in the previous two weeks and had had access to medication were asked whether this medication was provided by the public or private sector.

The samples ISA-Capital 2003 and ISA-Capital 2008 were weighted to compensate for the different selection probabilities. Weighting was done at the individual level, the sectors were weighted for access to different sampling fractions in the strata. The differences between 2003 and 2008 regarding socioeconomic characteristics/health status and access to medication were analyzed by corrected Satterthwaite χ^2 tests.

Crude and adjusted logistic regressions were used to explore the associations between socioeconomic factors/health status and access to medication in the public sector. The model 0 represents the crude odds ratio (OR) between socioeconomic factors and access to medication and model 1 was adjusted by age and gender. Significance was judged using $\alpha = 0.05$.

A concentration curve adjusted for sociodemographic factors was used to explore the associations between income and access to medication in the public sector. On the graph, a straight diagonal line represents perfect equality of distribution; the concentration curve line beneath or above shows the reality of the distribution. The concentration curve is a function of the cumulative proportion of ordered individuals mapped onto the corresponding cumulative proportion of their size; a larger area implies major inequality[19]. In the present study, the concentration curve plots cumulative income by access to medication in the public sector adjusted for age, gender and chronic disease.

Concentration index (ci), which is directly related to concentration curve, was used to measure the degree of socioeconomic inequalities in access to medication in the public sector in 2003 and in 2008. The concentration index is defined as twice the area between the concentration curve and the line of equality (the 45-degree line). If there is no socioeconomic-related inequality, the concentration index is zero. The convention is that the index takes a negative value when the curve lies above the line of equality, indicating a disproportionate concentration of the health variable among the poor, and a positive value when it lies below the line of equality[20].

Concentration curve and concentration index were analyzed as indicated by Wagstaff et al.[21]. Analyses were carried out in Stata 12.0 using the survey package, which considers the effects of complex study design and allows the different weights of the observations to be embedded.

RESULTS

Table 1 shows the descriptive results of the sample and differences between 2003 and 2008. Socioeconomic factors and health status did not change between 2003 and 2008. Access to medication was high in 2003 (89.55%) and in 2008 (92.99%). Access to medication in the public sector increases from 26.40% in 2003 to 48.55% in 2008, and the change is significant.

Table 2 shows access to medication in the public sector in 2003 and in 2008 by categories of education, income, housing condition and ethnicity. Access to medication in the public sector adjusted for age and gender was higher in non-Caucasians in 2003. In 2008, access in the public sector was higher in people with lower education, lower income and in those without a private health plan.

Regarding socioeconomic differences in access to medication in the public sector, in 2003 the concentration index was -0.63 (Standard Deviation (SD) = 0.134; Confidence Interval (CI) = 95%CI -0.37 – -0.88). In 2008, it was -0.52 (SD = 0,132; 95%CI -0.26 – -0.77). Figures 1 and 2 show the concentration curves for 2003 and 2008, respectively.

Table 1. Characteristics of the ISA-Capital 2003 and ISA-Capital 2008 respondents living in the city of São Paulo, Brazil.

Socioeconomic and sociodeographic factors and Access to medication	2003 n (%)	2008 n (%)	Difference 2003-2008 (p-value)*
Sociodemographic factors			
Age group (years)			0.254
0 – 11	843 (19.78)	580 (19.73)	
12 – 19	847(15.05)	605 (12.15)	
20 – 59	795 (54.76)	1162 (57.00)	
≥ 60	872 (10.42)	924 (11.12)	
Gender			0.347
Male	1678 (47.46)	1444 (47.44)	
Female	1679 (52.54)	1827 (52.56)	
Socioeconomic factors			
Ethnicity			0.111
Caucasian	2138 (65.08)	2002 (61.94)	
Non-caucasian	1146 (34.92)	1263 (38.06)	
Education (years of study)			0.278
0 – 3	620 (13.61)	9.12 (487)	
4 – 11	2300 (67.59)	2375 (71.18)	
12+	389 (18.80)	389 (19.69)	
Income (minimum legal wage)			0.521
≤ 2	1130 (35.77)	1243 (39.19)	
> 2 to 5	867 (28.88)	839 (31.14)	
≥ 5	900 (35.36)	644 (29.66)	
Housing condition			
Adequate	2688 (80.05)	2742 (85.83)	0.217
Inadequate	669 (19.95)	529 (14.17)	
Access to medication			
Access to medication prescribed in health care service	354 (89.55)	287 (92.99)	0.175
Access to medication in public sector	102 (26.40)	137 (48.55)	0.001

*The differences between 2003 and 2008 were analyzed by corrected Satterthwaite χ^2 tests.

Table 2. Crude and adjusted logistic regression for access to medication in the public sector and socioeconomic characteristics. São Paulo, 2003 and 2008.

	2003				2008			
	Access to medication in private sector (n = 252) n (%)	Access to medication in public sector (n = 102) n (%)	Access to medication in public sector[a] – Crude OR (95%CI)	Access to medication in public sector[a] – Adjusted OR[b] (95%CI)	Access to medication in private sector (n = 150) n (%)	Access to medication in public sector (n = 137) n (%)	Access to medication in public sector[a] – Crude OR (95%CI)	Access to medication in public sector[a] – Adjusted OR[b] (95%CI)
Education[c]								
0 – 3	40 (66.60)	29 (33.40)	1	1	17 (41.98)	24 (58.02)	1	1
4 – 11	163 (68.18)	72 (31.82)	0.93 (0.43 – 2.02)	0.98 (0.42 – 2.27)	108 (46.81)	108 (53.19)	0.82 (0.37 – 1.84)	0.63 (0.25 – 1.57)
≥ 12	46 (100)	0	-	-	25 (80.05)	4 (19.95)	0.18 (0.06 – 0.56)	0.12 (0.03 – 0.42)
Income[c]								
≤ 2	24 (69.75)	18 (30.25)	1	1	16 (40.45)	23 (59.55)	1	1
2.1 – 4.99	93 (70.99)	46 (29.01)	0.94 (0.37 – 2.80)	0.93 (0.43 – 2.01)	72 (47.97)	72 (52.03)	0.74 (0.29 – 1.84)	0.67 (0.25 – 1.82)
≥ 5	101 (83.45)	17 (16.55)	0.40 (0.18 – 1.17)	0.41 (0.15 – 1.15)	35 (77.01)	9 (22.99)	0.20 (0.06 – 0.70)	0.20 (0.05 – 0.73)
Housing condition								
Adequate	217 (74.49)	79 (25.51)	1	1	137 (53.33)	108 (46.67)	1	1
Inadequate	35 (67.35)	23 (32.65)	1.41 (0.66 – 3.03)	1.36 (0.61 – 3.03)	14 (35.86)	29 (64.14)	2.04 (0.95 – 4.41)	2.05 (0.93 – 4.49)
Ethnicity								
Caucasian	178 (81.23)	53 (18.77)	1	1	103 (55.47)	75 (44.53)	1	1
Non-caucasian	73 (61.31)	49 (38.69)	2.74 (1.38 – 5.39)	2.71 (1.40 – 5.31)	48 (45.30)	62 (54.70)	1.52 (0.62 – 2.72)	1.48 (0.93v2.84)
Private health plan[d]								
No					45 (26.30)	120 (73.70)	1	1
Yes					106 (84.80)	17 (15.20)	0.06 (0.03 – 0.13)	0.05 (0.03 – 0.120

[a] The focus of the present study is on access in the public sector. [b]Adjusted by age and gender. [c] Missings were excluded. [d] People with private health plan also can use public sector to obtain medication.

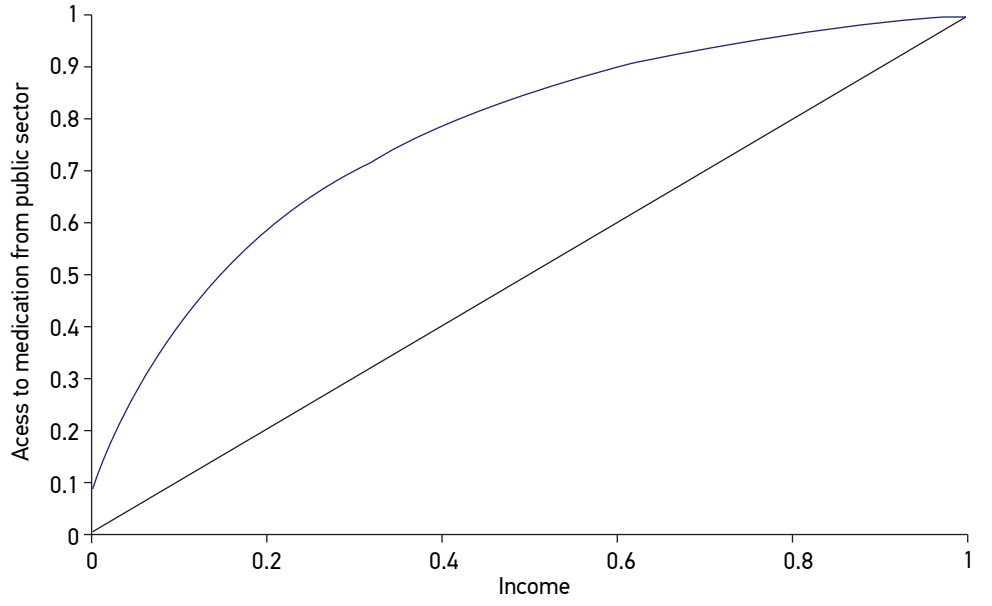

Figure 1. Access to medication from public sector adjusted for age and gender. Concentration curve. 2003.

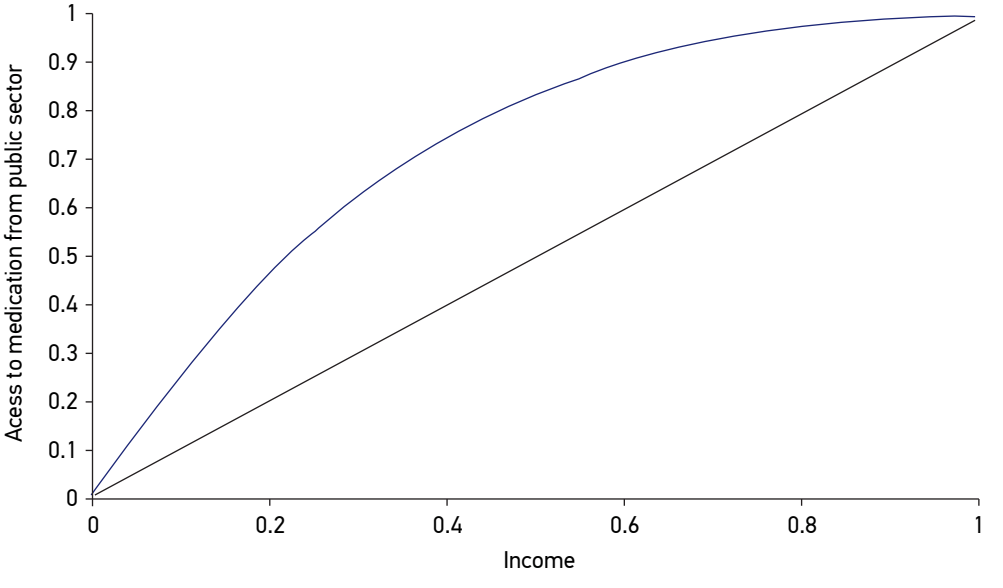

Figure 2. Access to medication from public sector adjusted for age, and gender. Concentration curve. 2008.

DISCUSSION

Access to medication has been improving in Brazil. Among the aims of the Brazilian Health System is a decrease in the socioeconomic disparities between individuals, which includes equity in access to medication. Deeper knowledge about access to, and coverage of, medication is important to inform public policies to achieve this aim.

We acknowledge several limitations to this study. The small study population can be inferred from our analyses. As our data only relate to medication prescribed in the health care service, the study of access to medication is limited to this population. We do not know about the reasons for lack of access to medication and we are not able to discuss the quality of pharmaceutical care in the public sector in this study. Finally, we do not know about medication costs, or if the medication prescribed is "high cost" or "low cost". If more than one medication was prescribed and the respondent had access to at least one of them, they were categorized as "access to medication prescribed in health care service", but it is possible the respondent was prescribed an expensive medication and a cheaper one but only had access to the cheaper item.

Education, income and housing condition did not change between 2003 and 2008. Although several economic changes have been occurring in Brazil since 2003, the socioeconomic characteristics did not change between 2003 and 2008. We did not observe any of these changes in São Paulo during the short period 2003 – 2008 in the present study.

Access to medication obtained in both the public and private sector was very high in both years (89.55 and 92.99%, respectively), and the proportion of access to medication did not change between 2003 and 2008. Similar results were found in a study of another capital in Brazil, which shows access to medication in general was 95.8%[22]. Access to medication has a high impact on health services because it is a basic ingredient of the therapeutic process. This access must be adequate, timely, good quality, equitably distributed and efficiently organized[23].

There was an increase in the proportion of access to medication in the public sector, from 26.40 in 2003 to 48.55 in 2008, and it was significant. Many factors may have influenced this increase in access to medication. Among them, the expansion of health policies for medication provision, changes in income distribution in population and judicialization of pharmaceutical care.

Health policies, such as Generic Drug Policy, HiperDia, Popular Drugstore program, *Dose Certa* and *Remédio em casa*, have influenced the increase in access to medication[3,5-7]. These programs offer medication at lower cost or cost-free to people at all levels of income. In some cases, there are problems such as program overlaps and unclear definition of responsibilities of municipalities and states in medication provision[6]; nevertheless, the programs for medication provision have increased access to medication in São Paulo and also promoted the decrease in inequalities in access to medication[4,5].

Although it is a less significant influence, the judicialization of pharmaceutical care also has increased access to medication in the public sector[24,25]. There has been an increase in

the number of lawsuits concerning access to medication brought against the State Health Department since the creation of SUS[25]. Deficiencies in access of SUS users to essential medication and also in access to drugs not included in Ministry of Health pharmaceutical care lists are solved, in most cases, by the legal process [24,25]. The judicialization of pharmaceutical care, mainly for higher cost medication, has influenced the decrease in inequality. There are currently 392,000 lawsuits demanding action relating to health in Brazil[26]; most are for medication and have been brought by both the lower income and higher income populations[24,25].

There has been an increase in the number of private health plans in Brazil[1], particularly in São Paulo. There has also been an increase in private health plans which cover only the doctor's consultation[12,13], which can increase the use of the public sector to obtain medication; people can see a doctor in the private sector and get medication from the public sector. According to our study, almost half the population had a private health plan in 2008. Nowadays, 60.00% of the population of São Paulo (6.7 million of people) have a private health plan[12,13]. Among them, there are plans with high cost and low cost that do not cover provision of medication. People with these plans obtain their medication in the public sector.

Access to medication in the public sector was 48.55% in 2008. These results show similar access in the public sector to that found in another state capital in Brazil in 2009, which shows access to medication among the elderly through the public sector to be 50.30%[22]. A study in Ribeirão Preto, São Paulo State in Brazil, showed provision of medication in the public sector was 60.3%[27]. Similar results were also found by a Brazilian study of 11 cities, that showed only 55.40% of the medication investigated was available in public health services[28]. According Silva et al.[29], among people that used health care service in Brazil, 56.70% were in the public sector (and 43.30% in the private sector). The authors studied use of the health care service including consultations, hospitalizations and vaccination. A similar result was found by Gomez-Dantés et al.[30], who studied the availability of some essential drugs at primary health care units of the public sector in Mexico and found a low supply of essential drugs in the health units.

The change in concentration index from -0,63 in 2003 to -0,52 in 2008 indicates that there was an expansion of SUS users. The higher income population started to use the SUS or the inclusion in the public sector of the population that previously only used the private sector can explain the increasing use of the public sector to obtain medication.

However, despite the increase in access to medication in the public sector by higher socioeconomic groups between 2003 to 2008, the lower socioeconomic groups were much more often covered by the public sector than the higher socioeconomic groups. Access to medication in the public sector was greater among those with lower income and among non-Caucasians in 2003, and among those with lower education, lower income, inadequate housing condition, non-Caucasians and those without private health plans in 2008.

Coverage of medication in the public sector is very important, particularly in the lower income population as in some cases these people cannot buy medication and depend on SUS. Designing a universal health insurance system is a complicated process and success depends on organizational and financial arrangements. In order to be a universal system, it is important that access to health care services, and particularly to medication, expand in order to eliminate or minimize out-of-pocket expenditure by the poorest citizens[31].

In order to achieve equity, equal access is seen as equal use for those in equal need[32]. People of low socioeconomic position are also likely to need more coverage by the public sector. Therefore, if inequalities in access to health care are of interest, it is important that the public sector attends people of lower income in order to adjust for this unequal need. The results of the present study show that the lower income population are supported by SUS to access medication and therefore the SUS tends to equity and is trying to universalize access to medication.

CONCLUSIONS

The present study provides insights into the socioeconomic factors associated with access to medication in the public sector and access to medication in São Paulo. Knowledge about inequalities in access to medication in the public sector is important to inform health policies to contribute to reducing inequalities in health care services use and must be investigated more deeply.

The findings indicate that access to medication was high in the period studied, and people with lower education and lower income are supported by SUS to get medication, therefore the SUS tends to equity and is trying to universalize access to medication. Otherwise, the provision of medication in the public sector increased from 2003 to 2008, with SUS coverage expansion to include people with higher income. Implementation and expansion of public programs for medication provision also contribute to explaining the increase. However, universal coverage of medication and equity in access to medication in the public sector are still challenges to SUS.

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