

## Social inequalities in health among the elderly

### Desigualdades sociais em saúde entre idosos

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#### Abstract

*The aim of the present study was to assess social inequalities in health status, health behavior and the use of health services based on education level. A population-based cross-sectional study was carried out involving 1,518 elderly residents of Campinas, São Paulo State, Brazil. Significant demographic and social differences were found between schooling strata. Elderly individuals with a higher degree of schooling are in greater proportion alcohol drinkers, physically active, have healthier diets and a lower prevalence of hypertension, diabetes, dizziness, headaches, back pain, visual impairment and denture use, and better self-rated health. But, there were no differences in the use of health services in the previous two weeks, in hospitalizations or surgeries in the previous year, nor in medicine intake over the previous three days. Among elderly people with hypertension and diabetes, there were no differences in the regular use of health services and medication. The results demonstrate social inequalities in different health indicators, along with equity in access to some health service components.*

*Health of the Elderly; Morbidity Surveys; Social Inequity; Prevalence*

#### Introduction

Studies on social inequalities in health have gained a new emphasis and focus, as methods for measuring disparities have improved and been systematized, health issues that are submitted to analysis have been broadened and studies produced in developed countries have revealed health gaps that encompass the whole society and not only the segment below the poverty line <sup>1,2</sup>. These factors have led multinational agencies and organizations to promote initiatives that incorporate health equity in political agendas and to propose and evaluate strategies for addressing the problem <sup>3,4,5</sup>.

Different concepts and approaches have been applied to health inequality research <sup>2,6</sup>. Different strata definitions have been used <sup>7</sup> including concepts of social class <sup>8</sup>. Some studies assessed the impact of the concentration of wealth on health <sup>9</sup> and others analyzed the effect of broader-scoped policies, including the political party in government, on the magnitude of social disparities in health <sup>10</sup>.

According to the literature, the size of social disparities varies with the health problem in question and the demographic subgroups analyzed. Multiple cultural and contextual variables influence the effect of the socioeconomic dimension on health. Social inequality tends to decline with age, being less accentuated among the elderly than in young adults and children <sup>11,12</sup>.

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This reduction largely results from the premature death that affects socially underprivileged segments. A study carried out on American population sample revealed that individuals at forty years of age, living below the poverty line, have patterns of biological risk similar to those at sixty years of age with a better socioeconomic status. Moreover, the life expectancy of the former group is 20 years lower than the latter<sup>12</sup>. The ageing process itself is more intense among individuals with a poorer socioeconomic status<sup>13</sup>. Despite the reduction in social inequality in health among the elderly, compared to younger people, it tends to persist among the underprivileged stratum as the result of unfavorable conditions throughout life<sup>14</sup>.

The effectiveness of policies and strategies for reducing inequality in health has been demonstrated in a number of studies. A comparison of the distribution of the prevalence of hypertension reveals a social gradient in the United States and an absence of this pattern in Canada, likely to be the result of universal health coverage and policies aimed at socially needier segments in the latter country<sup>15</sup>. Also in Canada, the lowest income segment of a province with anti-poverty social strategies is in a more favorable situation on the prevalence of several chronic diseases than that of a richer province with better mean health indicators, but with no similar policies<sup>16</sup>.

Considering the available literature on health inequalities among the elderly, the aim of the present study was to determine the magnitude of social inequality in health status, health-related behavior and use of health services among elderly individuals, seeking to assess the degree of social disparity in different health dimensions and offer information that may assist in the drafting of interventions.

## Methods

A population-based cross-sectional study was carried out involving 1,518 non-institutionalized individuals aged 60 years or more, who were residents of urban areas in the city of Campinas, São Paulo State, Brazil, between 2008 and 2009, and made up part of the sample of the ISA-Camp 2008/2009 health survey. A previous survey with similar contents and methods was developed in 2001/2002<sup>17</sup>. Campinas is the 14<sup>th</sup> largest city in Brazil in terms of population (with more than one million inhabitants) and is located 100km from the capital city of the state of São Paulo.

The ISA-Camp sample was obtained through a probabilistic stratified cluster sample in two stages. In the first stage, 50 census tracts were

selected with a probability proportional to the number of households. The selection was systematic, with the census tracts ordered by the percentage of heads of household with a university education, thereby producing an implicit stratification based on the schooling of the head of the household.

The sample size was obtained considering the estimation of a proportion of 0.50, with 95% confidence intervals (95%CI), a sampling error of 4% to 5% and a effect design of 2, totaling 1,000 individuals in each of the following age groups: adolescent (10 to 19 years), adult (20 to 59 years) and elderly (60 + years). Anticipating an 80% coverage and response rate, the sample size was corrected to 1,250. To achieve this sample size in each age group, 2,150, 700 and 3,900 households were independently selected to obtain the expected number of adolescents, adults and elderly individuals, respectively. All residents in the selected age group for the household in question were interviewed. In this study we used only the data involving individuals aged 60 or more.

Information on demographic and socioeconomic variables, illnesses and the use of health services was obtained through a previously tested structured questionnaire administered in home interviews by trained and supervised interviewers.

The variables analyzed in the present study were:

- Schooling (the defining variable of the social segments to be analyzed), assessed in terms of years of study and categorized as: three years or fewer, four to eight years and nine or more years;
- Demographic and socioeconomic variables: gender, age, self-reported skin color, marital status, place of birth, religion, monthly per capita household income (calculated as a multiple of the minimum wage), number of residents at home, number of appliances in the home and coverage of private health insurance;
- Health behavior: physical activity during leisure time: those who performed no physical activity at all were considered sedentary; smoking habits: smoker (yes, no); alcohol risk use (positive, negative) assessed by the *Alcohol Use Disorders Identification Test* (AUDIT), with 8 or more points being considered positive<sup>18</sup>; alcohol intake (drinkers, non-drinkers); daily intake (yes, no) of fruit, vegetables, legumes, soft drinks and milk; engaged in diet for losing weight (yes, no).
- Body mass index (BMI = kg/m<sup>2</sup>), calculated from reported information on weight and height data, using the categories established for the elderly: < 22kg/m<sup>2</sup> (underweight); between 22 and 27kg/m<sup>2</sup> (eutrophics); and > 27kg/m<sup>2</sup> (over-

weight)<sup>19</sup>. The variable analyzed was overweight (yes, no).

- Health status (conditions listed on checklist) (yes, no): arterial hypertension, diabetes mellitus, cancer, rheumatism/arthritis, osteoporosis, asthma, bronchitis, emphysema, tendonitis, vascular disease, symptoms (headache, back pain, allergy, dizziness/vertigo, insomnia); number of chronic diseases reported: two or more; minor mental disorders (yes, no), assessed using the *Self-Reporting Questionnaire* (SRQ-20), with a 7/8 cutoff point<sup>20</sup>; poor or very poor self-rated health (yes, no); and visual impairment (yes, no).
- Use of health services (yes, no): use of services in previous two weeks; hospitalization and surgery in previous 12 months; visit to dentist in the last year; use of medicines in previous three days; use of glasses/lenses; and use of dentures. For individuals with hypertension and diabetes, the following variables were analyzed: regular visits to the doctor to monitor the disease; orientations received on how to cope with the disease; time elapsed since last appointment and actions taken to control the disease.

In this study the dependent variables were all the health status and health services use indicators. The independent variable was educational level (years of schooling) and age and sex were used to produce adjusted prevalence ratios. The other demographic and socioeconomic variables were used to describe the social characteristics of the elderly groups defined by schooling level. Prevalence ratios of health services use, hospitalization, surgery and medicine intake were also adjusted for the number of chronic disease.

The association between variables was determined using the chi-square test, with a 5% level of significance. Simple and multiple Poisson regression models with robust variance were used to estimate crude and adjusted prevalence ratios and respective 95%CI. The different weights of the sampled individuals and the effect of the sample design were taken into account in the analyses, using the Stata 11.0 software (Stata Corp., College Station, USA). The study received approval from the Ethics Research Committee of the Medical Science Faculty (Faculdade de Ciências Médicas) of the Campinas State University (Universidade Estadual de Campinas – UNICAMP – process n. 079/2007).

## Results

Among the sampled individuals, there was a 6.5% loss due to refusal of the resident to allow the pre-survey of the individuals of the selected household. Among the 1,558 elderly individu-

als identified in the pre-survey, 2.3% refused to participate in the study. Thus, the data on 1,518 individuals aged 60 years of more were analyzed, with valid information on schooling, age and gender; 57.2% were female and 54% were between 60 and 69 years of age. There were statistically significant differences ( $p < 0.001$ ) for all social and demographic indicators analyzed between the elderly from different educational levels (Table 1). Among the segment with the highest degree of schooling, there was a greater proportion of people who had white skin color, were married, born in Campinas or another city in the São Paulo State, Catholic, had a higher per capita household income, a lower number of residents in the household, a greater number of appliances in the household, and had private health insurance.

Regarding health behavior (Table 2), the segment with the highest degree of schooling had greater proportions of elderly individuals who are alcoholic drinkers and who are physically active in their leisure time. Prevalence ratios (adjusted for age and gender) regarding daily intake of fruit, legumes and vegetables and dieting were significantly higher among the elderly individuals with the highest educational levels. Moreover, a significantly lower proportion of the individuals in this stratum were overweight. The segment with four to eight years of schooling had a significantly higher proportion of individuals who consume alcoholic beverages, and who eat fruits and vegetables every day, in comparison to the segment with the lowest degree of schooling.

The elderly individuals with the highest degree of schooling had a lower prevalence of hypertension, diabetes, headaches, back pain, dizziness/vertigo, poor/very poor self-rated health and visual impairment (Table 3). However, there was a higher prevalence of tendonitis/repetitive strain injury in this stratum. No associations were found between schooling and the others diseases and health problems analyzed.

The prevalence of dental appointments in the previous year was significantly higher among the elderly individuals with the highest degree of schooling. However, there were no differences between this stratum and the group with lower educational levels in the use of health services in the previous two weeks, hospitalizations and surgeries in the previous year and medicine intake in the previous three days. The segment with the highest education level also had a greater proportion of people who used glasses or contact lenses and a lesser use of dentures (Table 3).

Statistically significant differences were found between the middle (four to eight years) and lowest (three years or less) schooling strata in the

Table 1

Demographic and socioeconomic characteristics according to the level of education in an elderly population. Campinas, São Paulo State, Brazil, 2008/2009.

Variables	n	Educational level (in years)			p-value	Total
		0-3 [n = 546]	4-8 [n = 612]	9 + [n = 360]		
Sex					< 0.001	
Male	615	35.5	42.2	53.9		42.8
Female	903	64.5	57.8	46.1		57.2
Age group					< 0.001	
60-69	819	43.7	56.9	63.5		53.9
70-79	499	38.3	30.3	29.2		32.8
80 +	200	18.0	12.8	7.3		13.3
Skin color					< 0.001	
White	1,157	67.8	77.4	87.9		76.7
Black/Mixed/Other	359	32.2	22.6	12.1		23.3
Marital status					< 0.001	
Married/Cohabiting	846	50.1	56.8	65.2		56.6
Single	100	5.9	5.9	8.7		6.6
Divorced/Widow	572	44.0	37.3	26.1		36.8
Place of birth					< 0.001	
Campinas	311	10.1	25.4	28.0		20.7
Other city of São Paulo State	699	43.1	49.3	45.6		46.2
Other State	506	46.8	25.3	26.4		33.1
Religion					< 0.001	
Catholic	1,008	67.0	65.5	67.7		66.6
Evangelical	335	27.8	22.5	11.5		21.6
Others/None	174	5.2	12.0	20.8		11.8
Number of residents					< 0.001	
1-2	827	47.0	55.2	64.7		54.7
3-4	478	33.3	32.5	27.8		31.6
5 or +	213	19.7	12.3	7.5		13.7
Per capita income (minimum wage)					< 0.001	
< 1	607	55.8	34.3	24.0		39.2
1-4	738	41.7	58.6	42.1		48.5
> 4	173	2.5	7.1	33.9		12.3
Household appliances					< 0.001	
0-4	190	20.2	11.3	2.1		12.1
5-9	626	50.8	44.3	20.0		40.4
10 or +	702	29.0	44.4	77.9		47.5
Health insurance					< 0.001	
Yes	714	31.6	46.1	74.0		48.1
No	801	68.4	53.9	26.0		51.9

frequency of headaches, back pain, in the self-assessment of health, use of health services in the previous two weeks, dental appointments in the previous year and the use of glasses (Table 3).

In the analysis of the use of health services and disease control practices among the elderly individuals who reported having hypertension (n = 818) or diabetes (n = 332), there were no sta-

tistically significant differences between strata with regard to regular visits to the doctor, receiving medical orientations and the regular use of medications. Statistically significant differences between educational strata were found for the practice of physical activity to control hypertension and the adoption of a restricted diet to control diabetes (Table 4).

Table 2

Prevalence (%) and adjusted \* prevalence ratios (PR) of health behavior according to educational level in an elderly population. Campinas, São Paulo State, Brazil, 2008/2009.

Variables	Schooling (in years)			p-value **	Adjusted PR (2)/(1)	Adjusted PR (3)/(1)
	0-3 (1) [n = 546]	4-8 (2) [n = 612]	9 + (3) [n = 360]			
Smokers	11.1	12.1	10.7	0.7766	1.00 (0.96-1.03)	0.97 (0.93-1.01)
Alcohol drinkers	20.6	30.2	46.9	< 0.001	<b>1.37 (1.07-1.75)</b>	<b>1.94 (1.51-2.51)</b>
AUDIT (Positive)	3.7	4.1	4.9	0.6890	0.86 (0.36-2.05)	0.80 (0.30-2.12)
Sedentary in leisure time	76.4	69.3	53.5	< 0.001	<b>0.92 (0.85-0.99)</b>	<b>0.72 (0.62-0.83)</b>
Diet for losing weight	26.9	34.6	45.8	<b>0.0146</b>	1.22 (0.82-1.82)	<b>1.60 (1.08-2.38)</b>
BMI > 27kg/m <sup>2</sup>	42.6	37.9	32.5	<b>0.0260</b>	0.97 (0.92-1.01)	<b>0.93 (0.88-0.99)</b>
Daily consumption of						
Fruits	46.6	59.4	72.4	< 0.001	<b>1.32 (1.12-1.56)</b>	<b>1.68 (1.38-2.03)</b>
Legumes	38.1	43.3	56.3	<b>0.0024</b>	1.18 (0.97-1.45)	<b>1.64 (1.23-2.18)</b>
Vegetables	44.7	55.2	69.2	< 0.001	<b>1.26 (1.05-1.51)</b>	<b>1.63 (1.33-2.01)</b>
Soft drinks	11.8	9.6	13.8	0.1679	0.78 (0.52-1.15)	1.05 (0.69-1.59)
Milk	67.0	68.3	63.8	0.5299	1.05 (0.94-1.18)	1.02 (0.89-1.17)

BMI: body mass index.

\* Adjusted by sex and age;

\*\* Chi-square test.

## Discussion

The most important finding of this study was to verify that the strong social inequalities in this elderly population were associated to different illness and health-related behavior profiles, but the association of schooling with indicators of health services use was much more attenuated.

The strong correlation between degree of schooling and socio-demographic indicators is consistent with what has been reported elsewhere in the literature. Schooling is one of the most often used indicators for the analysis of social inequalities in health<sup>1,7,21</sup>. It is an indicator which remains stable during the life course and has higher validity and is easier to obtain than others socioeconomic variables, like income for example. However, schooling is closely related to age, as older generations in Brazil had fewer opportunities of access to the educational system than younger ones. Nowadays, most of the Brazilian elderly nowadays have a lower level of education than younger generations. Nonetheless, the results of the present study reveal that, even among the elderly, schooling is an adequate variable to identify social groups with very different patterns of living conditions.

A greater proportion of individuals from the higher educational level consume alcoholic beverages compared to those from the lower stratum, but with no greater prevalence of risky

drinking, as there was no association between schooling and AUDIT results. A household survey carried out in capital cities in Brazil<sup>22</sup> also found a greater prevalence of alcohol intake among the segment with the highest schooling level. As in the present study, the Risk and Protective Factors Surveillance System for Chronic Non-Communicable Diseases Through Telephone Interview (VIGITEL) found no significant differences regarding alcohol abuse between social strata<sup>23</sup>. The data in the literature on the association between alcohol intake, alcohol abuse and social strata are contradictory, but most of the publications reported greater frequency of alcohol intake among individuals of a higher socioeconomic level and greater alcohol dependence/risk drinking among lower strata<sup>24,25,26</sup>.

The elderly with a greater degree of schooling were significantly more physically active in leisure time than those from lower levels, which is similar to findings reported in previous studies<sup>26,27</sup>. Data from VIGITEL 2007 analyzing the residents of capital cities in Brazil also reveal a significantly higher prevalence of physical activity in the higher educational stratum<sup>23</sup>. A study carried out among elderly individuals in England reported a greater prevalence of smokers, alcohol abuse and sedentary lifestyle in groups with a poorer socioeconomic status<sup>26</sup>. In the present study, there was no association between education and smoking habits, which is similar to the

Table 3

Prevalence (%) and prevalence ratios (PR) \* of chronic conditions and use of health services according to educational level among the elderly. Campinas, São Paulo State, Brazil, 2008/2009.

Variables	Schooling (in years)			p-value **	Adjusted PR (2)/(1)	Adjusted PR (3)/(1)
	0-3 (1) [n = 546]	4-8 (2) [n = 612]	9 + (3) [n = 360]			
Hypertension	59.3	53.7	44.0	< 0.001	0.94 (0.85-1.04)	<b>0.80 (0.69-0.92)</b>
Diabetes	23.8	23.2	16.3	<b>0.0102</b>	1.00 (0.82-1.22)	<b>0.71 (0.54-0.95)</b>
Cancer	5.5	4.7	6.5	0.5261	0.88 (0.51-1.49)	1.19 (0.58-2.45)
Rheumatism/Arthritis/Arthrosis	27.8	26.9	22.3	0.1195	1.03 (0.85-1.25)	0.94 (0.75-1.17)
Osteoporosis	18.5	15.0	10.1	<b>0.0088</b>	0.94 (0.69-1.27)	0.76 (0.49-1.18)
Asthma/Bronchitis/Emphysema	7.9	5.6	4.0	0.0631	0.77 (0.49-1.20)	0.58 (0.28-1.20)
Tendonitis/Repetitive strain injury	3.3	5.0	7.2	0.0561	1.50 (0.76-2.98)	<b>2.34 (1.15-4.79)</b>
Headache/Migraines	23.6	18.2	12.4	< 0.001	<b>0.75 (0.60-0.94)</b>	<b>0.52 (0.36-0.75)</b>
Back pain	49.7	42.3	37.0	<b>0.0020</b>	<b>0.86 (0.75-0.99)</b>	<b>0.77 (0.64-0.92)</b>
Allergy	19.8	20.6	23.4	0.4285	1.07 (0.84-1.37)	1.29 (0.95-1.73)
Dizziness/Vertigo	22.8	19.0	14.4	<b>0.0124</b>	0.86 (0.69-1.07)	<b>0.67 (0.47-0.97)</b>
Insomnia	24.3	23.1	19.1	0.0880	0.99 (0.83-1.20)	0.88 (0.69-1.14)
Minor mental disorders (SRQ-20)	19.0	15.6	10.8	<b>0.0155</b>	0.91 (0.66-1.26)	0.71 (0.48-1.06)
Prevalence of 2 or more chronic diseases	63.6	55.9	47.9	0.0005	0.93 (0.83-1.04)	<b>0.84 (0.73-0.96)</b>
Poor/very poor self-rated health	17.4	10.8	6.9	< 0.001	0.94 (0.91-0.98)	0.91 (0.88-0.94)
Visual impairment	28.5	23.0	15.7	<b>0.0225</b>	0.83 (0.62-1.12)	<b>0.57 (0.33-0.99)</b>
Health service use (last 2 weeks)	21.8	29.7	23.2	<b>0.0069</b>	<b>1.40 (1.13-1.73) ***</b>	1.14 (0.85-1.58) ***
Hospitalization (last year)	14.1	15.3	13.1	0.6365	1.16 (0.85-1.58) ***	1.08 (0.76-1.53) ***
Surgery (last year)	10.1	10.6	11.8	0.8028	0.99 (0.97-1.02) ***	0.98 (0.96-1.01) ***
Dentist visit (last year)	17.6	33.8	62.7	< 0.001	<b>1.84 (1.43-2.36)</b>	<b>3.37 (2.60-4.36)</b>
Medicines (last 3 days)	82.1	79.6	79.4	0.5985	1.01 (0.98-1.03) ***	1.03 (1.00-1.06) ***
Wearing glasses or contact lenses	67.0	83.7	87.9	< 0.001	<b>1.25 (1.15-1.35)</b>	<b>1.32 (1.21-1.44)</b>
Wearing dental prosthesis	76.2	71.1	48.3	< 0.001	0.97 (0.89-1.05)	<b>0.68 (0.59-0.78)</b>

SRQ-20: Self-Reporting Questionnaire.

\* Adjusted by sex and age;

\*\* Chi-square test;

\*\*\* Adjusted by age, sex and number of chronic diseases.

finding on elderly reported by Azevedo-e-Silva et al.<sup>28</sup> based on the data from VIGITEL 2006, but it is different from results reported by other authors<sup>26,29</sup>.

Healthy behavior, such as dieting and careful nutrition, as expressed by the greater intake of fruit, vegetables and legumes, has also been reported as being higher among segments with a greater degree of schooling<sup>30,31</sup>, as found in the present study.

Social inequalities in healthy behavior have a strong influence on the maintenance or on broadening the social disparities regarding disease and mortality rates. Health-related behavior is an important mediator of the effect of social inequality on health. A study carried out in England reports that approximately 72% of the difference in mortality rates between social classes

stems from behavioral differences, with diet accounting for 17%, a lack of physical activity accounting for 21%, at-risk alcohol intake accounting for 12% and cigarettes – the most important risk factor for chronic diseases – accounting for 35% of the increase in the risk of death among socially underprivileged segments<sup>32</sup>. It is recognized that encouraging the practice of physical activities, better dietary habits, the moderate use of alcoholic beverages and quitting smoking is an important strategy for health promotion and the prevention and control of diseases as well as promoting a better quality of life. The incisive action of the public sector in the implementation of policies that encourage healthy behavior is fundamental to the promotion of equity in health.

Social disparities in the prevalence of chronic disease have been consistently reported in other

Table 4

Practices to control disease among hypertensive and diabetic individuals by educational level. Campinas, São Paulo State, Brazil, 2008/2009.

Diseases and control practices	Educational level (in years)			p-value *
	0-3 (%)	4-8 (%)	9 + (%)	
Hypertension	[n = 326]	[n = 332]	[n = 159]	
Do you regularly visit the doctor?	86.9	86.3	86.0	0.9557
Received medical orientation?	89.4	83.7	82.4	0.0726
When was your last visit?				0.8687
Last month	30.4	29.6	26.8	
1 to 6 months ago	54.5	54.6	53.6	
6 months or more	15.1	15.8	19.5	
What do you do to control the disease?				
Diet without salt	26.3	30.7	24.3	0.3702
Diet restriction for losing weight	3.3	4.2	5.0	0.5952
Physical activity	6.0	5.9	18.6	<b>&lt; 0.001</b>
Regular use of medicines	92.9	93.7	91.8	0.7201
Diabetes	[n = 131]	[n = 143]	[n = 58]	
Do you regularly visit the doctor?	92.5	87.4	93.3	0.1887
Received medical orientation?	92.5	90.2	94.7	0.5719
When was your last visit?				0.9930
Last month	38.3	39.0	38.9	
More than 1 month ago	61.7	61.0	61.1	
What do you do to control the disease?				
Diet	24.1	48.5	51.6	<b>0.0029</b>
Diet restriction for losing weight	2.2	6.6	5.1	0.2631
Physical activity	9.3	9.5	17.9	0.1572
Regular use of insulin	25.1	22.9	18.9	0.6308
Regular use of oral medicines	69.9	65.4	63.6	0.6701

\* Chi-square test.

countries as well as in Brazilian studies. Many chronic diseases have a social gradient, with a greater prevalence among more socially vulnerable segments, as seen in the present study with regard to hypertension, diabetes, headaches, back pain and dizziness/vertigo. The *Brazilian National Household Sampling Survey 2003 (PNAD)* also reports that all the chronic conditions included in the survey were more prevalent among the population with the lowest degree of schooling, with the exception of tendonitis/synovitis<sup>33</sup>. Machado et al.<sup>34</sup> reported that chronic musculoskeletal symptoms are less prevalent among individuals with a greater degree of schooling, whereas no statistically significant association was found between rheumatism and schooling, which is similar to the finding reported in the present study. The presence of two or more health conditions was less frequent among the stratum that had studied nine or more years,

which is similar to the finding reported by other authors<sup>35</sup>.

Social gradients in the prevalence of chronic conditions are also reported for other countries<sup>1,10,36</sup>. A study carried out in the USA reports that segments with less schooling have a greater prevalence of hypertension, chronic bronchitis, cancer, diabetes, back pain and symptoms of mental illness, while no such pattern was found for asthma or arthritis<sup>36</sup>. Although unfavorable gradients in illness among the population with the lowest socioeconomic status are widely reported, studies have addressed the possibility of reducing or even eliminating these differences, through appropriate actions involving public policies and health care systems<sup>15</sup>.

There are few diseases with inverse gradients affecting more economically privileged segments, as observed in the present study for tendonitis, similar to the results of others studies<sup>33,37</sup>.

Social inequalities are also evident in the frequency of visual impairment among the elderly analyzed. In the USA, data from the National Health Interview Survey indicate that the largest percentage of those with visual impairment (14%) is in the lowest educational stratum, whereas the segment with the highest degree of schooling has a prevalence of 7%<sup>38</sup>. A study developed in four regions of the State of São Paulo, detected a greater prevalence of visual impairment among individuals from households with heads in the lowest degree of schooling<sup>39</sup>. We observed that the use of glasses and contact lenses was more frequent in the stratum with higher education, which partially accounts for the lower frequency of complaints of visual impairment in this social segment.

Poor self-rated health was more frequent among elderly people with a lower degree of schooling. Previous studies have also reported intense social inequalities with regard to self-rated health<sup>10,40</sup>. Self-rated health has been identified as being strongly associated with functional disability among elderly individuals in Brazil<sup>41</sup>.

Social inequalities on health status and on illness prevalence tend to be less accentuated among elderly individuals than among the young due to the preventable and premature deaths that particularly affect the economically underprivileged segments of society<sup>12</sup>.

To assess inequalities in the use of basic health services, it is necessary to have data from population-based studies that help to identify possible situations of exclusion and barriers of access. Despite considerable differences in living conditions and health indicators among the elderly from different social strata, less important inequalities were found regarding the use of health services. No significant differences were found regarding hospitalizations and surgeries in the previous year and the use of medicines in the previous three days. Also, there was no difference between the two extreme strata related to the use of health services in the last two weeks. The analyses regarding the use of health services among individuals with diabetes and hypertension reinforce this observation. There were, among them, no significant differences between the different schooling strata in the use of routine medical visits, the regular use of medications or the receiving of medical orientations. These findings indicate a possible reduction in inequity regarding access to medical care through the actions of the Brazilian public health care system. The city where the survey was developed has a reasonably organized network of public services capable of meeting the basic health needs of the population dependent on public health care. A

total of 52.3% (95%CI: 44.2-60.2) of the elderly individuals in the city do not have private health insurance and therefore depend exclusively on the public health care system. A total of 68.7% of the elderly individuals in the lower educational level and even 26.1% of those in the segment with the highest degree of schooling are dependent on the public system (Table 1).

Inequity remains evident in access to oral health care, which is similar to findings reported in previous studies carried out in Brazil<sup>42</sup> as well as in other countries<sup>43</sup>. In a national evaluation, Barros et al.<sup>42</sup> found greater inequalities in oral health care in children and in the elderly. The use of dentures was reported more by individuals with fewer years of schooling, which likely stems from the lesser access to dental services throughout life among the low-income population.

Important inequalities were also found in individuals with hypertension and diabetes, on non-medicinal practices for controlling disease, such as physical activity and a controlled diet. A previous study found similar results<sup>44</sup>. Then, greater development and consolidation of the interventions of public health care services in non-medicinal practices for the control of disease are fundamental to ensuring advances in health equity.

The present study has limitations that should be addressed. One is the fact that the data on illness, health behavior and the use of health services consisted of self-reported information. Data on socially undesirable behavior are prone to be underestimated. The same occurs with the estimates for obesity based on the BMI, calculated from self-reported weight and height, which tend to be underestimated, especially among elderly individuals<sup>45</sup>. Some authors argue for the use of self-reported information regarding chronic diseases. Validation studies comparing this information to medical records and patient charts have revealed different degrees of accuracy depending on the type of disease, the presence of co-morbidities and the socio-demographic characteristics of the respondent<sup>46</sup>. An individual's recognition of the disease depends on his/her perception of signs and symptoms, the access to medical services and diagnostic tests, the quality of orientation given by health care professionals and the understanding of the information received. Important differences in estimates of disease prevalence occur depending on the method employed. The use of a checklist, as applied in the present study, enhances the validity of the information obtained in surveys<sup>47</sup>.

Another limitation of the present study resides in the cross-sectional design, which does not allow for inferences regarding causality, meaning



that it is therefore not possible to discern the direction of the effect. Moreover, sample size, even when adequate for estimating overall prevalence, becomes insufficient for detecting associations in some analyses. It is also necessary to consider the existence of type 2 errors on the various associations that were tested.

The magnitude of the differences encountered in the prevalence of disease between socioeconomic strata also tends to be underestimated by the lesser access to medical and diagnostic services among segments with lower degrees of schooling, leading a greater proportion of these individuals to be unaware of the fact that they have certain diseases. The estimated social disparities in the prevalence of disease may therefore actually be lower than the actual situation<sup>48</sup>. In spite of this, the illness indices have often proven to be higher in individuals from lower socioeconomic strata<sup>33,36</sup>, as seen in this study.

The present study assessed physical activity only in the leisure context considering this to be a more adequate indicator of a healthier lifestyle.

Another care taken in this study was the use of BMI categories recommended for elderly individuals, with cutoff points that take into account the changes in body composition stemming from the ageing process<sup>19</sup>.

## Conclusion

The prevalent social inequalities regarding living conditions and health-related behavior imply the maintenance or even future broadening of health inequalities. The findings of the present study point to the urgent need for broader-scope social and inter-sector policies directed at improving education opportunities and the distribution of income as well as the consolidation of health service strategies for the promotion of healthier lifestyles<sup>26</sup>. The offering of health services with good coverage and quality by the Brazilian public health care system may effectively remedy social inequality regarding the risk of becoming ill and dying.

## Resumo

*O objetivo do estudo foi avaliar desigualdades sociais no estado de saúde, comportamentos de saúde e uso de serviços segundo o nível de escolaridade. É um estudo transversal de base populacional com 1.518 idosos residentes em Campinas, São Paulo, Brasil (ISA-Camp 2008/2009). Observaram-se significativas diferenças sociodemográficas entre os estratos estudados. Idosos de melhor nível educacional, em maior proporção, consomem bebidas alcoólicas, são mais ativos fisicamente em contexto de lazer e têm padrões de dieta mais saudáveis. Apresentam, também, menor prevalência de hipertensão, diabetes, tontura, dor de cabeça, dor nas costas, deficiência visual, uso de prótese dentária e de saúde autoavaliada como ruim. Mas, não houve diferença no uso de serviços de saúde, hospitalizações, cirurgias e uso de medicamentos. Entre os hipertensos ou diabéticos, não houve diferença quanto ao uso regular de serviços de saúde e de medicamentos. Os resultados apontam a presença de desigualdades sociais em diversos indicadores de saúde e a presença de equidade no acesso a alguns componentes dos serviços de saúde.*

*Saúde do Idoso; Inquéritos de Morbidade; Iniquidade Social; Prevalência*

## Contributors

M. B. A. Barros was responsible for the conception and drafting of the article and planned and executed the statistical analyses. P. M. S. B. Francisco executed the statistical analyses and collaborated on the discussion and drafting of the manuscript. M. G. Lima and C. L. G. Cesar collaborated in the discussion and drafting of the manuscript.

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