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Survey on medicine use by elderly retirees in Belo Horizonte, Southeastern Brazil

ABSTRACT

OBJECTIVE: To describe self-reported use of medicines by Brazilian elderly retirees focusing on gender differences.

METHODS: Household survey conducted in a random sample comprising 667 subjects aged 60 years or more who were living in Belo Horizonte, Southeastern Brazil, in 2003. The elderly were interviewed by pharmacists, using a standardized questionnaire. The prevalence of medicine use and mean use in the 15 days previous to the interview were estimated and then stratified by gender according to sociodemographic and health variables.

RESULTS: The prevalence of medicine use was 90.1%, and significantly higher among women (93.4%) than men (84.3%). Women and men took on average 4.6±3.2 and 3.3±2.6 products (p<0.001), respectively. The most frequently used drug category was cardiovascular, followed by nervous system and gastrointestinal tract and metabolism. Women showed higher use in all these drug categories, as well as higher mean number of drugs consumed, according to selected sociodemographic and health variables.

CONCLUSIONS: The study identified higher use of medicines by women, making them more vulnerable to the harmful effects of polytherapy, such as drug interactions and inadequate use of medicines.

DESCRIPTORS: Health of the Elderly. Drug Utilization. Drugs of Continuous Use. Drug Therapy, Combination. Gender and Health. Pharmacoepidemiology.

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INTRODUCTION

Brazil is undergoing a significant demographic shift, with an increase in life expectancy and a marked aging of the population. In the first decade of the 21st Century, it is estimated that the population aged 60 and above will grow annually by half a million.[10] The elderly have specific social, economic and health needs for them to obtain a decent quality of life, and this has made the subject of aging a growing area of interest as a research field. Among them, pharmacoepidemiology which aims to study the distribution and determinants of factors related to medicines in specific populations and their application for effective pharmacological treatment.[9]

Individuals aged 60 and over are more frequent sufferers of chronic-degenerative illnesses, which often require constant medication to control and to prevent harmful consequences. The greatest level of medication among the elderly is found among women, the oldest, those with the worst perception of their health, those with the greatest frequency of chronic illness and those who most use health services.[3,8,17,18,21]

With regard to gender, differences in the use of medication by the elderly have been reported. Women use more analgesics, antirheumatic and psychotropic medication, while men use more antithrombotic and cardiac therapy and anti-asthmatics.[5,8,12,16] Other studies report on gender differences in the use of prescription and non-prescription medicines, with women using more of both.[6,13]

In Brazil, the pharmacoepidemiology of aging is still a new area and few studies have investigated differences between men and women in the frequency of drug use.[4,7,13,15]

The objective of the present article was to describe the use of medicines among elderly beneficiaries of the *Instituto Nacional de Seguridade Social* (INSS –National Institute of Social Security), with a particular focus on gender differences.

METHODS

The data analyzed here belong to a wider project[a] aimed at depicting the profile of retirees and pensioners who are aged 60 and over, are INSS beneficiaries and use medication in three locales: Brazil and the municipalities of Southeastern Brazil: Belo Horizonte and Rio de Janeiro.[1]

This is a cross-sectional study (survey). The target population was made up of elderly and/or pensioners aged 60 or more who were registered under the INSS/MPAS General Regime for Social Welfare and residents of Belo Horizonte in 2002. In December of that year, the registry of the *Empresa de Tecnologia e Informações da Previdência Social* (DATAPREV – Company for Technology and Information for Social Welfare) reported 157,809 elderly inhabitants who received welfare and social assistance benefits on a continuous bases from the Social Welfare System (retirees, pensions or recipients of social support to the elderly).

The selection of participants was made by DATAPREV, based on its registry of beneficiaries, using a simple random sample. The sample size was defined for a 95% confidence level, an answer rate of 75%, sample error of 4% and 0.8% for prevalences of between 50% and 1% respectively, and assuming that there were no significant differences between respondents and non respondents. Initially 800 individuals were randomly selected. However, it was then necessary to select further sample to account for possible losses, such as death, moving to another municipality or unknown place and addresses that could not be located. This procedure resulted in an increase in the initial sample of 81 individuals. Further details about the methodology are described in Acurcio et al.[1]

The information was obtained using a questionnaire with closed and pre-codified questions relating to sociodemographic characteristics, health conditions, use of health services and medication during the 15 days prior to the interview. In order to avoid recall bias, the data about drug use were obtained from records over the previous 15 days, gathered by 14 selected pharmacists who received prior training. Proof of use of most medication was taken from physicians' directions, containers or prescriptions presented by the interviewees.

For each specific pharmaceutical used, the manufacturer, type of medication and origin of the prescription or indication were identified. The manufacturer and type of medication were used to help in the classification of the medicines.

The one-to-one household interviews were carried out over a three month period (March to June 2003), preferably with the elderly individual selected from the sample. However, where this was not possible for health reasons, such as deafness or cognitive impairments, the interviews were carried out on relatives or careers, who also provided clarifications except in self-evaluation cases.

The units of analysis were the individuals and the active substances of the medication. The proportions of active substances used by the elderly were identified using the Dictionary of Pharmaceutical Specialties[14] and the Anatomical Therapeutic Chemical Classification System (ATC)[20] and grouped according to this classification. The number of active substances used by interviewees was used as an indicator for the intensity of drug use for each group, and was calculated by dividing the number of active substances contained in the medicines by the number of interviewees. A comparison by gender was made by dividing the number of active ingredients by male and female interviewees.

The answer variables were the use and number of medicines in the 15 days prior to the interview. The explanatory variables were age, level of schooling, type of house, co-habitation, health state and self reported morbidity, possession of private health insurance and use of health services.

The differences between the proportions were tested using Pearson's chi-square and chi-square linear tendency. The differences between means were compared using a variance analysis. A significance level of 5% was used for all the tests. SPSS 14.0.1 was used for all statistical analyses.

Some information loss occurred while carrying out the interviews, mainly due to refusal to participate, death or a change of address.[1] For the purposes of statistical

analysis, lost individuals were taken to be represented by those who were interviewed. Thus the effect of such a loss is limited to a reduction in the accuracy of the estimates.

The research was carried out within the standards of the Helsinki Declaration and approved by the Research Ethics Committees of the Universidade Federal de Minas Gerais and the Fundação Oswaldo Cruz.

RESULTS

Out of 667 individuals that responded to the survey, 63.7% were women. Results in Table 1 show that 43.6% (291) of participants were aged between 70 and 79, the majority had attended primary school but not completed it (67.4%) and 15.1% reported that they lived alone. Approximately half of the interviewees considered their health to be very good or good (46.8%) and 13.8% reported to have been bed ridden in the 15 days prior to the interview. More than a third of the retirees went for a medical consultation six or more times in the last year, and around a fifth reported some kind of hospitalization during the same period. More than two thirds referred to the occurrence of between one and four illnesses. The prevalence of medication use in the previous 15 days was 90.1%.

Table 1 also shows significant differences in percentages for men and women in relation to age (greater among women), schooling (greater among men) and co-habitation (larger proportion of women who live alone). In addition, women reported a worse health state, were more regularly bed ridden over the previous 15 days, consulted a physician more often in the previous year and reported a greater number of illnesses when compared with men. The prevalence of medicine use was significantly less among men compared with women.

The participants used a total of 2,742 medicines (mean = 4.1; dp = 3.0; range=1 to 22), corresponding to 3,298 active substances. This difference between the number of medicines and the number of active ingredients was due to the fact that 20% of the medicines contained mixtures of a fixed dose of two or more ingredients. Most medication was recommended by a physician (89%). Men used an average of 3.3 products (dp = 2.6) and women 4.6 (dp = 3.2 (p<0.001).

Table 2 shows that the most commonly used active ingredients in the general sample and by gender related to the cardiovascular and nervous systems and to the digestive/metabolic system. Levels of consumption of the active ingredients relating to these three groups, by individual, were greater among women: 1.17 for cardiovascular, 1.58 for nervous system and 1.47 for the digestive/metabolic system.

Table 1. Characteristics of elderly people included in the study sample. Belo Horizonte, Southeastern Brazil, 2003.

Higher education	Total		Men		Women	
	n	%	n	%	n	%
Age group*						
60-69 years	264	39.6	110	45.5	154	36.2
70-79 years	291	43.6	100	41.3	191	44.9
≥ 80 years	112	16.8	32	13.2	80	18.8
			p = 0.010			
Schooling*						
Never went to school	98	14.8	22	9.2	76	18.0
Primary school (incomplete)	348	52.6	113	47.1	235	55.7
Primary school (graduated)	62	9.4	25	10.4	37	8.8
Secondary school	94	14.2	42	17.5	52	12.3
Higher education	60	9.1	38	15.8	22	5.2
			p = 0.000			
Co-habitation**						
Alone	101	15.1	21	8.7	80	18.8
With spouse and/or offspring	461	69.1	210	86.8	251	59.1
Other	105	15.8	11	4.5	94	22.1
			p = 0.000			
Self-reported health status*						
Very good	68	10.2	38	15.7	30	7.1
Good	244	36.6	95	39.3	149	35.1
Average	274	41.1	90	37.2	184	43.4
Poor	61	9.2	16	6.6	45	10.6
Very poor	19	2.9	3	1.2	16	3.8
			p = 0.000			
Bed ridden during the previous 15 days**						
Yes	92	13.8	24	9.9	68	16.0
			p = 0.038			
Medical consultation over the previous year*						
Never	80	12.0	43	17.8	37	8.7
Once to 5 times	337	50.6	120	49.6	217	51.2
6 or more times	249	37.4	79	32.6	170	40.1
			p = 0.002			
Hospitalization during the previous year**						
Yes	132	19.8	44	18.2	88	20.7
			p = 0.493			
Possession of private health insurance coverage **						
Yes	362	54.4	143	59.1	219	51.7
			p = 0.076			
Nº of self-reported illnesses*						
None	17	2.5	7	2.9	10	2.4
1 to 2	166	24.9	79	32.6	87	20.5
3 to 4	280	42.0	106	43.8	174	40.9
5 or more	204	30.6	50	20.7	154	36.2
			p = 0.000			
Use of medication over last 15 days*						
Yes	601	90.1	204	84.3	397	93.4
			p = 0.000			

* For comparisons between men and women, the chi-square test for linear trends was used
** For comparisons between men and women, Pearson's chi-square test was used

Table 2. Distribution of active substances, by groups and sub-groups* and number of drugs per elderly person. Belo Horizonte, Southeastern Brazil, 2003.**

Anatomic and Therapeutic Group	Total***		Men****		Women*****	
	%	Active substances/ elderly person	%	Active substances/ elderly person	%	Active ingrdients/ elderly person
Alimentary Tract and Metabolism	18.4	0.91	17.6	0.83	18.7	1.10
Drugs for acid related disorders	3.6	0.18	3.1	0.15	3.8	0.22
Drugs used in diabetes	3.7	0.18	5.2	0.25	3.0	0.18
Vitamins	4.8	0.24	4.5	0.21	5.0	0.29
Mineral suplements	2.6	0.13			3.0	0.18
Blood and Blood Forming Organs	4.7	0.23	5.6	0.26	4.4	0.26
Antithrombotic agents	4.0	0.20	5.4	0.21	3.5	0.19
Cardiovascular System	28.4	1.40	31.9	1.50	27.0	1.59
Cardiac therapy	2.3	0.11			2.3	0.14
Diuretics	9.0	0.45	8.9	0.42	9.2	0.54
Beta blocking agents	3.7	0.18	5.0	0.24	3.1	0.18
Calcium channel blockers	3.9	0.19	4.5	0.21	3.8	0.22
Agents acting on the renal-angiotensin system	5.7	0.28	7.2	0.34	5.1	0.30
Lipid modifying agents			2.6	0.12		
Dermatologicals	4.8	0.24	5.4	0.25	4.6	0.27
Antifungals	1.1	0.05	1.1	0.05	1.1	0.06
Emollients and dermatological treatments	0.6	0.03	0.8	0.03	0.5	0.03
Antibiotics and chemotherapeutics for dermatological use	0.9	0.05	0.9	0.04	1.0	0.06
Corticosteroids, dermatological preparations	1.2	0.07	1.5	0.06	1.2	0.07
Agents that act on the musculo-skeletal system	6.2	0.31	4.5	0.21	6.9	0.41
Antiinflammatory and antirheumatic products	3.8	0.19	2.5	0.12	4.3	0.25
Muscle relaxants	1.5	0.08	1.3	0.06	2.1	0.12
Nervous System	21.5	1.06	19.4	0.92	22.3	1.31
Analgesics	8.1	0.40	7.3	0.34	8.5	0.50
Psycholeptics	3.4	0.17	3.2	0.15	3.5	0.21
Psychoanaleptics	7.0	0.35	5.6	0.28	7.5	0.44
Respiratory System	5.7	0.28	6.5	0.31	5.3	0.31
Nasal Preparations	0.8	0.04	1.0	0.04	0.8	0.04
Anti-asthmatics	1.8	0.09	2.4	0.10	1.7	0.09
Antihistamines for systemic use	1.9	0.10	2.2	0.09	1.9	0.10
Total	100.0	4.94	100.0	3.98	100.0	5.50

* According to classification in the Anatomical Therapeutic Chemical Classification System (ATC)
** Includes the Anatomical Therapeutic Groups (Level 1 of the ATC) where frequency is 4% and above and the most common treatment sub-groups (totaling up to 80% at each level).
*** Total: number of active substances = 3298; number of elderly people interviewed= 667
**** Men: number of active substances = 962; number of elderly people interviewed = 242
***** Women: number of active substances = 2336; number of elderly people interviewed = 425

The treatment sub-groups most commonly used for the cardiovascular system were diuretics, substances related to the renal-angiotensin system and calcium channel blockers. The most acute differences between the genders were found for diuretics, whose consump- tion among women was approximately 44% greater than among men. The treatment sub-groups for the nervous system were mainly represented by analgesics, pscyhoa- naleptics and psycholeptics, whose consumption was greater among women (by 61%, 73% and 50% respec-

Table 3. Prevalence and prevalence ratios (PR) for use of medication by elderly, average number of drugs used and p-value for differences between averages, by sociodemographic variables. Belo Horizonte, Southeastern Brazil, 2003.

Variable	Total			Men			Women		
	n elderly (%)	Use/Non use PR (CI 95%)	n medicines (DP)	n elderly (%)	Use/Non use PR (CI 95%)	n medicines (DP)	n elderly (%)	Use/Non use PR (CI 95%)	n medicines (DP)
Age group									
60-69 years	229 (86.7)	1.0	3.56 (2.62)	89 (80.9)	1.0	2.82 (2.34)	140 (90.9)	1.0	4.09 (2.69)
70-79 years	265 (91.1)	1.05 (0.99; 1.11)	4.30 (3.22)	84 (84.0)	1.04 (0.92; 1.18)	3.57 (2.75)	181 (94.8)	1.04 (0.98; 1.11)	4.68 (3.39)
≥ 80 years	107 (95.5)	1.10 (1.03; 1.17)	4.96 (3.17)	31 (96.9)	1.20 (1.07; 1.34)	3.97 (2.57)	76 (95.0)	1.05 (0.97; 1.12)	5.35 (3.31)
		p = 0.000			p = 0.028			p = 0.013	
Schooling									
Primary School (incomplete)	399 (89.5)	1.0	4.06 (2.96)	112 (83.0)	1.0	3.27 (2.60)	287 (92.3)	1.0	4.40 (3.05)
Primary School (graduated) or more	197 (91.2)	1.02 (0.97; 1.07)	4.28 (3.16)	90 (85.7)	1.03 (0.93; 1.15)	3.33 (2.55)	107 (96.4)	1.05 (1.0; 1.1)	5.19 (3.42)
		p = 0.386			p = 0.860			p = 0.024	
Co-habitation									
Partner	507 (89.6)	1.0	4.09 (3.02)	185 (83.7)	1.0	3.30 (2.59)	322 (93.3)	1.0	4.60 (3.16)
Alone	94 (93.1)	0.96 (0.91; 1.02)	4.26 (3.11)	19 (90.5)	0.93 (0.80; 1.08)	3.10 (2.47)	75 (93.8)	1.0 (0.94; 1.06)	4.56 (3.20)
		p = 0.613			p = 0.730			p = 0.921	

tively). The most commonly mentioned medication for treatment of the digestive and metabolic system were vitamins, drugs for diabetes treatment, anti-acids and other substances for treating peptic ulcers and flatulence. Among these, only hypoglycemic medicines were used more by men (24% more). Other relevant differences were the greater use of antithrombotic agents by men, and of drugs that affect the muscular-skeletal system by women.

Among the interviewees, there was a positive and significant association between the use of medicines and age of 80 or more, poor self-reported health, to have been bed ridden during the previous 15 days, a greater number of medical consultations over the previous year, a history of hospitalization, possession of private health insurance and a greater number of self-reported morbidities (see Tables 3 and 4). These associations were also present among men, with the exception of the variable for possession of a private health plan, which was not statistically significant. Among women, the probability of medicine use did not differ according to sociodemographic variables (Table 3), but increased significantly with a greater number of medical consultations (Table 4).

In terms of the number of medicines used, in the general sample, the average number of medicines used was significantly higher among older individuals, with poorer perception of their health, who had been bed ridden during the previous 15 days, with a greater number of medical consultations and related illnesses, with at least a record of hospitalization over the previous year and possession of private health insurance. The same was found for women (for whom there was also a significant association with level of education) and among men (for whom, however, there was no significant association with a history of hospitalization and membership of a private health plan). Independently of the chosen characteristic, the average number of medicines used by women was always higher than the average used by men.

DISCUSSION

The sample size was not designed to test for gender differences, so some of these differences may not have been detected due to the small number of observations. However, it would be unreasonable to assume that this fact invalidates the differences observed and described here. Generalizations that can be drawn from these estimates are only applicable to retirees and pensioners on the INSS, who are residents of Belo Horizonte and are aged 60 and above. Thus, the extrapolation of the results for the entire elderly population of Belo Horizonte in only possible with restrictions.

Table 4. prevalence and prevalence ratios (PR) for use of medication by elderly, average number of drugs used and probability of significance of differences between averages, by health variables. Belo Horizonte, Southeastern Brazil, 2003.

Variable	Total			Men			Women		
	n elderly (%)	Use/Non use PR (CI 95%)	N medicines (DP)	n elderly (%)	Use/Non use PR (CI 95%)	N medicines (DP)	n elderly (%)	Use/Non use PR (CI 95%)	N medicines (DP)
Self-reported health status									
Very good/good	267 (85.6)	1.0	3.29 (2.66)	102 (76.7)	1.0	2.60 (2.37)	165 (92.2)	1.0	3.80 (2.76)
Average	256 (93.4)	1.09 (1.03; 1.15)	4.50 (2.95)	83 (92.2)	1.20 (1.08; 1.34)	3.84 (2.40)	173 (94.0)	1.02 (0.96; 1.08)	4.82 (3.15)
Very poor/ poor	78 (96.3)	1.13 (1.06; 1.20)	6.02 (3.47)	19 (100.0)	1.30 (1.19; 1.43)	5.37 (3.06)	59 (95.2)	1.03 (0.96; 1.11)	6.23 (3.59)
		$p = 0.000$			$p = 0.000$			$p = 0.000$	
Bed ridden									
No	513 (89.2)	1.0	3.91 (2.96)	180 (82.6)	1.0	3.10 (2.53)	333 (93.3)	1.0	4.41 (3.10)
Yes	88 (95.7)	1.07 (1.02; 1.13)	5.39 (3.14)	24 (100.0)	1.21 (1.14; 1.29)	4.92 (2.47)	64 (94.1)	1.01 (0.95; 1.08)	5.56 (3.34)
		$p = 0.000$			$p = 0.001$			$p = 0.006$	
Medical consultation									
Up to 5	356 (85.4)	1.0	3.19 (2.60)	128 (78.5)	1.0	2.55 (2.16)	228 (89.8)	1.0	3.60 (2.77)
6 or more	245 (98.4)	1.15 (1.10; 1.20)	5.68 (3.06)	76 (96.2)	1.23 (1.19; 1.34)	4.78 (2.72)	169 (99.4)	1.11 (1.06; 1.16)	6.09 (3.12)
		$p = 0.000$			$p = 0.001$			$p = 0.000$	
Hospitalization									
No	476 (89.0)	1.0	3.89 (2.98)	163 (82.3)	1.0	3.14 (2.59)	313 (92.9)	1.0	4.33 (3.11)
Yes	125 (94.7)	1.06 (1.01; 1.12)	5.05 (3.05)	41 (93.2)	1.13 (1.02; 1.25)	3.93 (2.43)	84 (95.5)	1.03 (0.97; 1.09)	5.61 (3.18)
		$p = 0.000$			$p = 0.064$			$p = 0.001$	
Health insurance									
No	265 (87.2)	1.0	3.78 (2.92)	78 (78.8)	1.0	2.91 (2.44)	187 (91.2)	1.0	4.20 (3.04)
Yes	335 (92.5)	1.06 (1.01; 1.12)	4.41 (3.09)	126 (88.1)	1.12 (0.99; 1.26)	3.54 (2.64)	209 (95.4)	1.05 (0.99; 1.10)	4.99 (3.23)
		$p = 0.007$			$p = 0.061$			$p = 0.010$	
N of self-reported morbidities									
Up to 2	139 (76.0)	1.0	2.31 (2.16)	58 (67.4)	1.0	1.87 (1.98)	81 (83.5)	1.0	2.70 (2.24)
3 to 4	265 (94.6)	1.25 (1.14; 1.36)	4.11 (2.61)	98 (92.5)	1.37 (1.17; 1.60)	3.65 (2.35)	167 (96.0)	1.15 (1.05; 1.26)	4.39 (2.73)
5 or more	197 (96.6)	1.27 (1.17; 1.38)	5.75 (3.31)	48 (96.0)	1.42 (1.22; 1.67)	4.92 (2.74)	149 (96.8)	1.16 (1.06; 1.27)	6.01 (3.43)
		$p = 0.000$			$p = 0.000$			$p = 0.000$	

Prevalence of medicine use (90.1%) and the average number of products used (4.1) were greater than in other countries,[3,6,8,12] where prevalence varies from 75% to 88% and amounts range from 2 to 3.8 medicines used. Compared with other national studies, the prevalence was greater than that found in Bambuí (Southeastern Brazil) and in Fortaleza (Northeastern), but similar to that of Porto Alegre (Southern).[7] The differences can be attributed, in part, to the characteristics of the reference population and the intervals in the recording period. Differences may also be related to the fact that in other studies, particularly those from other countries, prescription and non-prescription medicines were analyzed separately. While 85% of the medicines used in the present study were prescribed by an identified source, the criteria for classifying medicines according to the need for a medical prescription differ between Brazil and developed countries, which would suggest that any comparisons should be treated with caution. Taking into consideration these differences, the findings of the present study are consistent with the literature in terms of the high levels of medication use by people aged 60 and above and reinforce concerns about the possible over medication of this sub-group of the Brazilian population.

The greater use of medication by elderly women compared with men is consistent with the results presented in other epidemiological studies. However, the present study found both the prevalence of and average number of medicines used by women to be greater than levels found by other authors.[6,7,12,13]

The most commonly used treatment groups were similar to those found in developed countries such as England,[3] Finalnd[12] and Spain.[17] The frequency of consumption in this study, be it of cardiovascular drugs or those that treat the nervous system, gastro-intestinal tract or metabolism, was the same as that found in the Brazilian municipalities of Porto Alegre, Fortaleza and Bambuí.[4,7,13] While a more accurate comparison of the frequencies of use requires an analysis of the confidence intervals, slight differences can be partially attributed to medicinal associations, whose classification is more sensible to differences. This fact is especially important in relation to medication for the nervous system, and in particular analgesics, and drugs treating the digestive and metabolic systems, notably anti-acids and multi-vitamins. These similarities in consumption patterns seem to be the result of common needs among elderly populations in different locations. However, it is also possible that the physicians responsible for prescribing the medication may apply a standard prescription according to a patient's age, as a result of ideological and market based pressures. It may be possible that the combination of need and prescription does not vary significantly across different areas studied.

There were differences between men and women in terms of the use of certain treatment groups and sub-groups. Women's greater use of medication for the cardiovascular, nervous and musculo-skeletal systems, for thyroid therapy and of vitamin supplements is consistent with findings from other countries. The same is true for the greater use of antithrombotic agents by men.[5,8,16] This pattern can be explained in part by the different morbidity profile of the two sexes after 60, with a greater prevalence of osteo-related diseases and depression among women and of heart disease among men. In addition, women on average live to be older than men, and certain illnesses such as heart disease can affect younger men. This may explain the greater use of cardiovascular medication among women, particularly elderly women who, on average, are older than men. Another hypothesis is that there appears to be a tendency among men to use more intensively products aimed at treating illnesses whose pharmacological treatment is already well established. The opposite is true for women, who tend to use more frequently medicines for treating symptoms or those that are acquired without a medical prescription, such as analgesics, vitamin supplements, anti-acids and muscular relaxants.

In general terms, age is an important factor in the pharmacoepidemiology of aging.[13,15,19] Amongst the elderly, those who are oldest are more likely to use medicines and do so in greater quantities when compared with younger people in this category, and this appears to be independent of gender. It is possible that this situation is related to greater frequencies and/or severity of the illnesses involved, as well as the greater use of health services.[12] When comparing the use and non use of medicines, the increase in prevalence with age was more accentuated among men. However, the increase in the number of medicines used as age increases was more marked among women. In the first case, the frequency of use among younger men was lower than among women of the same age range, implying that increments are greater for men as they get older.

In the present study, level of schooling influenced the quantity of medicines used by women. In developed countries, few studies have shown evidence of an association between level of schooling and use of specific classes of medication amongst the elderly.[3] In Brazil, some studies reported a greater use of prescribed medication amongst older people who had a higher socioeconomic level.[4,13,15] While the use of schooling as a measure of socioeconomic levels should be treated with caution, such a finding could suggest inequalities in the access and use of medicines by the elderly. This fact may also indicate that total consumption by women will increase with schooling. These hypotheses require further investigation, with appropriate samples, given that women tend to age in less favorable economic conditions.[2]

The health related variables were, for the most part, associated with the use of medication and the number of medicines used, in line with the findings of other epidemiological studies. [7,8,13,15] The present study found there to be gradients for the differences in the number of medicines used, in relation to the perception of one's health and the number of reported illnesses, with this holding true for both all interviewees and for each gender group. This leads to the observation that the worse the health indicator, the greater the number of medicines used. This increased consumption raises questions about the impact of polypharmacy on the morbi-mortality of elderly Brazilians, which could be better understood by means of longitudinal studies.

Possession of a private health insurance had a significant association with a greater probability of medicine use, and a use in greater quantities. This suggests that by facilitating access to physicians who prescribe medication, an insurance policy increases drug consumption. This association was not observed in other studies, at least not when other factors were controlled. [6,13] In the present study, possession of a private health insurance policy made a difference on the quantity of medicines used only among women.

In summary, the profile of medication use by the elderly involved in this study was similar to that found in other countries and in other elderly populations in Brazil. The prevalence of use and the quantity of medicines were greater among women. While many different reasons exist for this over-use of medication among women, efforts must be made to ensure appropriate pharmaceutical treatment for this sub-group who are more vulnerable to the harm that can result from the improper use of medication. On the other hand, subsequent studies should give greater attention to the profile of medicine use by men in order to identify those factors that promote and those that discourage the appropriate use of medication. Further research into the pharmacoepidemiology of aging in Brazil is required to consider the multiple use of medicines and to understand its impact on the adherence to treatments and on the morbidity and mortality of the elderly. This would make it possible to provide consistent supporting information to the National Policy on Medications and to encourage a more rational use of such products, as well as improve the health conditions of the elderly in Brazil.

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