



## Analysis of medication use by elderly persons with supplemental health insurance plans

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### Abstract

*Objective:* To analyze the socio-demographic and pharmacotherapeutic profiles of elderly users of a private health plan. *Method:* A cross-sectional and descriptive study was conducted with 239 elderly users of a private health plan in a medium-size city in the state of São Paulo, Brazil. A structured questionnaire was used for data collection and absolute and relative frequencies were obtained. The pharmacotherapeutic survey estimated the prevalence and average number of medicines used in the 15 days prior to the interview, as well as adherence to treatment. *Results:* Of the respondents, 79% were female, with a mean age of 73 years. The main health problems reported were: arterial hypertension, rheumatism/arthritis, dyslipidemia and diabetes. A total of 97.1% of the elderly persons used medicine, and the most frequently used classes were for the cardiovascular and digestive systems. An average of 5.9 drugs/elderly person were used and 62.8% of the sample were undergoing polymedication. A total of 11.7% of the sample used medications that were unsuitable for the elderly, 51% had average adherence to medication and 12.1% had poor adherence. *Conclusions:* The majority of elderly people in the sample were female, lived with relatives and had a higher-level education. Despite the use of polymedication and the presence of multiple comorbidities, the percentage of elderly persons with low adherence to treatment was lower than that found in other studies. A high level of education and purchasing power, which facilitated the access to medication of the elderly patients under study, may be important predictors of adherence to treatment. The results support maintaining a model of care for the elderly centered on the treatment of diseases and pharmacotherapy.

**Keywords:** Supplemental Health. Elderly. Drug Utilization. Polypharmacy.

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## INTRODUCTION

The aging process is in most cases accompanied by the onset of diseases, a finding confirmed by the Pesquisa Nacional de Saúde (the National Health Survey) (PNS) of 2013, in which the elderly were found to be the age group with the highest rates of noncommunicable chronic diseases (NCCD)<sup>1</sup>. Around 80% of elderly persons suffer from one or more NCCD and 36% suffer from three such illnesses<sup>2</sup>. In the 2008 Pesquisa Nacional por Amostra de Domicílios (the National Household Sample Study) (PNAD)<sup>3</sup>, 77.4% of elderly persons said they suffered from a NCCD, and approximately 55% of individuals with Supplemental Health Insurance (SHI) had an NCCD<sup>3</sup>.

Elderly persons are therefore expected to use multiple medications to control these diseases and to maintain quality of life and the quantity of years lived<sup>4</sup>, as such treatment is a significant technological development designed for this purpose. Such use can cause harm to health however, especially when used improperly or to the detriment of non-drug treatment measures, which, as they require changes in behaviors that have been defined throughout life<sup>5</sup>, demand great attention from both the elderly persons and the health team.

In addition to using multiple medications, the elderly are more exposed to the consequences of this use, as they undergo physiological changes that modify pharmacodynamics and pharmacokinetics, contributing to the toxicity of such drugs<sup>6</sup>.

The most common errors in drug use among the elderly involve inappropriate medications, improper dosage, inadequate frequency, insufficient duration of use or exaggerated consumption, and the unsuitable combination with other drugs, causing unwanted interactions. Problems also arise from non-adherence to drug treatment<sup>7</sup>.

Many countries have their own evaluative criteria to guide prescribers about the risks of indicating a large number of drugs for the elderly population, such as the PRISCUS criteria in Germany, the French consensus panel list, STOPP/START Screening in Ireland, the Beers criteria in the USA, and McLeod's

list in Canada<sup>8</sup>, among other protocols around the world. Brazil does not have its own consensus, with the Beers Criteria the most commonly used reference in the country. The first list of inappropriate drugs was published in 1991 and updated in later versions<sup>8</sup>, and the latest version of the Beers Criteria, updated by the American Society of Geriatrics (AGS), was published in 2015<sup>9</sup>.

Given the different conditions involving the use of drugs among the elderly, it is important to recognize the profile of drug use by this population in different life and health contexts, so that strategies can be designed for the rational prescription of drugs for this age group.

However, there are few studies that deal with elderly persons with SHI, who, despite their greater purchasing power, can present complex problems that require specific actions. Membership in a health plan results in ease of access to care and medical prescription and is associated with the increased use of medications<sup>10</sup>. The amount of medicines used and their financial cost therefore weigh significantly in the budget of this age group, while many older people with SHI also seek to obtain at least some of their drugs through the Sistema Único de Saúde (the Unified Health System) (SUS)<sup>6</sup>.

The 2013 Pesquisa Nacional de Saúde (National Health Survey) (PNS)<sup>11</sup>, published in 2015, found that 27.9% of the population surveyed had a health plan of some kind, with this rate rising to 28.4% among people aged 60 years or older. However, in 2016 the Agência Nacional de Saúde Suplementar (the National Agency of Supplemental Health) (ANS) stated that 48.8 million people (25.5%) in Brazil have SHI, of whom 12.3% are elderly, and who are predominantly women<sup>12</sup>.

In view of the above and the lack of studies in the context of supplemental health, and considering the geographical and populational heterogeneity of Brazil, it is believed that the use of drugs among the elderly with SHI presents specific issues that require further elucidation. The present study aims to analyze the sociodemographic and pharmacotherapeutic profiles of elderly users of supplemental health plans.

## METHOD

A cross-sectional quantitative study was carried out of the profile of the medication use of elderly people with supplemental health insurance, living in a town in the interior of the state of São Paulo, Brazil. This town has 224,637 inhabitants<sup>13</sup>, with approximately 78,000 beneficiaries of health insurance, corresponding to 34.7% of the total population. Of these, 15.4% are over 60 years of age, according to ANS data<sup>12</sup>. The vast majority of these elderly people belong to the portfolio of beneficiaries of the health plan provider studied.

The study population included people who were 60 years of age or older, irrespective of gender, who were not institutionalized and were users of the health plan with the widest coverage in the town. The sample size was calculated using the following statistical parameters: an elderly population who used the health plan of 8,474 people, a prevalence of medication use of 83%<sup>10</sup>, a margin of error of 5%, and a confidence level of 95%, resulting in 239 elderly people.

The data were collected through interviews at home, from May 2014 to January 2015, using a questionnaire applied by the principal researcher. From the list with names and addresses of the elderly provided by the health plan provider, a random draw was performed to enable data collection to be carried out. After three unsuccessful attempts to locate an interviewee the next elderly person was drawn.

The information was obtained directly from the elderly persons, and the elderly/caregiver were asked to provide the researcher with all medications used in the fifteen days prior to the date of the interview. In cases in which the elderly person presented difficulty in providing such information, the interview was performed with the caregiver/family member responsible for administering their medication.

The questionnaire was composed of demographic data (gender, ethnicity/color, marital status, age and religion); social data (occupation, medication expenses, educational level, with whom the elderly person lived and economic class according to the

Critério de Classificação Econômica Brasil (the Brazilian Economic Classification Criteria)<sup>14</sup>, health problems in the last six months; medications used, prescribed or otherwise; access to medications; adherence to medication use evaluated with the Portuguese version of the Morisky-Green Test (MGT), which consists of four questions through which the elderly are classified as having high, medium and low adherence<sup>15</sup>. The behavior of those with low adherence is also defined as intentional or unintentional.

The Beers Criteria, updated in 2015<sup>9</sup>, were created to evaluate the inappropriate use of drugs. They include a list of pharmacological classes and subclasses that help in the selection of appropriate medicines and the identification of Potentially Inappropriate Medications (PIM), or in other words, those that offer greater risks than benefits for the elderly. This list is divided into five categories: medications that are inappropriate for the elderly; those that should be avoided with determined illnesses or syndromes; medications that should be used with precautions among the elderly; medications that require an adjustment in dosage in accordance with renal function and medications that can cause medication-related hospitalization.

The drugs were classified according to the Anatomical Therapeutic Chemical Classification System (ATC) 2016<sup>16</sup>, recommended by the World Health Organization for drug use studies. In this classification, medications are divided according to the anatomical group or system in which the drug and its active principle act. Descriptive statistics were used for the analysis of the data.

The present study was authorized by the manager of the Cooperativa dos Usuários Médicos (the Medical Users Cooperative) (UNIMED) and was approved by the Ethics Committee for Research involving Human Beings of the institution to which the principal investigator is affiliated, under Approval Number 607.824 dated March 31, 2014. The participants were informed about the nature of the study, its objectives, methods and possible inconveniences inherent in the interview process, and signed a Free and Informed Consent Form.

## RESULTS

As shown in Table 1, of the 239 interviewees, the majority (79%) were women; 75.8% were aged between 60-79 years; 80.7% were of white/Caucasian skin color/ethnicity; 52.7% were married and 74.5% practiced the Catholic religion. The mean age for both genders was 73 ( $\pm 8$ ) years. In terms of occupation, the majority were retired (81.2%). Medication expenses were between R\$101.00 and R\$300.00 (40.1%). The most prevalent economic class was B, to which 51.1% of respondents belonged. The majority of the elderly lived with relatives (75.6%) and 27.2% had completed higher education. The respondent (61.5%) was the main person responsible for paying for the health insurance.

A total of 955 health problems were reported by the elderly, with arterial hypertension the most prevalent, affecting 17.5% (167) of the interviewees, followed by rheumatism or arthrosis (8.6%), dyslipidemia (8.4%) and diabetes (7.6%). On average,

the elderly described suffering from four health problems.

Among the elderly interviewed, 97.1% (232) had used some type of medication in the 15 days prior to the interview, while 62.8% (150) consumed five or more drugs. The average number of medications used by the elderly was 5.9 ( $\pm 4.1$ ), with men consuming 5.4 ( $\pm 3.3$ ) medications on average and women 6.1 ( $\pm 4.2$ ). The maximum number of drugs consumed by the elderly was 15. In terms of access to medicines, 48.9% (117) purchased them in commercial pharmacies with their own resources, 36.5% (87) bought some of their medicines in a commercial pharmacy, while others used public health units where medications are dispensed free of charge. Of the elderly persons interviewed, 51% (122) exhibited medium adherence and 12.1% (19) low adherence to medication use (Table 3). Among the elderly who did not adhere to medication, 47.4% were found to be in the condition of intentional non-adherence, that is, even if they feel better when taking medication, the patient stops using it.

**Table 1.** Distribution of demographic characteristics of the 239 elderly users of the Supplemental health plan. Marília, São Paulo, 2015.

Variables	n (%)
Gender	
Male	50 (21.0)
Female	189 (79.0)
Age (years)	
60 - 69	90 (37.7)
70 - 79	91 (38.1)
80-89	52 (21.7)
90 or more	6 (2.5)
Ethnicity/skin color	
White	193 (80.7)
Black/Brown	18 (7.5)
Yellow	28 (11.8)
Marital status	
Unmarried	20 (8.4)
Married	126 (52.7)
Widower	91 (38.1)
Separated	1 (0.4)
Common Law Marriage	1 (0.4)

to be continuous

Continuação da Tabela 1

Variables	n (%)
<b>Religion</b>	
Catholic	178 (74.5)
Evangelical	20 (8.4)
Spiritism	20 (8.4)
Buddhist/Other	21 (8.70)
<b>Occupation</b>	
Retired	194 (81.2)
Housewife	23 (9.6)
Others	22 (1.2)
<b>Spending on medicines</b>	
Up to 100.00	65 (27.1)
From 101.00 to 300.00	96 (40.1)
From 301.00 to 500.00	41 (17.2)
More than 500.00	13 (5.5)
Nothing / Do not know	24 (10.1)
<b>Lives</b>	
Alone	58 (23.6)
With friends	2 (0.8)
With relatives	179 (75.6)
<b>Economic Classification</b>	
Class A	15 (6.2)
Class B	122 (51.1)
Class C	90 (37.6)
Class D	10 (4.3)
Did not answer	2 (0.8)
<b>Education</b>	
Illiterate/Incomplete elementary	59 (24.7)
Complete elementary/Incomplete high school	54 (22.6)
Complete high school/Incomplete higher education	60 (25.1)
Graduate	65 (27.2)
Did not inform	1 (0.4)
<b>Responsible for paying for health plan</b>	
Interviewee themselves	147 (61.5)
Family (child/spouse)	78 (32.7)
Others	14 (5.8)

**Table 2.** Health problems described by interviewees. Marília, São Paulo, 2015.

Health problems described	n (%)
High pressure	167 (17.5)
Rheumatism or arthrosis	82 (8.6)
Dyslipidemia	80 (8.4)
Diabetes	73 (7.6)
Restless or troubled sleep	66 (7.0)
Infarction, angina	59 (6.2)
Hypothyroidism	50 (5.2)
Bronchitis, influenza, pneumonia	34 (3.5)
Varicose veins	26 (2.7)
Osteoporosis	25 (2.6)
Visual impairment	19 (2.0)
Labyrinthitis	18 (1.9)
Itchy, sore skin	17 (1.8)
Depression	16 (1.7)
Urinary infection	14 (1.5)
Kidney problems	9 (1.0)
Cancer	9 (1.0)
Diverticulitis	7 (0.7)
Uric acid	7 (0.7)
Osteopenia	6 (0.6)
Panic Syndrome	6 (0.6)
Falls	6 (0.6)
Benign prostatic hyperplasia	6 (0.6)
Others	153 (16.0)
Total	955 (100.0)

**Table 3.** Use of medications in the fifteen days prior to the date of the interview, way of obtaining medicines, and degree of adhesion of elderly persons interviewed. Marília, São Paulo, 2015.

Variables	n (%)
Use of medications in 15 days prior to the interview date	
Yes	232 (97.1)
No	7 (2.9)
Number of medicines	
0	7 (2.9)
1 to 4	82 (34.3)
5 or more	150 (62.8)
Medicines obtained from	
Health unit	15 (6.3)
Pharmacy	117 (48.9)
Third parties	0 (0)
Health unit + pharmacy	87 (36.5)
Pharmacy + Third Parties	11 (4.5)
Health Unit + Pharmacy + Third Parties	2 (0.8)
Does not use medicines	7 (2.9)

to be continuous

Continued from Table 3

Degree of adherence	
High	69 (28.9)
Average	122 (51.0)
Low	19 (8.0)
Not applicable	29 (12.1)
Low adherence behavior	
Intentional	9 (47.4)
Not intentional	7 (36.8)
Both	3 (15.8)

A total of 1358 drugs were consumed (Table 4), with medications for the cardiovascular system appearing most frequently (30.2%), and antihypertensive drugs the most used (8.10%). Drugs for the digestive system and metabolism were the next most common (22.60%), predominantly vitamins (8.9%), followed by those for the nervous

system (18.19%), where analgesics were the most used (5.54%).

Of the drugs used, 11.7% (159) were considered to be potentially inappropriate for the elderly, with musculoskeletal relaxants (27%) and proton pump inhibitors (22%) the most commonly used (Table 5).

**Table 4.** Anatomic classification of medications used by the elderly, according to the Anatomical Therapeutic Chemical (ATC) Classification System<sup>16</sup>, 2016, Marília, São Paulo, 2015

Anatomical Classification	n (%)
Cardiovascular apparatus	410 (30.2)
Digestive system and metabolism	307 (22.6)
Nervous system	247 (18.2)
Musculoskeletal system	130 (9.6)
Blood and Hematopoietic Organs	71 (5.2)
Systemic hormonal preparations, other than sex hormones and insulins	56 (4.3)
Herbal medicines	42 (3.1)
Respiratory Device	36 (2.6)
Sensory organs	20 (1.5)
Genito-urinary tract and sex hormones	16 (1.2)
Antimicrobials for systemic use	14 (1.0)
Dermatological	5 (0.3)
Others	4 (0.3)
Total	1358 (100.0)

**Table 5.** Inappropriate medications for elderly persons according to the Beers Criteria, 2015. Marília, São Paulo, 2015.

Group/medications	n (%)
Musculoskeletal system	54 (34.0)
Musculoskeletal relaxants	4 (27.0)
Non-steroidal anti-inflammatory drugs	11 (7.0)
Digestive system and metabolism	36 (22.6)
Proton Pump Inhibitor	35 (22.0)
Metoclopramide	1 (0.6)
Central Nervous System	33 (20.8)
Benzodiazepines	17 (10.8)
Amitriptyline	8 (5.0)
Paroxetine	4 (2.5)
Phenobarbital	3 (1.0)
Non-benzodiazepine hypnotics	1 (1.0)
Endocrine	16 (10.1)
Insulin	9 (5.7)
Estrogen	5 (3.2)
Long-lasting sulphonylureas	2 (1.2)
Cardiovascular	14 (8.8)
Amiodarone	9 (5.8)
Nifedipine	2 (1.2)
Digoxin	2 (1.2)
Methyldopa	1 (0.6)
Antimicrobial	3 (1.9)
Nitrofurantoin	3 (1.9)
Antithrombotics	2 (1.2)
Ticlopidine	2 (1.2)
Antihistamines	1 (0.6)
Hydroxyzine	1 (0.6)
Total	159 (100.0)

## DISCUSSION

In terms of the sociodemographic data of the interviewees, the majority were female, confirming the findings of another study<sup>17</sup>, as well as data from the Instituto Brasileiro de Geografia e Estatística (the Brazilian Institute of Geography and Statistics) (IBGE) which describe the feminization of old age<sup>18</sup>, as women are less exposed to the risk of illness and death<sup>17</sup>. Nevertheless, in the present study, the predominance of women (79%) was greater than that found in general studies, which have described this proportion as around 55%, coinciding with the PNAD 2008<sup>3</sup> and IBGE projections for the elderly

population of Brazil in 2016.<sup>19</sup> In a study carried out in the same locality by Marin et al.<sup>20</sup>, it was found that among users of the Family Health Strategy (FHS), 61.8% of the elderly population was female. In terms of the elderly who use health insurance, it has been found that for every 100 men aged 60 years or over, there are 143 women<sup>21</sup>. In addition, women are more likely to agree to data collection, as was the case in the present study.

The most prevalent age range in the present study was 70-79 years (38.1%). This older profile was also observed in elderly beneficiaries of health insurance when compared with those without health

insurance<sup>21</sup>. However, among elderly persons with SHI in Brazil, the largest age group was 60-69 years<sup>12</sup>. The predominance of white/Caucasian skin color/ethnicity, the Catholic religion, and a marital status of married corresponded to data from the 2010 Demographic Census<sup>22</sup>. Among women, however, there was a predominance of widows, which is explained by male over-mortality and by the fact that older men seek to remarry, often with younger women<sup>18</sup>.

The majority of the elderly persons were retired, an index similar to those found in social indicators of the Brazilian population<sup>18</sup>, in which 77.4% of the elderly population were found to be retirees and/or pensioners.

When applying the Brazilian Economic Classification Criteria 2015<sup>14</sup>, most of the elderly persons interviewed belonged to class B, in line with PNAD 2008<sup>3</sup>, which confirms that elderly people with health insurance are from the most socially favored classes. It is important to emphasize that this social class represents only 25.5%<sup>12</sup> of the Brazilian population.

A study carried out in Rio de Janeiro<sup>6</sup> found an association between having health insurance and greater spending on medicines. The average expenditure on medicines accounts for approximately one quarter of the average monthly income of more than half of the Brazilian elderly population<sup>23</sup>.

Most of the elderly interviewed lived with relatives, but many lived alone, which is considered a justification for pharmacological monitoring, as there is an indication that these elderly people are more prone to problems related to medication use<sup>6</sup>.

Another finding of the present study which differs from results observed in the general elderly population was schooling, as 52.3% of participants in the present study had completed secondary or higher education. Even so, almost a quarter (24.7%) had no education or incomplete elementary schooling only. A study by Marin et al.<sup>20</sup> of elderly users of an ESF (Family Health Strategy) (Estratégia Saúde da Família) in the same city<sup>19</sup> found that 68.1% of individuals did not have an education or only had incomplete elementary schooling, as opposed to 24.7% who did. The PNS 2013<sup>24</sup> found that the

higher the level of education, the greater the health plan coverage, with figures ranging from 16.4% for individuals without education or with incomplete elementary schooling to 68.8% for those with complete higher education.

As has also been found among the general population, the present study reported an average of four health problems per elderly person, with the distribution of diseases that most affected this age group very similar to that found in the PNS 2013<sup>24</sup>, although depression was found to be the 14<sup>th</sup> most common disease affecting the elderly in the present study, while it was the 4<sup>th</sup> most prevalent chronic disease among the Brazilian population in the PNS 2013. In the present study, the 4<sup>th</sup> ranked CNCD was diabetes, which was closer to the results of PNAD 2008<sup>3</sup> and the findings of a study of elderly SUS users in the same locality<sup>20</sup>. In a study carried out in Belo Horizonte, in the state of Minas Gerais<sup>17</sup>, it was concluded that although the morbidity and mortality profile of the SHI beneficiaries was similar to that observed for SUS users, the average diagnosis of disease described by the elderly in this study was 2.5 times greater than the results of a study with SUS users<sup>20</sup>.

The prevalence of drug use in the study population was 97.1%, surpassing the rates found in other regions of the country, such as 79.4% in the south<sup>25</sup> and 85.5%<sup>26</sup> in the northeast regions. These data are in line with the study by Silva et al.<sup>10</sup>, in which it was found that enrollment in a health plan was positively associated with the use of medication, due to the greater ease of access to doctors from different specialties, resulting in a greater number of prescriptions.

Polypharmacy was practiced by 62.8% of the elderly participants of the study. National studies have found a variation ranging from 15.97% to 36%<sup>27,28</sup>. This variation can occur due to methodological differences (populations studied, recall period) and even to the interpretation of the concept of polypharmacy. However, it is known that the use of six or more drugs raises the risk of serious drug interactions by as much as 100%<sup>29</sup>.

The therapeutic classes most used by the study population were antihypertensive drugs, followed by

vitamins and analgesics. The frequent use of drugs that act on the cardiovascular system in this age group has also been found in other studies<sup>10,17</sup> and is consistent with the PNS-2013, which highlights cardiovascular disorders as having a higher occurrence of CNCDs.

The simultaneous occurrence of multiple diseases, associated with the use of large quantities of drugs, the lack of a private health plan, a low level of schooling and the aging process itself, with loss of independence and cognitive capacity, are factors that limit adherence to medications<sup>30</sup>. Good schooling, a health plan and good functional and cognitive capacity are factors that likely contributed to the fact that only 12.1% of the elderly in the present study had low adherence to treatment. However, the data from the sample diverge regarding the occurrence of comorbidities and the use of large quantities of drugs as limiting factors of adherence to treatment. In spite of the use of polypharmacy and the presence of several comorbidities, low adherence to treatment occurred in a smaller proportion of the elderly persons in the present study than generally found in literature. It is possible that a high level of schooling and purchasing power, facilitating access to medication among the elderly studied, are important predictors of adherence to treatment.

According to the Beers Criteria 2015<sup>9</sup>, 11.7% (159) of the drugs used by the elderly persons in this study were inappropriate, a prevalence lower than those found in other studies, which ranged from 13% to 44.73%. It is important to note that the Beers Criteria revised in 2015 includes consistent modifications over previous versions, such as the withdrawing or changing of the groups of many inappropriately used medications for the elderly, regardless of disease.

In Brazil, as in many countries around the world, a national consensus is being developed on medicines that are inappropriate for the elderly<sup>32,33</sup>, considering existing medicines in the domestic market and the possibility of replacing inappropriate drugs with other drugs with a lower risk/benefit ratio.

Among the drugs considered to be inappropriate for the age group of the present study, musculoskeletal relaxants (carisoprodol, Cyclobenzaprine and orphenadrine) were the most frequently used. These drugs are tolerated poorly by the elderly as they cause

anticholinergic effects, sedation and weakness. They are sold in Brazil in combination with dipyrone, diclofenac, paracetamol and caffeine and without the need for medical prescription, allowing their use as self-medication<sup>34</sup>. In the USA, the use of muscle relaxants among the elderly aged over 65 years increased 136% between 1999 and 2012<sup>34</sup>. Proton pump inhibitors, meanwhile, elevate gastric pH, increasing the risk of infection by *Clostridium difficile*, bone loss, fractures, pneumonia and malabsorption<sup>35</sup>, and so the Beers Criteria 2015 recommends avoiding their use for more than eight weeks<sup>9</sup>. The medications used by the participants of the present study differed from those seen among elderly Family Health Strategy users<sup>20</sup>. Among such individuals, the use of muscle relaxants was not observed, whereas proton pump inhibitors represented the 5<sup>th</sup> most used group of medicines. It should be considered that this difference in data may be related to the recall period used. In addition to this variable, it is important to point out that 85% of the patients receiving care via the SUS obtain most of their medication from within the system itself or from a Farmácia Popular (Popular Pharmacy) (21.9%)<sup>24</sup>. Muscle relaxants associated with non-steroidal anti-inflammatory drugs (NSAIDs) are not among the medicines provided by city authorities and are not listed in the Relação Nacional de Medicamentos (National Medications List) (RENAME). Many of the participants in this study (48.3%) bought their medicine from a commercial pharmacy, as was also demonstrated by PNAD 2008<sup>3</sup>.

However, it should be considered that the PIM list for the elderly, according to the 2015 Beers Criteria<sup>9</sup>, continues to disregard the heterogeneity of the elderly population and the availability of pharmaceutical specialties in the markets of each country<sup>29,32</sup>, as it is designed for use in the USA. The new version, however, puts greater emphasis on clinical judgment in decision-making regarding the pharmacotherapy of the elderly. However, while the lack of specific criteria in Brazil continues, the application of the 2015 Beers Criteria facilitates clinical practice and improves the quality of care.

Among the limitations of this study are difficulty of access to the population of elderly SHI users, as there was a great deal of refusal, especially among elderly men.

## CONCLUSIONS

The sociodemographic profile showed that the majority of the sample was female, who lived with relatives. There was an older mean age than in other similar studies, and most of the sample had a higher level of education, differing from the general level of schooling of the Brazilian elderly population.

Regarding pharmacotherapeutic profile, the disease/elderly person ratio of the sample was similar to many studies on the subject, although indices of the use of polypharmacy, the mean medication use/elderly person and the prevalence of medication use were higher than in literature. The use of potentially inappropriate medications was lower than the majority of Brazilian studies. This variation may be associated with changes made in the updated 2015 Beers Criteria, which is significantly different from previous versions, as well as demographic differences among the elderly, local medical and pharmaceutical care, access to health services and the recall period of the study. Regarding adherence to treatment,

12.1% of the elderly had low adherence. Despite the use of polypharmacy and the presence of several comorbidities, the proportion of low adherence to treatment among the elderly was smaller than that found in literature. It may be that the higher level of schooling and purchasing power, favoring the access to medication of the elderly studied, are important predictors of adherence to treatment.

The results regarding medications suggest that an elderly care model focused on the treatment of diseases and pharmacotherapy continues to predominate, even among individuals with greater purchasing power, higher levels of education and access to a supplemental health plan. Therefore, in order to better understand this issue, it is important that new studies are carried out, evaluating the training of those who prescribe medicine and their knowledge regarding the risks/benefits of medications, to better define criteria and proposals that can rethink the model of patient care for the elderly population, given the increase in the life expectancy of this population.

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