

# Drug Utilization in Homes for the Aged in Brasilia, Brazil

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## ABSTRACT

This paper aims to describe the socioeconomic and epidemiological profile, as well as the standards of medicine consumption in a group of 154 elderly people from five homes for the aged in Brasilia, in order to expand the understanding about some characteristics and individual needs of this population and its influence on the quality of drug's therapy. Data were collected between January and December of 2007, it was used a questionnaire adapted from Dader's method (2002) and a pharmacotherapeutic follow up method and it was responded by the elders and caregivers. Data were supplemented with information from medical records and prescriptions available in the institutions. The studied group has an average age of 74.6 years, living in their current homes for about 5.4 years and the group consists mainly of men with preserved cognitive status. The members of the group have low monthly income, low education level and are sedentary. They consume 4 - 5 drugs and are affected mainly by cardiovascular and psychiatric diseases. Results suggest that low monthly income, low education level, the prevalence of sedentary lifestyle, elders with compromised cognitive status, the increasing number of chronic diseases and the high consumption of drugs in the researched group may be important factors for the emergence or injury drugs-related problems (DRP) as non-adherence to treatment, medication errors, drug interactions and adverse drug reactions compromising the quality of medication therapy. This study points out the necessity of including a pharmacotherapeutic follow-up for the elderly people in order to minimize such problems and provide better quality of life for patients.

**Keywords:** Elderly; Homes for the Aged; Health of the Elderly; Health of Institutionalized Elderly; Drug Therapy; Drug Utilization

## 1. Introduction

The increasing number of elderly in the world and Brazilian populations have led to an important alteration on the morbimortality profile, predominantly with regards to chronic degenerative diseases [1]. Cardiovascular, locomotor and psychiatric diseases are the most common [1-5] and require the use of continuous medication. Studies have shown that each elder takes an average of four to six medications [2-8] and those numbers increase with aging. Cardiovascular and psychotropic drugs are the most used, followed by anti-inflammatory, painkillers and gastrointestinal agents [2,4,5,9]. The high level of medication consumption by the elderly leads to a large number of Drug-Related Problems (DRP) and to the occurrence of adverse reactions causing an increase in hospitalizations and health care costs [4-6,8,10]. The population aging has also contributed to relevant socioeconomic changes, such as increase demand for social and health services, both previously considered characteristics of developed countries [1]. Therefore, it has been necessary to restructure the health services, increasing demand for more complex and specialized services, besides providing staff qualification

aiming to assist the elderly. In this context, the homes for the aged, maintained by either the government, religious associations, charities or by the elderly or families emerged as an option to assist the social needs of the modern society [11]. The increasing demand for this services may be explained in most cases by psychosocial and economical difficulties facing the families that take care of the elderly, especially of those with declined functional capacity [11]. Those elderly become more and more dependent on others for performing everyday activities and require more complex and more expensive care [11]. In some cases, institutionalization might lead to family separation, abandonment and social isolation. It is believed that this situation connected to health conditions, lack of qualified professionals and difficulty in accessing public health services [12] influence the access and the decision to initiate pharmacotherapy [7,13] also influencing the occurrence and worsening of DRP [6]. In addition, public health policies which exclude the institutionalized elderly worsen this group's health situation and the occurrence of these problems. In that perspective, this study aims to describe the socioeconomic and epidemiological profile, as well as the

standards of medication consumption in the elderly population of homes of the aged in Brasilia in order to expand understanding about the characteristics and individual needs of the population, in constant growth and its influence in the quality of drug's therapeutic.

## 2. Methods

An epidemiological, transversal, descriptive and exploratory study done with elderly residing in five homes of the aged in Brasilia. The institutions chosen were active on the list of the Federal District Council for Elderly Rights during the period of data collection and voluntary agreed to participate by signing the Agreement Term. All participating institutions were considered philanthropic, and assisted a total of 300 elderly. Data was collected from January to December 2007. The sample—154 men and women—60 or over, chosen by convenience, made use of at least one type of continuous medication. The total proportion of older people excluded from the study does not fit this profile was only six individuals (2.0% of total population). The elderly were classified in two groups according to cognitive status: with or without discernment. Those able to provide and receive correct and coherent information were classified as elderly of discernment. This classification was done by the staff of the institutions. Data was collected through a questionnaire adapted from the Dader Method for Pharmacotherapy Follow-up [14] and answered by those classified as with discernment. Information was complemented with medical prescriptions and medical records.

The analyzed variables were: Socioeconomical Profile (sex, age, education, monthly income, marital status, time in the institution, perception about the institutionalization and family life), Epidemiological Profile (prevailing diseases), physical activities and Pharmacotherapeutic Profile (medications in use, number of medications by elder, monthly expenses with medications, the elderly's understanding about the name, reason and dosage of the medication being used, reasons for not adherence the treatment and access to medication). The medications were classified according to the Anatomical-Therapeutical-Chemical Classification System (ATC).

Data on physical activity were supplied by the elderly and caregivers considering the sedentary and bedridden elderly people who do not perform any physical activity weekly. Were considered for the calculation of this variable, the elderly who perform any physical activity at least once a week in the last six months. In four institutions (80.0%) there are programs to combat sedentary lifestyle including swimming and water aerobics classes taught by physical education teachers as well as some elderly, in general, preserved autonomy, power walks by the institution or its surroundings.

The degree of autonomy for activities of daily living was defined by the institutions' staff, based on the results of the Test of Functional Capacity Evaluation Scale according to Katz (cited by Araújo and Ceolim) [15] used by physical educators, partners in the research project and volunteers in research institutions. Such a test has been applied consistently in the five institutions using the same parameters.

Data on perceptions regarding the institutionalization were obtained from the direct questioning the elderly with discernment, which assessed the frequency (often, sometimes, rarely or never) they feel depressed and anxious and the most common symptoms of such situations (sadness, despair, disbelief, isolation, crying, attempted suicide, the idea of death, restlessness, insomnia, palpitations, sweating). In addition, those with discernment were asked about the feeling in relation to the institution where lives (satisfied or not satisfied).

The prevalence of depression and psychiatric disorders in the sample was accounted for considering the cases diagnosed by qualified professionals (psychologists and psychiatrists) and that contained in the records of the institutions, not being confirmed by the application of specific tests by researchers in addition to not getting accurate information the existence of systematic diagnostic in five institutions. It is noteworthy that all institutions are provided with psychologists and psychiatrists. In addition to these institutions are limited in number, assisted by physicians, nurses, physiotherapists, occupational therapists and nutritionists. No institution has pharmacist.

Data for monthly cost drugs were obtained from information in the institutions that keep notes of the financial control of the income of each elderly. For older people whose monthly income is managed by the family, institutions have information only on drugs that were purchased by own resources. For these seniors, monthly income was reported by the elderly or the caregiver wisely and spending on drugs was obtained by scanning the market price thereof at the time of research and equivalent percentage of average monthly income reported.

Data was allocated in SPSS (Statistical Package for Social Sciences) 15.0 version and analyzed using chi-square and student's t tests taking into consideration significant results to  $p \leq 0.05$ . Associations among variables were evaluated through nested log-linear model sequences: of homogenous association, of conditional independency and joint independency. In order to test the effect on the lack of associations among the variables for the sequence models, the chi-square conditional of the verisimilitude ratio test was used with 5% significance level.

The study protocol was approved by the Research Ethics Committee of the Federal District Health Secretary (Protocol 125/05). The participants were included in the study after signing or having their legal guardians sign the Clearance and Free Agreement Term.

### 3. Results

In the sample ( $n = 154$ ), 51.3% were male and 53.9% with discernment. Among the elderly without discernment (46.1%), women accounted for a higher rate ( $p = 0.0164$ ). The elderly were at an average age of 74.6 years old, and there was more people over 75 years old compared to other age groups. There was no statistical difference among men and women. The studied group had lived in the institutions for about five years ( $p > 0.05$ ) (**Table 1**). As to education level, 46.6% were either not educated or attended school for less than a year, and 43.9% of the elderly attended elementary school for up to seven years. Most part of the group received an average of up to two minimum wages (R\$830.00), and was formed by singles and widows or widowers ( $p > 0.05$ ) (**Table 1**).

**Table 1. Social economic characteristics of the elderly in Homes for the Aged in Brasilia, Brazil ( $n = 154$ ).**

Variable	Men		Women		Total	
	n	%	n	%	n	%
Age						
60 - 64 years old	12	15.2	14	18.7	26	16.9
65 - 69 years old	18	22.8	11	14.7	29	18.8
70 - 74 years old	12	15.2	11	14.6	23	14.9
≥75 years old	37	46.8	39	52.0	76	49.4
Total	79		75		154	
	Marital Status					
Single	37	48.7	33	44.6	70	46.7
Widow/Widower	20	26.3	28	37.8	48	32.0
Separated/Divorced	19	25.0	13	17.6	32	21.3
Total	76		74		150	
	Education Level <sup>a</sup>					
None	31	41.3	38	52.0	69	46.6
1 - 7 years	35	46.7	30	41.1	65	43.9
8 - 10 years	08	10.7	03	4.1	11	7.4
Over 10 years	01	1.3	02	2.8	03	2.1
Total	75		73		148	
	Monthly Income <sup>b</sup>					
<2	64	81.0	48	64.0	112	72.7
2 - 3	10	12.7	23	30.7	33	21.4
>4	05	6.3	04	5.3	09	5.9
Total	79		75		154	

<sup>a</sup>Education level in years of study; <sup>b</sup>Minimum wage in Brazil during the data collection period (in reais = R\$415.00 or in US dollars = US\$233).

Most of the elderly with discernment (83.2%) were independent when performing everyday activities such as taking a shower, getting dressed and walking around the institution as opposed to those incapable of discernment (80.3%) who depended on their caregivers to perform such activities ( $p < 0.0001$ ). When they were surveyed about their perception regarding the institutionalization, 66.3% of the elderly with discernment said they be satisfied with the institution, 55.4% reported not being depressed and 67.5% did not complain about anxiety. There was no significant difference related to sex for both variables.

Concerning family life and institutionalization, it was observed that only 51.0% ( $n = 78$ ) of the elderly were frequently visited by their families, and there was no difference between men and women ( $p = 0.4202$ ). As to family habits, most of the elderly were considered sedentary (79.5%), and there was no significant difference between the sexes ( $p = 0.2111$ ).

The group is affected mainly from health problems related to the cardiovascular (82.5%) and nervous (54.6%) systems, particularly systemic arterial hypertension (76.6%), joint problems (16.3%), type II mellitus diabetes (16.2%), respiratory problems (13.0%), cardiac insufficiency (12.3%) and gastrointestinal problems (11.7%). The elderly with discernment suffered from a higher number of health problems when compared to those incapable of discernment ( $p < 0.0001$ ). When the relation between the perception about the institution and the occurrence of depression—diagnosed by a professional and reported in the elderly's (with or without discernment) medical records—was analyzed, it was verified that for both sexes there is a strong relation between both variables, and those who said that liked the institution were less susceptible to depression ( $p < 0.0001$ ). A similar pattern was observed when the relation between the occurrence of psychiatric problems and satisfaction with the institution ( $p < 0.0001$ ) was analyzed.

In the studied group, the number of continuous medications taken by women was higher when compared to men ( $p < 0.00001$ ). An average of each man ( $n = 79$ ) took four medications while the women ( $n = 75$ ) took nine medications. The most common medications used by the group were cardiovascular agents (81.2%), those from the central nervous system (63.0%), those from the endocrine system (18.9%), those from the gastrointestinal system (16.9%) and the respiratory system (7.8%) (**Table 2**).

The study also showed that the elderly with discernment use more drugs than those considerate without discernment (five and four medications, respectively) ( $p = 0.008$ ), and women with discernment accounted for more ( $p < 0.0001$ ).

It was also verified that 98.2% of the elderly used at

**Table 2. Main drugs used by the elderly in homes for the aged in Brasilia, Brazil (n = 154).**

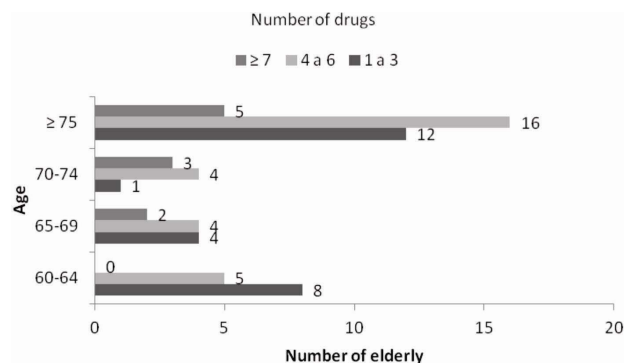
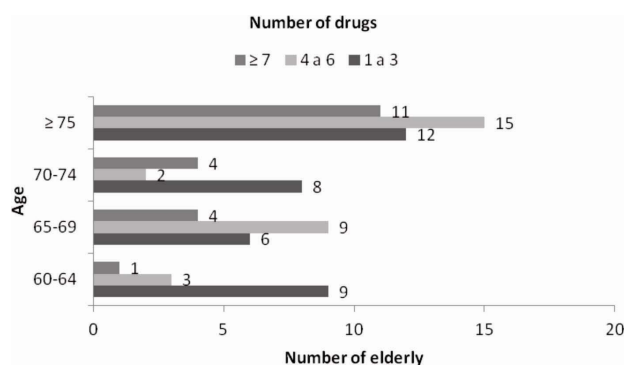
Pharmacological group	Class and main drugs	%
<b>Cardiovascular System</b>		
Antihypertensives	Inhibitors of angiotensin-converting enzyme (Captopril)	54.6
	Thiazide diuretics (indapamide and hydrochlorothiazide)	39.6
Antiplatelets aggregation	NSAIDs (Acetylsalicylic acid)	29.3
Antiarrhythmics	Calcium channel blockers (Nifedipine and Diltiazem)	15.0
	Beta-blockers (Propranolol and Atenolol)	12.4
Cardiotonics	Digitalis (Digoxin)	10.4
<b>Central Nervous System</b>		
Hipnotics, sedatives and anxiolytics	Benzodiazepines (Diazepam)	24.0
Antipsychotics	Phenothiazines (Chloropazine and Thioridazine)	15.0
	Butyrophenone (Haloperidol)	12.4
Antidepressants	Tricyclics (Amitriptyline)	12.4
	Other antidepressants (Fluoxetine)	10.4
Anticonvulsivants	Dibenzazepine (Carbamazepine)	5.9
<b>Gastrointestinal System</b>		
Antiulcers	Antagonist H2 (Ranitidine)	1.0
	Proton-pump inhibitors (Omeprazol)	3.9
<b>Endocrine System</b>		
Antidiabetics	Sulphonylureas (Gliclazide and Glibenclamide)	9.8
	Biguanide (Metformin)	9.1
	Insuline (NPH and Regular)	5.2
<b>Others</b>		
Vitamins and minerals	Vitamin complex	20.2

least one psychotropic agent, and the antipsychotics (29.9%), hypnotics, sedatives and anxiolytics (24.0%), antidepressants (22.1%) and anticonvulsants (14.3%) were the most common. There was no significant difference between the sexes as to psychotropic drugs, except for the antipsychotics, which were more used by women ( $p = 0.041$ ).

A statistical analysis showed a positive relation between the number of medications used and age ( $p = 0.045$ ). The elderly around 60 and 64 years old used one to three medications ( $p = 0.0091$ ) and older seniors used more medications, which was observed with both sexes (**Figures 1 and 2**).

Regarding the level of information that the elderly with preserved cognitive status ( $n = 83$ ) had about the medications used at the time of the survey, it was observed that 69.9% remembered something about the medical prescription and the women were the ones who had more information about the name, indication and dosage, as compared to men. In the group, 40.0% of the men were not able to give any information about the medication therapy, and that number was smaller among the women (15.2%) (**Table 3**).

Data showed that 92.8% of the elderly with discernment took their medications by themselves while 56.3% of those without discernment depended on their caregivers. 28.6% of the elderly with discernment and 29.3% of

**Figure 1. Relation between the drugs utilization and age by institutionalized elderly men in Brasilia, Brazil (n = 79).****Figure 2. Relation between the drugs utilization and age by institutionalized elderly women in Brasilia, Brazil (n = 79).**

**Table 3. Information level about current medical prescription between elderly with preserved cognitive status (n = 83).**

Variable	Men		Women		Total	
	n	%	n	%	n	%
Able to give some information	30	60.0	28	84.8	58	69.9
Able to give correct information about names of drugs	22	44.0	14	42.2	36	43.4
Able to give correct information about indication of drugs	21	40.0	13	37.9	34	41.0
Able to give correct information about dosage	18	36.5	16	49.0	34	41.0

those without discernment had some type of problem that prevented them from adherence the medication therapy. The man identified problems were: difficulty to access the prescribed medication (61.7%), refusal to take the medication (48.3%), gastrointestinal discomfort (18.9%), swallow difficulty (10.1%), complaints about the taste or bad smell and/or uncomfortable administration (2.3%).

The access to medication was evaluated by the availability of the prescribed medication in the institutions and the Federal District's health centers located near the institutions considering the public health policies.

In the studied institutions, 96.5% of the medications prescribed to the elderly were available inside the institutions at the time of the study and 80% were available at the public health services. Medication which was not available that way accounted for 12.3% of the monthly salary of each elder ( $p = 0.0025$ ).

#### 4. Discussion

The study's results corroborate data found by other studies which refer to socioeconomic, epidemiological, and pharmacotherapeutic profile of the Brazilian elderly population [2-6,9,16-21] and elderly population in other countries [22,23].

Despite the many studies showing that life expectancy among women is higher than in men, and, therefore, showing a higher proportion of women in the elderly population [3,5,7,9,20] in the studied group there was no difference between the two sexes due to higher cardiovascular protection supplied by female hormones, and lower alcohol and tobacco consumption, as well as medical assistance [7].

Results also show aging within the elderly population (**Table 1**) due to a higher prevalence of elders over 75 years old; also shown by Chaimowicz [1] and Castellar *et*

*al.* [16], pointing out continuous increase in the life expectancy of the Brazilian population, as the world population.

The increase of the elderly population caused relevant socioeconomic and cultural changes [1]. In the modern society, many families do not find ways to take care of their elders, increasing the search for homes for the aged [11]. It is known that the elderly's increasing dependence on others to perform everyday activities, plus the lack of preparation of their families, the high number of diseases and medications used to treat them, and the low family income contribute to the reasons for institutionalization [11,18].

This study suggests that many features (socioeconomic condition, level of education and morbidity profile) present in the study group are the reasons for institutionalization of many the elderly. The sample consists of elderly who live alone (singles or widowers), with low education level, low monthly income, without a family life, significantly dependent on others, with increasing health problems, and who are users of medication with increasing health care expenses. That hypothesis is corroborated by a study done with a group of Brazilian older seniors which showed significant relation to age, medications, distancing from family and social life and functional capacity [24]. According to authors, the higher the use of medications and the less family life, the worse the functional capacity of the elderly, and that situation gets worse with aging [24].

Most part of the elderly in the study stated that they liked the institution where they lived and did not complain about sadness or pathological anxiety—even though it is known that the institution might represent breaking family and social ties, leading to loneliness, depression, boredom, lack of faith and psychic problems. Contrary to this finding, an analysis of the medical prescriptions showed a high number of psychotropic drugs consumption among the elderly, and antidepressants plus antipsychotics were the most prescribed, which indicated that there was significant prevalence of affective and psychiatric disorders in the studied groups. That might infer that the elderly accepts the situation the way it is, does not have any hope for the future, and that the group was over-medicated. Besides that, the high frequency of psychotropic drugs prescriptions may suggest the practitioner's, the health centers' and the society's lack of experience when dealing with the elderly and their peculiarities, leading to medication for common aging situations, such as insomnia, anxiety and depressive states.

Studies have shown that there is chronic use of psychotropic drugs by the elderly, especially hypnotics, sedatives and anxiolytics from the benzodiazepine class due to constant insomnia and anxiety, which leads to severe consequences, such as increase in medication in-

teractions, adverse reactions, development of dependence and tolerance [25]. According to the researchers, women, widows people, those less educated and those who get a lower income suffer more from insomnia, which was also observed in the studied group.

The morbidity profile of the group has also been showed by other studies which pointed out that the cardiovascular, neurological, psychiatric and orthopedic diseases as the most common at this age [2,4,5,9,16,19-21]. It is believed that such morbidity profile associate to sedentary lifestyle in the studied group plus the high medication consumption, especially of psychotropic drugs, might be reasons for declining functional capacity and, therefore, low quality of life [24] showed a positive relevant relation between the medication used and the functional capacity of the older seniors. According to the authors, the high utilization of drugs reduces the functional capacity of the users, probably because of medication interactions and increase in adverse reactions [24].

The higher prevalence of diseases in the elderly with discernment and, therefore, the higher use of medication, might reflect a better capacity to communicate and express themselves when compared to the elderly without discernment. Health problems in those with compromised cognitive status might not be noticed by health professionals due to the fact that these patients are not able to properly describe their symptoms [20]. Besides that, the elderly capable with preserved cognitive status might complain more about several problems when compared to the first.

Studies have shown that the elderly with jeopardized cognitive function and different levels of dependence becomes the main group to be institutionalized due to the fact that they require more complex care by their families and better facilities, as well as better economical and psychosocial structures [15,18]. Although the results of this study do not corroborate that hypothesis due to the fact that most of the elderly in the group presented good cognitive state, there was a significant percentage of elderly with jeopardized cognitive status (46.1%), which indicates that the psychiatric disorders in the group might have been an important factor for institutionalization.

Although references show that the elderly with cognitive dysfunction are the main users of polypharmacy due to the fact that they present chronic health problems and functional limitations, Loyola Filho [20] showed less consumption of all types of medications by these elderly, which was also showed by this study. It is believed that underutilizing these medications might be related to the cognitive status of the patients and, therefore, the possibility of not following the therapeutic regimen, which might lead to prescribing fewer medications [20].

The morbidity profile of the studied group justifies the medications consumption profile and the average of five medications per elder, which was showed by other studies

[2-7,16,17,19,21]. Similarities related to the epidemiological profile and the use of medications shown by these studies seem to reflect the group's common problems and needs.

The finding of other studies [3,5,8,20] that women take more medication, might be explained by the older age of the group because there are more people over 70 years of age who are women. That hypothesis might be corroborate by the analysis of the positive relation between the number of medications taken and the age, which showed increase in the use of medications with aging (**Figures 1 and 2**).

Two situations found in the studied group—polypharmacy and lack of pharmacotherapy follow-up—might increase the DRM, such as prescription mistakes, drugs interactions, self-medication, difficulty with adherence medication and occurrence of adverse reactions to medications [3,5,7,8,10,16].

In the elderly population, such problems might get worse due to limitations common for the age, such as motor, visual, auditory and swallow difficulties, decline in functional and cognitive capacities, increase in psychiatric disorders, depressive states, as well as low education level and family income [7,15,17,18,21]. In the studied group, it is believed that these factors influence the occurrence of DRM, especially, difficulty with adherence the therapeutic scheme [6].

Adherence the medication is a multifactorial variable which is influenced by the patient's health conditions, access to medications, family income, level of education, presence and intensity of adverse reactions, psychological and psychic conditions and positive results of the treatment [6,7,13,17,21].

When compared to other elderly, the institutionalized elderly have better adherence to treatment because it is not under their responsibility to take the medication, it is under the caregivers' responsibility. Therefore, some factors such as forgetfulness, suspension or self-alteration, common among the elderly without family, caregiver or health professional supervision; are not present. A study done by Cintra *et al.* [17] showed that problems related to using and administration medication are minimized when the elderly are followed by family and/or caregivers. According to the authors, the presence of family or caregiver is extremely important for the medication therapy because as aging develops, so does lack of independence when performing everyday activities, such as taking the medicine [17].

In the studied group, problems with adherence medication are minimized because in the homes for the aged, the responsibility for access and administration medication it is the caregiver's and not the elderly's. On the other hand, the elderly who are not institutionalized can find problems with access to medication in the public health services



[17,26].

Although problems which jeopardize adherence the treatment are small among the elderly in the sample, results suggest that difficulty with access, high number of medications, adverse reactions and age limitations are important factors which influence them, corroborating the data's references [7,13,21].

Besides those factors, the high prevalence of psychiatric disorders, the frequency of depressive and state of discouragement of many elderly, and the education level might explain the lack of knowledge by some elderly with discernment regards to the used therapeutic scheme because it is known that the understanding and commitment to the pharmacotherapy represent important factors to guarantee adherence the treatment [5-7,9,21]. In this study, the elderly information's level did not present direct relation with the education's level for the users of both sexes. It is believed that in the homes for the aged as the medication's administration it is the caregivers' responsibility, there is no concern about orienting the elderly on the medical prescription.

In addition, other studies have shown strong influence of the availability of medication and the user's socioeconomic level on adherence the pharmacotherapy [6,7,27]. Data from the World Health Organization (mentioned by Rozenfeld) [8] show that 25% of the world population does not have complete access to medication, having limited access or not having access to essential medication [8]. However, this study revealed that the studied group did not have difficulty with accessing the medication, because the homes for the aged are supplied of medicines by not only by the health public services but also by donations from the community and charitable events due to its philanthropic status. The expenses with medication not available that way were little (12.3%). However, lack of free medication, even being little, plus the elderly's monthly income, usually less than two monthly salaries for retired elders, in most part, are important factors for limiting access and adherence treatment [6,7,27].

The results lead us to conclude that there is a strong influence of the socioeconomic and morbidity profile in pharmacotherapy quality in institutionalized elderly. In addition, the monitoring of the utilization drug through an effective pharmacotherapeutic follow-up, plus actions that encourage physical activities aiming to maintain functional capacity, and educational actions that promote understanding about the pharmacotherapy are extremely important as a way to encourage self-care, adherence to therapeutic scheme and, therefore, improve the elderly's quality of life. It is also necessary to promote larger integration among the Primary Health Care System services and the Homes for the Aged in order to optimize services to the elderly that live in those places and also the social institutions' operation. Besides that, educational services

aiming to increase human resources' development and training must be promoted as a way to improve the elderly's health assistance, providing them with complete and specialized assistance.

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