Thalyta Renata Araújo Santos[I]

Dione Marçal Lima[I]

Adélia Yaeko Kyosen Nakatani[II]

Lílian Varanda Pereira[II]

Geraldo Sadoyama Leal[III]

Rita Goreti Amaral[I]

Medicine use by the elderly in Goiania, Midwestern Brazil

ABSTRACT

OBJECTIVE: To analyze the pattern of use of medications use in aged people and associate it with socioeconomic aspects and with the self-rated health.

METHODS: A population-based cross-sectional design study with 934 elderly people from Goiania, Midwestern Brazil, between December 2009 and April 2010. Data were collected through a questionnaire. The dependent variable was the number of medications consumed and the independent variables were sex, marital status, education, type of residence, age, income, and self-rated health. Drugs were classified according to the Anatomical Therapeutic Chemical Classification. The inappropriate drugs for the elderly were identified according to the Beers-Fick criteria. The tests used were Chi-square and Fisher's exact test, p was considered significant when < 0.05.

RESULTS: The elderly consumed 2,846 medicines (3.63 medications/person). The most commonly consumed were those which act in the cardiovascular system (38.6%). The prevalence of polypharmacy was 26.4% and self-medication was 35.7%. The most used drugs for self-medication were analgesics (30.8%), 24.6% of the elderly consumed drug considered inappropriate. Women, widows, those aged 80 or over and with worse self-rated health were more likely to practiced more polypharmacy. Most self-medication was associated with lower levels of education and worse self-rated health.

CONCLUSIONS: The pattern of drug use by the elderly was similar to that found in the elderly in other regions of Brazil. The number of drugs used, the prevalence of self-medication and practice of polypharmacy and inappropriate drug use were within the national average.

DESCRIPTORS: Aged. Drug Utilization. Drug Therapy, Combination. Drugs of Continuous Use. Self Medication. Diagnostic Self Evaluation. Cross-Sectional Studies.

[I] Faculdade de Farmácia. Universidade Federal de Goiás. Goiânia, GO, Brasil

[II] Faculdade de Enfermagem. Universidade Federal de Goiás. Goiânia, GO, Brasil

[III] Departamento de Ciências Biológicas – Campus Catalão. Universidade Federal de Goiás. Catalão, GO, Brasil

Correspondence:
Thalyta Renata Araújo Santos
Faculdade de Farmácia – UFG
Av. Universitária, esq. com 1ª Avenida, Setor Universitário
74605-220 Goiânia, GO, Brasil
E-mail: thalytarenata@hotmail.com

Received: 3/15/2012
Approved: 7/23/2012

Article available from: www.scielo.br/rsp

INTRODUCTION

Ageing populations are considered a global phenomenon and constitute one of the biggest public health challenges we face today.[3] Brazil also finds itself in this situation. The 2010 Population Census showed that the elderly make up 12.0% of the population. In Goiás, the elderly constitute 9.3% of the total population and 9.6% in Goiânia, Midwestern Brazil.[a] Higher prevalence of chronic illness means that the elderly are frequent health care service users and possible society's most medicated group. The elderly population contribute around 25.0% of total medicine sales in developed countries.[2]

Therapeutic proposals making use of various medicines simultaneously are inappropriate and may have serious, even fatal, consequences for the elderly due to alterations in the metabolism which occur with age.[17] Failure to follow pharmacological treatment, adverse reactions, drug interactions, high prices and hospitalizations are the main consequences of practicing polypharmacy.[7]

Elderly bodies present alterations in physiological functions which should not be neglected. These alterations lead to different pharmacokinetics and greater sensitivity to both the therapeutic and adverse effects of medicines.[19] Some medicines are considered unsuitable for use by the elderly due to reductions in their efficacy or because the increased risk of adverse effects outweighs their benefits.[9]

Self-medication places the health of the elderly population at risk. This practice can increase risks related to prescribed medicines, delay correct diagnosis and mask illness.[23]

Knowledge of the elderly population's medicine use and factors related to this is indispensable in order to be able to redefine public policy and improve the elderly's quality of life and health. This study aims to analyze medicine use patterns in the elderly and their links to socio-economic aspects and self-rated health.

METHODS

This is a descriptive, transversal population-based study of 934 elderly people from Goiânia, Midwestern Brazil, between December 2009 and April 2010.

Sample size was calculated based on the number of elderly people in the municipality in 2007 (7.0% of 1,249,645 inhabitants) and 30.0% expected frequency for the specific objectives of the epidemiological survey, with 955 confidence interval, 5% level of significance, absolute precision of 5% and 1.8 design effect of cluster sampling (DEF). To cover possible losses, an extra 11% was added, giving a sample of 934 elderly people.

Individuals aged ≥ 60 and who resided more than four days a week in the homes where the interviews took place were considered eligible to take part. Those who were not at home at the time the visit took place were excluded. The interviewers had been previously trained by REVISI staff.

A pilot study with 50 elderly people was carried out in order to assess the instrument to be used in the research and to identify the mean number of elderly people in each census sector (CS) of the municipality.

Each CS had a mean of 17 elderly people. Thus, 56 CS would be necessary to reach the sample size. The CSs were randomly selected from the 912 CS which make up urban Goiânia, using an electronic randomizing system. Draws took place to define the blocks and corners in which data collection should begin for the selected CS.

The first residence from the corner selected, excluding non-residential properties, was visited. If no elderly person lived there, the interviewer moved on to the next residence until an elderly resident was found, after which the systematic search began again. If two consecutive houses visited had elderly residents the second house was not included. And so on, until the estimated total of elderly people for the sample was reached.

Those elderly people eligible to take part were invited to participate in the research and respond to a questionnaire. This questionnaire was composed of 12 sections and delivered to central office for quality control of the data after being completed.

The dependent variable was the number of medicines used and the independent variables were gender, marital status, schooling, type of housing, age and self-rated health.

The following questions were used: "Which medicines do you use regularly?" and "Was the medicine prescribed/recommended by the doctor, a neighbor, pharmacy employee, yourself, family member or from an old prescription?" The elderly person was asked to show what medicines they took, with their respective prescriptions, and the names were copied directly from the labels. Prescriptions were considered old if they were dated more than three months before the interview.

The information from the questionnaires were used to verify associations between polypharmacy and self-medicating with socio-economic conditions and self-rated health and between polypharmacy and

[a] Instituto Brasileiro de Geografia e Estatística. Censo 2010. Brasília; 2011 [cited 2011 Jun 20]. Available from: http://www.censo2010.ibge.gov.br

Table 1. Distribution of medicines unsuitable for use by the elderly, according to Beers-Fick[a] criterion based on the pharmacological group and possible consequence of use. Goiânia, Midwestern Brazil, 2010.

Pharmacological group	Unsuitable medicines used	Possible consequences of use	n	%
Benzodiazepines of long half-life	Diazepam / bromazepam / clonazepam	Sedation; possibility of falls and fractures	66	34.2
Antidepressants	Amitriptyline / fluoxetine	Anticholinergic effects and orthostatic hypotension, CNS stimulation, restlessness and sleep disorders	31	16.0
Calcium channel blockers	Short half-life Nifedipine	Hypotension, constipation	23	11.9
Antiarrhythmics	Amiodarone	Changes in the QT interval, arrhythmias	19	9.8
short half-life Benzodiazepines, according to dose	Lorazepam / alprazolam	Considering the increased sensitivity to benzodiazepines presented by the elderly, lower doses are safer and as effective as the higher	17	8.8
Cardiac glycosides	Digoxin	Increased risk of digitalis toxicity	12	6.2
Antihistamines	Dexchlorpheniramine / promethazine	Potent anticholinergic effects, prolonged sedation	7	3.6
Non-steroidal anti-inflammatory drugs for long half-life used in high doses or for prolonged periods	Naproxen / piroxicam / tenoxicam	Risk of gastrointestinal bleeding, kidney failure, heart failure and hypertension	5	2.6
Muscle relaxants and antispasmodics	Carisoprodol / cyclobenzaprine	Anticholinergics effects; questionable effectiveness at doses tolerated by elderly	4	2.0
Gastrointestinal antispasmodic agents	Butylscopolamine	Anticholinergic effects; questionable effectiveness at doses tolerated by elderly	3	1.6
Antihypertensives	Methyldopa	Exacerbation of depression, bradycardia	3	1.6
Antianemics	Ferrous sulphate	Significantly increased incidence of constipation	3	1.6
Total			193	100.0

[a] Beers-Fick[9]

self-medicating. The number of medicines was counted based on the elderly's reports and polypharmacy was defined as using five or more medicines.[13] Self-rated health was assessed using the following question: "In general, would you say your health was very good, good, regular, bad or very bad?" Information on gender, age, schooling, marital status, family income and type of housing was collected for the socio-economic profile.

The main active ingredient of each medicine was identified and classified according to the Anatomical Therapeutic and Chemical Classification – ATC[b] into 14 major groups, corresponding to an anatomic number. Each group was divided into subgroups, corresponding to therapeutic groups. These two first groups (anatomic group and therapeutic subgroup) were those taken into account for this study. This classification does not include natural products classified as phytotherapeutic.

The Beers-Fick[9] criterion was used to identify prevalence of use of medicines unsuitable for the elderly. The main active ingredient of each of the medicines used by the elderly in the study was checked to see whether it was in the list of this criterion.

Numerical variables were explored using descriptive measures of centrality and dispersion and categorical variables were explored using simple and relative frequencies. To investigate the association between qualitative variables the Chi-square (X^2) test was used $n \geq 5$ and Fisher's exact test when $n < 5$; prevalence ratio (PR) and their respective confidence intervals (IC). The significance level for all tests was set at $p < 0.05$.

The data were inputted into the Excel program. Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) version 15.0 for Windows and EpiInfo 6.04.

The study was approved by the Ethical Research Committee of the Universidade Federal de Goiás (Protocol nº 050/2009).

[b] World Health Organization. Anatomical therapeutic chemical – ATC classification index with defined daily doses- DDD's. Olso; 2000.

Table 2. Distribution of medicines used by the elderly according to ATC anatomical and therapeutic classification.[a] Goiânia, Midwestern Brazil, 2010.

Pharmacological group	n	%
Alimentary tract and metabolism	488	17.1
Antacids and drugs for treatment of peptic ulcer and flatulence	116	4.1
Medicines for intestinal disorders	1	0.0
Anti-emetics and anti-nausea	28	1.0
Digestive	5	0.1
Laxatives	2	0.1
Anti-diarrhea	6	0.2
Anti-obesity	2	0.1
Drugs used in diabetes	138	4.8
Vitamins, dietary supplements, tonics and appetite stimulants	190	6.7
Blood and blood forming organs	151	5.3
Antithrombotic drugs	151	5.3
Cardiovascular	1,100	38.6
Cardiac therapy	145	5.1
Anti-hypertensives	561	19.7
Diuretics	180	6.3
Vasodilators	55	1.9
Association hypotensive / diuretic	32	1.1
Vasoprotective	10	0.4
Lipid-lowering	117	4.1
Dermatological medicines	10	0.3
Other dermatological preparations	10	0.3
Genito-urinary system and sex hormones	36	1.3
Sex hormones and antagonists, hormone replacement	34	1.2
Anti-incontinence	2	0.1
Systemic hormonal preparations, excluding sex horm	145	5.1
Corticosteroids for systemic use	17	0.6
Thyroid hormones	100	3.5
Insulin	28	1.0
General anti-infection for systemic use	23	0.8
Anti-bacterial for systemic use	22	0.8
Anti-mycotics for systemic use	1	0.0
Antineoplastic and immune-modulating agents	7	0.2
Antineoplastic agents	7	0.2
Musculoskeletal system	138	4.9
Anti-inflammatory	86	3.0
Anti-rheumatic prepared anti-gout	27	1.0
Drugs for treatment of bone diseases	25	0.9
Nervous system	559	19.6
Painkillers, muscle relaxant	259	9.1
Anti-epileptic	101	3.6
Anti-Parkinson	17	0.6
Anti-psychotics	66	2.3
Psychoanaleptics	115	4.0
Other nervous system drugs	1	0.0
Anti-parasitic products, insecticides and repellents	1	0.0
Anti-helminthic	1	0.0
Respiratory system	48	1.7
Medicines for obstructed airways	35	1.2
Preparations for coughs and colds	3	0.1
Antihistamine	10	0.4
Sensory organs	25	0.9
Ophthalmic products	25	0.9
Other	14	0.5
Herbal remedies	101	3.6
Total	2,846	100.0

[a] Anatomical Therapeutic and Chemical Classification

Table 3. Frequency of origin of recommendation/prescription of medicines used for self-medication. Goiânia, Midwestern Brazil, 2010.

Origin of recommendation/prescription	n	%
Current prescription	2,383	83.7
Self-medication	461	16.2
Neighbor	11	0.4
Pharmacy counter	13	0.5
Self	144	5.1
Family member	27	0.9
Old prescription	266	9.3
Don't know or didn't respond	2	0.1
Total	2,846	100.0
Medicines used for self-medication	n	%
Painkillers, muscle relaxant	142	30.8
Anti-hypertensives	68	14.8
Herbal medicines	36	7.8
Anti-inflammatory	31	6.7
Vitamins, nutrients	23	5.0
Other	161	34.9
Total	461	100.0

RESULTS

Of the elderly people studied, 83.8% fully completed the questionnaire. Of these, 65.0% were female, 45.7% were aged between 60 and 69 and the mean age was 71.9 (minimum 60 and maximum 96 years old). Around 50.0% had started or completed Primary

Table 4. Association between polypharmacy and socio-economic conditions and self-rated health. Goiânia, Midwestern Brazil, 2010.

	Polypharmacy		No polypharmacy		p[a]	RP (IC)	IC
	n	%	n	%			
Sex							
Male	52	19.0	221	81.0	< 0.001	1.6	1.21;2.11
Female	155	30.4	355	69.6			
Marital status							
Married	86	22.3	300	77.7	0.009	0.7	0.58;0.93
Single	18	24.0	57	76.0	0.62;	0.9	0.59;1.37
Widowed	86	34.1	166	65.9	< 0.001	1.5	1.19;1.90
Divorced	16	23.9	51	76.1	0.62	0.9	0.57;1.40
Schooling							
Illiterate	35	27.8	91	72.2	0.71	1.1	0.78;1.45
Reads and writes but never went to school	9	26.5	25	73.5	0.85	1.0	0.57;1.78
Primary completed/ incomplete	105	28.0	270	72.0	0.33	1.1	0.89;1.42
High school completed/ incomplete	36	22.0	128	78.0	0.14	0.8	0.58;1.09
Further education complete/ incomplete	20	26.0	57	74.0	0.93	1.0	0.66;1.46
Type of housing							
Own	456	73.5	164	26.5	0.87	1.0	0.76;1.38
Rented	75	77.3	22	22.7	0.38	0.8	0.57;1.25
Borrowed	38	67.9	18	32.1	0.30	1.2	0.83;1.85
Other	2	100	0	0.0	0.96	ni	ni
Age (years)							
60 to 69	78	21.8	280	78.2	0.007	0.7	0.56;0.92
70 to 79	72	27.3	192	72.7	0.70	1.0	0.82;1.34
80 or more	57	35.4	104	64.6	0.004	1.5	1.14;1.89
Income ($)							
Up to 1,200.00	69	25.0	208	75.0	0.28	0.9	0.67;1.13
1,200.00 and over	99	28.8	245	71.2			
Self-rated health							
Very good	13	18.1	59	81.9	0.09	0.7	0.40;1.10
Good	49	21.0	184	79.0	0.03	0.7	0.550.97
Regular	92	26.3	258	73.7	0.98	1.0	0.78;1.27
Bad	35	47.3	39	52.7	< 0.001	2.0	1.49;2.59
Very bad	9	39.1	14	60.9	0.16	1.5	0.89;2.55

[a] Chi-square test and Fisher exact test
ni: not included

Education, 49.5% were married and 32.0% widowed and 80.0% of the elderly in this study lived in their own home. They predominantly (46.5%) rated their own health as 'regular'.

In this study, 2,864 medicines were used by the elderly (a mean of 3.63 medicines per person) and they had taken at least one medicine on the day of the interview. The maximum number of medicines was 19. Women used more medicines than men (3.94 and 3.06 respectively, $p < 0.001$). The prevalence of practicing polypharmacy was 26.4%.

Adopting the Beers-Fick criterion, 24.6% of the elderly used at least one unsuitable medicine. Of the 2,846 medicines, 6.8% were considered unsuitable. Of these, 90.2% were from a current prescription. The most commonly used unsuitable medicines were long half-life benzodiazepines (34.2%) and anti-depressants (16.0%) (Table 1).

Table 5. Association between self-medication and socio-economic conditions and self-rated health, and between self-medication and polypharmacy. Goiânia, Midwestern Brazil, 2010.

	Self-medication		No self-medication		p[a]	RP	IC
	n	%	n	%			
Sex							
Male	99	36.3	174	63.7	0.83	1.0	0.84;1.24
Female	181	35.5	329	64.5			
Marital status							
Married	126	32.6	260	67.4	0.06	0.8	0.69;1.01
Single	26	34.7	49	65.3	0.81	1.0	0.69;1.33
Widowed	100	39.7	152	60.3	0.13	1.2	0.96;1.41
Divorced	28	41.8	39	58.2	0.29	1.2	0.88;1.60
Schooling							
Illiterate	51	40.5	75	59.5	0.25	1.2	0.91;1.46
Reads and writes but never went to school	21	61.7	13	39.3	0.001	1.8	1.34;2.36
Primary completed/incomplete	137	36.5	238	63.5	0.74	1.0	0.86;1.24
High school completed/incomplete	55	33.5	109	66.5	0.47	0.9	0.72;1.16
Further education complete/incomplete	15	19.5	62	80.5	0.001	0.5	0.32;0.82
Type of housing							
Own	220	35.5	400	64.5	0.65	0.9	0.75;1.19
Rented	36	37.1	61	62.9	0.78	1.0	0.79;1.37
Borrowed	21	37.5	35	62.5	0.79	1.0	0.74;1.49
Other	1	50.0	1	50.0	0.59	1.4	0.35;5.60
Age (years)							
60 to 69	137	38.3	221	61.7	0.18	1.1	0.94;1.37
70 to 79	98	37.1	166	62.9	0.57	1.1	0.87;1.29
80 or more	45	27.9	116	72.1	0.02	0.7	0.57;0.97
Income ($)							
Up to 1,200.00	96	39.3	148	60.7	0.22	1.1	0.93;1.41
1,200.00 and over	130	34.5	247	65.5			
Self-rated health							
Excellent	12	16.7	60	83.3	< 0.001	0.4	0.26;0.73
Very good	85	36.5	148	63.5	0.98	1.0	0.82;1.23
Good	130	37.1	220	62.9	0.71	1.0	0.86;1.25
Regular	35	47.3	39	52.7	0.041	1.3	1.03;1.74
Bad	12	52.2	11	47.8	0.11	1.4	0.97;2.17
Polypharmacy							
Yes	72	34.8	135	65.2	0.73	1.0	0.78;1.20
No	208	36.1	368	63.9			

[a] Chi-square and Fisher exact tests

Regarding the anatomical classification, 38.6% of the medicines used acted on the cardiovascular system, followed by those which acted on the nervous system (19.6%) and digestion and metabolism (17.1%). According to the therapeutic classification, the most commonly used medicines were for hypertension (19.7%), followed by analgesics (9.1%) and the group of vitamins, dietary supplements, tonics and appetite stimulants (6.7%) (Table 2).

Around 83.7% were from a current prescription and 16.2% from self-medicating; 35.7% of the elderly reported self-medicating, of which the most commonly used medicines were analgesics (30.8%), followed by antihypertensive medications (14.7%) and herbal medicines (7.8%) (Table 3).

Gender, marital status, age and self-rated health showed significant associations with practicing polypharmacy ($p < 0.05$) (Table 4). Polypharmacy was most frequent

among women (RP = 1.60), widowers (RP = 1.50), those aged > 80 (RP = 1.47) and those who rated their own health as very bad (RP = 1.97).

Schooling, age and self-rated health proved to be associated with self-medicating ($p < 0.05$). This practice was less frequent among individuals with higher levels of education (RP = 0.52), those aged > 80 (RP = 0.74) and those who rated their own health as very good (RP = 0.43). There was no link between polypharmacy and self-medicating ($p > 0.05$) (Table 5).

DISCUSSION

The results of this study show that the mean number of medicines used by the elderly in the municipality of Goiânia was higher than those observed in other state capitals in Brazil such as Porto Alegre, Southern Brazil and Fortaleza, Northeastern Brazil[6,10] and lower than those observed in Belo Horizonte, Southeastern Brazil.[21] These inequalities in the numbers of medicines used may be explained by differences in the services provided to the population and the type of health care model used in each region.[14] The continued growth in the number of medicines used among the elderly may be explained by the increase in prevalence of chronic illness in this age group, as well as by a health care model which views medicine as the main form of intervention. However, the implications of this use need to be measured and assessed as to their risks benefits.[7]

There was a high prevalence of polypharmacy, as more than ¼ of the elderly people were exposed to this practice. This prevalence was greater than that observed in Belo Horizonte and similar to that found in Porto Alegre.[10,14] National studies indicate polypharmacy prevalence of between 11.0% and 40.6%.[14,18]

Polypharmacy is often necessary, as many elderly people suffer from a variety of illnesses and symptoms which require the use of various medicines to guarantee the best possible quality of life. Polypharmacy with medications which have not been prescribed does not necessarily mean that these medicines are being used incorrectly.[7] However, there are high rates of polypharmacy and the use of multiple medications increases the risk of adverse reactions and drug interactions.[7,14] A more critical and systematic approach for those elderly who really need multiple medications is needed.

The most elderly are those who most frequently practice polypharmacy, as has been seen in other studies in Brazil.[14,21] This correlation between polypharmacy and increased age may be related to higher use of health care services by those of most advanced age.[13]

It was women who most frequently practiced polypharmacy, similar to other national epidemiological studies.[21,22] Greater use of medicines by elderly women may be connected with questions such as women living longer than men and thus spend longer living with chronic illness, the greater attention women pay to their own health problems and reported higher demand for health care.[13]

The number of elderly people who self-medicate is similar to that found in other Brazilian studies. More than 30.0% of the elderly in the north east self-medicated and a prevalence of 46.0% was observed in Minas Gerais.[6,15] A revision of studies on self-medication among the elderly shows rates between 12.0% and 44.0%.[1,16] A large part of the population, including the elderly, self-medicate to treat minor and major symptoms. Reports indicate easy access to medicines as an important factor in this practice.[15]

The most commonly self-medicated medicines are analgesics, as has been observed in other Brazilian studies.[4,14] Self-medicating with analgesics is typically common among the elderly, as their use is related to treating pain and inflammation, common symptoms at this stage.

Medication for high-blood pressure occupies the second place in the most commonly self-medicated drugs. This is worrying, even when they have been previously prescribed. Hypertension is a chronic disease with major health problems and using medications to control it requires regular monitoring. The major cause of mortality among the elderly in Brazil is the stroke, probably due to a lack of systematic control of risk factors.[12]

Elderly people with lower levels of education are those who most frequently self-medicate. In a study carried out in the Northeastern Brazil, the least well off elderly were those who practiced the most self-medication.[6] This may be explained by difficulties accessing health care services and prior awareness raising on the risks self-medicating cause. Elderly people aged 80 and over were those who were less likely to self-medicate, possible due to higher levels of using health care services where the patient is better cared for.[13]

No link was found between polypharmacy and self-medication. The high prevalence of polypharmacy was due to prescriptions and not to self-medicating. This shows the importance of raising doctors' awareness about medicalization, especially among the elderly.[7]

Over half the elderly rated their own health as regular, bad or very bad. This finding was better than that observed in Bambuí[11] and similar to that found in Lima-Costa et al,[12] using data from the 2003 PNAD (*Pesquisa Nacional por Amostragem Domiciliar* - National Research for Sample of Domicile), in which 56.4% rated their own health as regular, bad or very bad. Classifying health as very bad was associated with polypharmacy, similar to the findings of other

pharmacoepidemiological studies.[11,14] Patients who rated their health as very bad sought solutions to their health problems in medicines, whether prescribed or self-medicated.

The prevalence of use of medicines unsuitable for the elderly is within the range found in other studies in Brazil (15.4% to 41.0%).[8,18] This high prevalence is largely due to prescribed medicines. In a study carried out in Rio de Janeiro, Southeastern Brazil, 17.0% of medicines used were unsuitable, of which 90.0% had been prescribed.[22] This reflects the lack of knowledge of medicines which are inappropriate for the elderly on the part of the doctors, something which could have serious clinical and economic consequences for the health care system.[9]

The most commonly used unsuitable medicines in this study were benzodiazepines and anti-depressants. Despite the serious consequences using these medicines may have for the elderly, this finding was similar to that of Castellar et al.[5] Benzodiazepines have a longer half-life in the elderly and consequent prolonged sedation with the risk of falls and fractures. The same occurs with anti-depressants, with which there is a strong possibility of anticholinergic effects (difficulty breathing, blurred vision, increased heart rate, and decreased blood pressure), orthostatic hypotension and stimulation of the central nervous system.[9]

Often, the pharmacological profile of these medicines and their possible consequences when used by the elderly is not known to the doctor.[7] This situation is not improving. The very act of visiting a health center increases the chance of using unsuitable medicines, as the SUS (Brazilian Unified Health System) does not have a list of medicines more suitable for elderly. Obreli Neto & Cuman[20] (2010) verified a significant reduction in use of unsuitable medicines by patients monitored by a multi-professional program.

The most commonly used groups of medicines were similar to those in the national and international literature.[6,10,14,16,21] Medicines for the cardiovascular system were the most commonly used, explained by the high prevalence of cardiovascular disease among the elderly population.[12] In the therapeutic group, medicines for high blood pressure were those most commonly used, which corresponds to the high levels of hypertension in Brazil.[11]

Although the results of this study are important, some limitations should be considered. The questionnaire involved various aspects of the elderly's health and was not specific to medicine use. Such observations, however, do not compromise the importance of the study. Subsequent investigations should evaluate medicine use among the elderly in a broader way, looking at adhesion, dosage, posology and method of administration.

The pattern of medicine use among the elderly in Goiânia was similar to that found in the elderly in other regions of Brazil. The number of medicines used, the prevalence of polypharmacy and self-medication and use of unsuitable medicines were within national average. The most commonly used groups of medicines corresponded to the most common illnesses in the elderly population and concur with various other studies in Brazil. Women, widowers, those aged 80 and over and those who rated their own health as very bad were those who most commonly practiced polypharmacy; self-medication was associated with lower levels of education and worse self-rated health.

Health care professionals' contributions are necessary in order to optimize the rational use of medicines for the elderly and reduce as far as possible the complications linked to their use. The results of this study may serve as an alert to health care managers, with the aim of adapting the health care network to the real needs of today's elderly as well as preparing for the new contingents of elderly which increase every year.

ACKNOWLEDGEMENTS

To the *Secretaria Estadual de Saúde de Goiás* and *Secretaria Estadual de Saúde de Goiânia* for their contribution in carrying out this project. To the researchers Sandro Batista, Eugênia Emília Madlum and Ana Luiza Lima for their contribution to planning the work and to all the researchers from the *Rede de Vigilância à Saúde do Idoso de Goiânia* for their participation in carrying out the work.

REFERENCES

1. Aziz MM, Calvo MC, Schneider IJC, Xavier AJ, d'Orsi E. Prevalência e fatores associados ao acesso a medicamentos pela população idosa em uma capital do sul do Brasil: um estudo de base populacional. *Cad Saude Publica*. 2011;27(10):1939-50. DOI:10.1590/S0102-311X2011001000007

2. Bortolon PC, Medeiros EFF, Naves JOE, Karnikowski MGO, Nóbrega OT. Análise do perfil de automedicação em mulheres idosas brasileiras. *Cienc Saude Coletiva*. 2008;14(4):1219-26. DOI:10.1590/S1413-81232008000400018

3. Carvalho JAM, Garcia RA. O envelhecimento da população brasileira: um enfoque demográfico. *Cad Saude Publica*. 2003;19(3):725-33. DOI:10.1590/S0102-311X2003000300005

4. Cascaes EA, Falchetti ML, Galato D. Perfil da automedicação em idosos participantes de grupos da terceira idade de uma cidade do sul do Brasil. *ACM Arq Catarin Med*. 2008;37(1):63-9.

5. Castellar JI, Karnikowski MGO, Vianna LG, Nóbrega OT. Estudo da farmacoterapia prescrita a idosos em

instituição brasileira de longa permanência. *Acta Med Port.* 2007;20(2):97-105.

6. Coelho Filho JM, Marcopito LF, Castelo A. Perfil de utilização de medicamentos por idosos em área urbana do nordeste do Brasil. *Rev Saude Publica.* 2004;38(4):557-64. DOI:10.1590/S0034-89102004000400012

7. Costa SC, Pedroso ERP. A prescrição de medicamentos para idosos internados em serviço de clínica médica: atualização. *Rev Med Minas Gerais.* 2011;21(2):201-14.

8. Faustino CG, Martins MA, Jacob-Filho W. Medicamentos potencialmente inapropriados prescritos a pacientes idosos ambulatoriais de clínica médica. *Einstein (Sao Paulo).* 2011;9(1):18-23.

9. Fick DM, Cooper JW, Wade WE, Waller JL, Maclean JR, Beers MH. Updating the Beers criteria for potentially inappropriate medication use in older adults: results of a US consensus panel of experts. *Arch Intern Med.* 2003;163(22):2716-24. DOI:10.1001/archinte.163.22.2716

10. Flores LM, Mengue SS. Uso de medicamentos por idosos em região do sul do Brasil. *Rev Saude Publica.* 2005;39(6):924-9. DOI:10.1590/S0034-89102005000600009

11. Lima-Costa MF, Firmo JOA, Uchôa E. A estrutura da auto-avaliação da saúde entre idosos: projeto Bambuí. *Rev Saude Publica.* 2004;38(6):827-34. DOI:10.1590/S0034-89102004000600011

12. Lima-Costa MF, Loyola Filho AI, Matos DL. Tendências nas condições de saúde e uso de serviços de saúde entre idosos brasileiros: um estudo baseado na Pesquisa Nacional por Amostra de Domicílios (1998, 2003). *Cad Saude Publica.* 2007;23(10):2467-78. DOI:10.1590/S0102-311X2007001000021

13. Linjakumpu T, Hartikainen S, Klaukka T, Veijola J, Kivelä S-L, Isoaho R. Use of medications and polypharmacy are increasing among the elderly. *J Clin Epidemiol.* 2002;55(8):809-17. DOI:10.1016/S0895-4356(02)00411-0

14. Loyola Filho AI, Uchoa E, Lima-Costa MF. Estudo epidemiológico de base populacional sobre uso de medicamentos entre idosos na Região Metropolitana de Belo Horizonte, Minas Gerais, Brasil. *Cad Saude Publica.* 2006;22(12):2657-67. DOI:10.1590/S0102-311X2006001200015

15. Loyola Filho AI, Uchoa E. Automedicação: motivações e características de sua prática. *Rev Med Minas Gerais.* 2002;12(4):219-27.

16. Marin MJS, Cecílio LCO, Perez AEWUF, Santella F, Silva CBA, Gonçalves Filho JR, et al. Caracterização do uso de medicamentos entre idosos de uma unidade do Programa Saúde da Família. *Cad Saude Publica.* 2008;24(7):1545-55. DOI:10.1590/S0102-311X2008000700009

17. Medeiros-Souza P, Santos-Neto LL, Kusano LTE, Pereira MG. Diagnosis and control of polypharmacy in the elderly. *Rev Saude Publica.* 2007;41(6):1049-53. DOI:10.1590/S0034-89102006005000050

18. Nassur BA, Braun V, Devens LT, Morelato RL. Avaliação dos medicamentos inapropriados utilizados por idosos admitidos em hospital geral filantrópico. *Rev Soc Bras Clin Med.* 2010;8(3):208-11.

19. Nóbrega OT, Karnikowski MGO. A terapia medicamentosa no idoso: cuidados na medicação. *Cienc Saude Coletiva.* 2005;10(2):309-13. DOI:10.1590/S1413-81232005000200008

20. Obreli Neto PR, Cuman RKN. Programa de atenção farmacêutica no uso racional de medicamentos em idosos usuários de unidade básica de saúde no estado de São Paulo. *Am J Pharm.* 2010;29(3):333-9.

21. Ribeiro AQ, Rozenfeld S, Klein CH, César CC, Acurcio FA. Inquérito sobre uso de medicamentos por idosos aposentados, Belo Horizonte, MG. *Rev Saude Publica.* 2008;42(4):724-32. DOI:10.1590/S0034-89102008005000031

22. Rozenfeld S, Fonseca MJM, Acurcio FA. Drug utilization and polypharmacy among the elderly: a survey in Rio de Janeiro City, Brazil. *Pan Am J Public Health.* 2008;23(1):34-43. DOI:10.1590/S1020-49892008000100005

23. Sá MB, Barros JAC, Sá MPBO. Automedicação em idosos na cidade de Salgueiro-PE. *Rev Bras Epidemiol.* 2007;10(1):75-85. DOI:10.1590/S1415-790X2007000100009

Article based on the Masters dissertation entitled: "Análise do padrão do uso de medicamentos em idosos no município de Goiânia, Goiás", presented to the Postgraduate Program in Health Sciences at the Universidade Federal de Goiás, in 2012.
Study financed by the Fundação de Apoio à Pesquisa do Estado de Goiás, Edital 001/2007.
The authors declare that there are no conflicts of interest.