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Factors associated with polypharmacy among elderly people receiving care under the family health strategy

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Abstract

Objective: to identify the medication profile, the prevalence of polypharmacy and associated factors among elderly people receiving care from Family Health Strategy teams. *Method:* an analytical, document-based, cross-sectional survey with a quantitative approach was conducted in Brazlândia in the Distrito Federal, Brazil, with a sample of 211 elderly people enrolled in and receiving care from one of the local Family Health Strategy teams. Data were submitted to bivariate analysis and multiple analysis through logistic regression. *Results:* a considerable number of the elderly (62, 29.4%) were undergoing polypharmacy. The majority (56, 26.5%) used three different classes of drug, with antihypertensive drugs the most used. Diabetes mellitus, cardiovascular complications and the use of antihypertensive drugs were factors associated with polypharmacy. *Conclusion:* polypharmacy is a worrying reality and demands a new approach on the part of professionals, as this important aspect of geriatrics should be carefully evaluated to avoid harm and iatrogeny among the elderly.

Keywords: Aged. Health Services for the Aged. Polypharmacy.

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INTRODUCTION

The elderly population today comprises more than a fifth of the Brazilian population. In the Distrito Federal (the Federal District) the increase in the elderly population has been five times greater than the national average. This population group is therefore becoming increasingly important and should be considered in health care management and planning. Health services, such as the Family Health Strategy (FHS), should include perspectives that provide a suitable response to the growing demands of the elderly population[1,2].

Elderly patients residing in territories served by the FHS generally present a series of health problems that, when associated with unfavorable socioeconomic conditions, can compromise their autonomy and independence[3]. The FHS, as a structure of the Sistema Único de Saúde (the Unified Health System) (SUS), should provide privileged care for the elderly in an ascending manner within the health system, presupposing the integrality of care for the elderly[4,5].

The elderly population is more often affected by chronic diseases, and so is arguably the most medicalized group in society [1]. In addition, elderly persons are more likely to use a number of drugs as they undergo more physiological changes in pharmacokinetics and pharmacodynamics due to their age[6]. The frequent simultaneous use of many drugs by the elderly has also been identified. This may be related to the attempt to ease situations that arise due to the aging process, as well as acting as a treatment for diseases that are common in the aging process[7]. The elderly are vulnerable to adverse events related to the use of medications, and their clinical individualities should also be considered[8]. Polypharmacy is therefore an important issue in the health care of the elderly, although it does not always indicate a risk. When properly recommended and when side effects are monitored polypharmacy may be the only option for the adequate treatment of comorbidities[6].

Identifying the characteristics and factors associated with the consumption of drugs by Brazilian elderly persons can therefore help to plan actions that promote the rational use of medications, and consequently promote a better quality of life for this age group, especially when there remains a gap in the knowledge of age-based differentials in pharmacotherapy by the elderly[9].

The present study aims to identify the drug profile of elderly persons receiving care under the Family Health Strategy, as well as describing the prevalence of polypharmacy and associated factors among this group.

METHOD

An analytical, document-based, cross-sectional study was carried out with a quantitative approach. It is based on an analysis of the profile of medications prescribed in the Family Health Units for elderly persons living in Brazlândia in the Distrito Federal, Brazil, receiving care through the Family Health Strategy.

All the medical records of patients aged 60 and over registered and residing in the area covered by the FHS teams of the administrative district of the Government of the Federal District of Brazlândia were considered. According to information from the Sistema de Informação da Atenção Básica (the Basic Care Information System) (SIAB), around 60% of the Brazlândia region is covered by family health teams, with around 34,000 registered residents. Of the registered population, 2,879 are aged 60 years or over. There are currently 11 Family Health Teams. However, for the present study, only the five teams with electronic medical records were considered. Thus, for the purposes of the sample calculation, the 1,709 elderly people registered with these five teams were considered.

For the definition of the sample size, simple random sampling was used. The calculations used in this process were based on a 15% proportion of elderly persons in the general population, a population of 1,709 elderly persons enrolled in the SIAB, a margin of error of 3% and a level of confidence of 95%. The number identified (176) was increased by 20% for possible losses. Thus, the minimum number of elderly individuals for the study, defined by the sample calculation, was 211 individuals.

The 211 elderly persons were randomly selected using simple random sampling, considering the percentage of elderly people in each FHS team, using data from Form A (home-based registration records). When there were problems with the records of the elderly persons, for reasons such as not fulfilling the study criteria, a new medical record was drawn, always respecting the randomization of the sample.

Data were collected from April to May 2015. The inclusion criteria were: people aged 60 and over, with electronic medical records, who reside in Brazlândia, are registered with one of the Brazlândia FHS teams and use at least one drug on an ongoing basis. The medical records of patients which contained less than one year of information, as well as medical records with incomplete data, were excluded. SIAB data were also surveyed, as well as those from Forms A and B, which are completed and updated on a monthly basis by the family health team.

The drugs prescribed for the elderly were evaluated in terms of drug class, dose, and posology. The drugs were grouped and standardized according to the Anatomical Therapeutic Chemical Classification (ATC). This categorization is standardized by the World Health Organization (WHO) for research involving drugs[10].

The independent variables that were studied and dichotomized were: gender (male vs. female); age (<70 years x ≥70 years, with the mean considered the cut-off point, and the data found to present symmetrical distribution); presence of self-reported chronic behaviors and morbidities - smoking, alcoholism, hypertension, diabetes mellitus, osteoporosis, cardiovascular complications, mental suffering, gastrointestinal diseases (yes x no); systolic pressure (<139 mmhg x ≥140 mmhg); diastolic pressure (≤9 mmhg x > 9 mmhg).

The collected data were organized and analyzed, initially through a descriptive analysis of the data that made up the drug profile, and the prevalence of polypharmacy was then identified. Polypharmacy was defined as the concomitant use of five or more medications[11]. For this purpose, the variable of polypharmacy was constructed based on the categorization of the amount of medication used. Thus, polypharmacy was considered practiced by those elderly persons who used five or more drugs throughout the day and not practiced by those who used less than five drugs[11]. The dependent variable was therefore defined for the analysis of factors associated with polypharmacotherapy.

In order to verify the existence of associations between the sociodemographic and clinical variables and the polypharmacy-dependent variable, bivariate analysis was carried out using the Pearson chi-square test. Logistic regression analysis was used to define the factors associated with polypharmacy in the final model. For this stage of the final model, all the variables that showed an association up to a level of 20% ($p \leq 0.20$) in bivariate analysis were analyzed together. The final significance level was 5% ($p \leq 0.05$), with the presentation of the Odds Ratio (OR) and respective confidence intervals of 95%.

This study was conducted in accordance with Resolution 466/12 of the National Health Council. The research project was evaluated and approved by the Ethics Research Committee of the Fundação de Ensino e Pesquisa da Saúde (the Health Teaching and Research Foundation) (FEPECS)/Secretaria de Estado de Saúde (State Health Secretary) (SES) of the Distrito Federal, under Consolidated Opinion nº. 1.020.135 and Certificate of Presentation for Ethical Evaluation (CAAE) 38201714.1.0000.5553.

RESULTS

A total of 211 medical records of elderly persons were considered for the study. The concomitant use of 5 or more drugs, or polypharmacy, was identified in the medical records of 62 (29.4%) of the elderly.

Among the elderly persons in the present study, the majority (56, 26.5%) used three different classes of drug (Table 1).

In the bivariate analysis, the following factors ($p < 0.05$) were associated with polypharmacotherapy: systolic blood pressure (BP), diabetes, arterial hypertension, and cardiovascular complications (table 2). There was a significant association with all classes of drug except anti-depressants and steroids.

Table 1. Quantity of classes of drug per patient among elderly persons in Brazlândia (n=211). DF, 2015.

Quantity of different classes of medication	N **(%)**
None	5 (2.4)
One only	18 (8.5)
Two classes	30 (14.2)
Three classes	56 (26.5)
Four classes	40 (19.0)
Five classes	19 (9.0)
Six classes	18 (8.5)
Seven classes	10 (4.7)
Eight classes	8 (3.8)
Nine classes	7 (3.3)
Total	211 (100.0)

Table 2. Bivariate analysis between polypharmacotherapy and sociodemographic, clinical, and related variables and diseases (n=211). DF, 2015.

Sociodemographic and Clinical Variables	Polypharmacy		*p* value
	Yes N (%)	No N (%)	
Gender			
Male	20 (24.1)	63 (75.9)	0.11
Female	42 (32.8)	86 (67.2)	
Age(years) (mean=70 years; sd=8.6)			
Up to 70	34 (30.1)	79 (69.9)	0.12
More than 70	28 (28.6)	70 (71.4)	
Smoker			
No	60 (29.0)	147 (71.0)	0.33
Yes	2 (50.0)	2(50.0)	
Alcoholism			
No	61 (29.2)	148 (70.8)	0.50
Yes	1 (50.0)	1 (50.0)	
Systolic Blood Pressure			
Up to 139 mmHg	22 (21.0)	83 (79.0)	0.00
Over 140 mmHg	39 (37.5)	65 (62.5)	
Diastolic Blood Pressure			
Up to 9 mmHg	51 (28.3)	129 (71.7)	0.31
More than 9 mmHg	10 (34.5)	19 (65.5)	
Glycemia (mean=161 mg/dl;sd=70)			
Diabetes			
No	22 (15.2)	123 (84.8)	0.00
Yes	40 (60.6)	26 (39.4)	

to be continued

continued from Table 2

Sociodemographic and Clinical Variables	Polypharmacy Yes N (%)	No N (%)	*p* value
Hypertension			
No	10 (17.9)	46 (82.1)	0.01
Yes	52 (33.5)	103 (66.5)	
Osteoporosis			
No	54 (28.6)	135 (71.4)	0.29
Yes	8 (36.4)	14 (63.6)	
Cardiovascular complications			
No	28 (19.2)	118 (80.8)	0.00
Yes	34 (52.3)	31 (47.7)	
Mental Suffering			
No	53 (31.0)	118 (69.0)	0.19
Yes	9 (22.5)	31 (75.5)	
Gastrointestinal Diseases			
No	57 (29.4)	137 (70.6)	0.59
Yes	5 (29.4)	12 (70.6)	

Table 3. Bivariate analysis of polypharmacy and drug classes used (n=211). DF, 2015.

Drug classes	Polypharmacy Yes N (%)	No N (%)	*p* value
Anti-Hypertensives			
No	3 (6.2)	45 (93.8)	0.00
Yes	59 (36.2)	104 (63.8)	
Diuretics			
No	13 (15.1)	73 (84.9)	**0.00**
Yes	49 (39.2)	76 (60.8)	
Calcium channel betablockers			
No	43 (25.4)	126 (74.6)	**0.01**
Yes	19 (45.2)	23 (54.8)	
ACE inhibitors			
No	31 (22.6)	106 (77.4)	**0.00**
Yes	31 (41.9)	43 (58.1)	
AT1 Blockers			
No	38 (24.8)	115 (75.2)	**0.01**
Yes	24 (41.4)	34 (58.6)	
Adrenergic Inhibitors			
No	38 (22.5)	131 (77.5)	**0.00**
Yes	24 (57.1)	18 (42.9)	
Hypoglycemic agents			
No	30 (17.3)	141 (82.5)	**0.00**
Yes	32 (80.0)	8 (20.0)	

to be continued

continued from Table 3

Sulfonylureas			
No	31 (17.9)	142 (82.1)	**0.00**
Yes	30 (81.1)	7 (18.9)	
Biguanides			
No	26 (16.0)	137 (84.0)	**0.00**
Yes	36 (75.0)	12 (25.0)	
Insulin			
No	58 (29.1)	141 (70.9)	0.75
Yes	4 (33.3)	8 (66.7)	
Anti-hypercholesterolemic agents			
No	39 (21.9)	140 (78.2)	**0.00**
Yes	23 (71.9)	9 (28.1)	
Statins			
No	42 (23.2)	139 (76.8)	**0.00**
Yes	20 (66.7)	10 (33.3)	
Anti-aggregation platelet			
No	33 (19.3)	138 (80.7)	**0.00**
Yes	29 (72.5)	11 (27.5)	
Cardiovascular Cardiotonics			
No	53 (26.6)	146 (73.4)	**0.00**
Yes	9 (75.0)	3(25.0)	
Anti-depressants			
No	53 (30.8)	119 (69.2)	0.22
Yes	9 (23.1)	30 (76.9)	
Corticoids			
No	60 (30.2)	139 (69.8)	0.26
Yes	2 (16.7)	10 (83.3)	

ACE: angiotensin converting enzyme inhibitors; AT1:Angiontensin1

As shown in table 4, in the multiple analysis, the variables that remained associated with polypharmacy were diabetes mellitus, cardiovascular complications and the use of anti-hypertensive drugs. As about 70% of study participants had hypertension and probably used antihypertensive drugs, the variable hypertension was not considered for the final model, in order to avoid possible confusion.

Table 4. Final model of factors associated with polypharmacy among the elderly. DF, 2015.

Independent Variables	Adjusted OR	CI 95%	*p* value
Diabetes			
No	1		
Yes	17,77	7,25-23,52	0,00
Cardiovascular Complications			
No	1		
Yes	7,76	3,27-8,40	0,00

DISCUSSION

The data of the present study reveal a high prevalence of elderly people being treated with polypharmacy (29.4%). A similar reality was observed in a cross-sectional study with elderly patients attending a FHS unit in São Paulo, Brazil (30.6%) [12]. A study conducted with elderly residents of Goiânia, in the state of Goiás found an average of 3.63 medications per elderly, as well as a prevalence of polypharmacy of 26.4%, similar to the prevalence found in the present study. A higher prevalence was found in a municipality in the extreme south of Rio Grande do Sul (31.86%)[13]. A study carried out among elderly people attended by the FHS in the urban area of Recife, Pernambuco, identified a prevalence of polypharmacy of 11%, lower than that found in the present study[14]. A survey conducted in southern Brazil, comparing elderly residents in urban and rural areas, found a prevalence of polypharmacy of 13.9%, close to that found in the aforementioned study in the northeast (11%). These variations may be related to regional inequalities related to health care and policies regarding the availability of medications, which can vary considerably in the different regions of Brazil.

In the present study, the class of drugs most commonly prescribed were those used to control blood pressure levels. Several studies agree that such medications are the most prescribed drug class[14,15]. This finding can be explained by the high prevalence of hypertension in Brazil, especially among the elderly, which can be as high as 50% in the various regions of the country[16]. As hypertension is a factor that is known to influence the practice of polypharmacy, it was not considered in the final model in order to allow the expression of little known variables.

The use of up to six different types of antihypertensive drugs was observed in another study carried out in Montes Claros, Minas Gerais. However, such use should be performed with care, as it makes possible the occurrence of adverse events, drug interactions and iatrogenies[17]. The findings identified in the present work and in the cited studies are significant and worrying, reinforcing the importance of careful guidance, especially for an elderly population that is at a stage of life that requires more attention and greater care. Especially when there are difficulties with the identification of medicines, such situations can promote inappropriate use, as well as causing damage that further compromises health[18]. One way of avoiding the high prevalence of hypertension and its consequent impact on the excessive use of medicines is investment in preventive measures to influence behavior and lifestyle so that the occurrence of this disease is lower in the long term[16].

The present study revealed that in addition to the use of antihypertensive drugs, diabetes and cardiovascular complications were factors associated with polypharmacy. An average consumption of 5.7 medications was found among hypertensive elderly persons, 4.8 among diabetics and 6.2 among hypertensive diabetics[17]. Other similar data have been found in research on the subject. A cross-sectional epidemiological study was carried out with 167 elderly people living in an area covered by a basic health unit in the municipal region of Uruguaiana, Rio Grande do Sul, where it was found that the diseases most frequently described by the elderly persons were cardiovascular complications, and that the use of drugs to control these morbidities was common[19]. Other studies in São Paulo and Florianopolis in the state of Santa Catarina have described how the main problems described were arterial hypertension and found that the majority of elderly persons (88.0%) made use of medications[11,20].

Chronic diseases and clinical manifestations due to aging can be considered the main elements involved in the etiology of polypharmacy.[11] The fact that the presence of hypertension, diabetes, heart problems, osteoporosis and mental suffering increase the risk of elderly persons using more than five medications has, to some extent, a logical explanation. It is known that pharmacological therapy is a necessary intervention in many cases, and can provide an improvement in the health status of the elderly patient, provided that medications are properly used[19]. However, the absence of integrated health care programs for the elderly may jeopardize the rational use of drugs[21].

In a similar manner to this research, one investigation found that the most prescribed drug classes were those aimed at problems of the cardiocirculatory system and antihypertensive drugs, followed by drugs of systemic use and those that

work in the digestive system and the metabolism[16]. In a study on the use of antihypertensive and antidiabetic drugs among the elderly in Belo Horizonte, Minas Gerais, the most commonly used antihypertensive classes were diuretics, ACE inhibitors and β-blockers, probably because they were supplied by SUS[17]. Similarly, in a retrospective study of medical records of 382 elderly individuals belonging to four FHS units, it was found that thiazides were the most prescribed drugs, both as monotherapy and in association with other classes. Angiotensin-converting enzyme inhibitors were the second most used class of antihypertensive drugs, both in isolation and in combination. Beta-blockers, calcium channel blockers, and loop diuretics were less commonly used[20].

These results highlight the need to implement treatment protocols for hypertension and diabetes in health institutions and to make prescribers of medication aware of their use, with a view to improving quality of care and favoring therapeutic effectiveness and therapeutic[17]. In addition, knowledge of the sociodemographic, health and polypharmacy characteristics of these elderly people favors the implementation of specific actions for this age group by health professionals, especially those who work in Primary Health Care, as focusing on the population in question, prevention and permanent monitoring, as well as integration between the levels of health care are important for specialized care and for the adequate management of the pathologies that affect this public[19].

Some limitations should be considered when interpreting the results of the present study, such as the limited geographical space. Only 60% of the residents of Brazlândia, DF, receive medical care from the FHS, and of the 11 teams of this service only five had electronic medical records. This was one of the criteria for inclusion in the research. Another limiting fact is the lack of standardization in filling out medical records. Many professionals do not take proper care when writing down details about physical examinations, anamnesis and medications being used and prescribed. This is especially detrimental to studies of medical records, which can also lead to harm to patients and professionals in epidemiological as well as technical and legal matters. However, it is important to note that the present study was conducted with a representative sample of elderly people in a region where the subject had not yet been studied, and therefore provides relevant data.

CONCLUSIONS

The present study allowed the evaluation of polypharmacy among elderly persons receiving care through the FHS, and the identification of related factors. The prevalence of polypharmacy was high; most individuals used three different drug classes, while diabetes mellitus, cardiovascular complications and the use of antihypertensive drugs were the factors associated with a high prevalence of polypharmacy.

This is a worrying reality that demands new postures on the part of the professionals. Polypharmacy should be carefully evaluated, in order to avoid harm to the elderly such as iatrogenics. It is necessary to implement measures that alert and make family health professionals, especially prescribers of medication, aware of the importance of the issue, in order to improve the quality of care provided to the elderly population and to achieve therapeutic rationality. In addition, specific actions are required and should be contextualized to the singularities of the elderly in the context of the FHS, focusing on appropriate assistance to this public and the problem of polypharmacy.

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