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Moving ahead

After entering adulthood following its 18th birthday, RBGG is delighted to bring its readers another edition, the first of this new year. Despite the difficulties we have faced, we remain committed to improving our publication, and are proud to introduce in this edition the journal's first thematic section, which will discuss the use of drugs and the associated risks for the elderly. With the publication of this section, RBGG opens up a new space where readers can enjoy a collection of articles addressing the same central theme, albeit with different perspectives regarding objects of study and research questions.

In addition to this new feature, RBGG is continuing its mission to investigate topics of major importance to Geriatrics and Gerontology. Among these, we would like to highlight articles that deal with clinical outcomes and reveal the relationship between hypertension and diabetes and healthy eating, as well as examining anxiety disorder in patients with chronic pain. The much-discussed subject of falls among the elderly is back on the agenda, as well as the quality of life of elderly persons in a range of life circumstances.

Another topic returning to the discussion table is the self-perception of the elderly about a specific aspect of their lives – in this case, oral health. The same oral health where, according to the last national epidemiological survey, conducted in 2010 and published in 2013 (Brazilian Ministry of Health, 2013), few advances have been observed among the elderly population. How this population perceives their oral health is therefore an extremely relevant issue that requires further exploration to attempt to tackle the problems that permeate the oral health conditions of the elderly.

Following this same logic, frailty in its various nuances once again makes its mark on the pages of RBGG. In an innovative manner, this edition establishes a link between aspects of information and communication technology, in the form of mobile applications, which have truly invaded our lives and can make a major contribution to the lives of those that are growing old and their caregivers. The same caregivers also appear in the pages of this issue in a study aimed at those caring for patients with Parkinson's Disease. Listening to such individuals is essential, especially as the echoes of their voices have not yet travelled far.

Nor in this issue could we avoid discussing tuberculosis, an infectious disease that has reemerged in the pages of journals and magazines. This disease also affects the elderly population, justifying another look at infection among this part of the population.

Concluding this edition is an article that deals with the physical beauty of the elderly, a theme that represents the emergence of a duality and serves as a moment of reflection and learning. We age, yes, whether with or without physical signs, but without losing our essential tenderness. And in this context, I would like to highlight the wise words of the poet Mario Quintana in his poem entitled Envelhecer (“Getting Old”).

Before, all the roads led away.

Now all the roads come back.

The house is welcoming, the books are few.

And I myself prepare tea for the ghosts.
(Free translation)

Aging, in the four verses of the great Quintana, opens a space for what we propose to be, the reflection of who we are today and who, in fact, we will be tomorrow. Old age allows us a feeling of resignation for what the poet leads us to, but also the possibility of re-signifying it. And this is what we hope for!

We hope you enjoy another edition of RBGG and have an excellent year of reading.

Kenio Costa Lima
Associate editor



Self-perceived oral health among the elderly: a household-based study

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Maria Vieira de Lima Saintrain⁴
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Abstract

Objective: to evaluate the self-perceived oral health status of elderly persons and its relation to self-care practices, the use of public oral health services, denture use, dental complaints and impact on everyday activities. *Method:* The 95 subjects of this quantitative, analytical and cross-sectional study were from Fortaleza, a state capital in the northeast of Brazil. They were aged 60 years or over and were mentally capacitated according to the Mini-Mental State Examination. The study parameters included gender, age group, race/ethnic background, level of schooling, household income, self-care practices, use and need for dentures, dental complaints, impact on everyday activities, access to oral health services, and access to information. The outcome parameter was self-perceived oral health. To verify the association between the study parameters and the outcome parameter, prevalence ratios were calculated and submitted to the Chi-squared test, the Fisher's exact test, the Mann-Whitney test and multivariate regression analysis. *Result:* self-perceived oral health was described as good/excellent significantly more often by women than by men ($p=0.044$). Oral health had a negative impact on everyday activities among nearly one third of the sample ($n=29$; 30.5%). The mean and median values of *dental complaints* and *impact on everyday activities* were significantly lower for subjects reporting good/excellent oral health than for subjects reporting poor/fair oral health. *Conclusion:* it is expected that these results will strengthen oral health care for elderly persons, in order to maintain their quality of life during this stage of life.

Keywords: Self-perception.
Oral Health. Elderly.

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INTRODUCTION

An epidemiological study has reported that poor oral health conditions affect 3.9 billion people worldwide. Due to a lack of prevention and dental treatment, tooth loss was found to be the most prevalent sequela among the population¹. Most dental losses are due to tooth decay, which, when left untreated, is the most common chronic disease and a major global public health problem, with significant impacts on people, health systems and economies².

In addition to dental caries, severe periodontitis also results in tooth loss, especially among the elderly. It is the sixth most frequent of all the conditions studied, and consequently has a major impact on the well-being of people and societies in different phases of life¹.

The Pesquisa Nacional de Saúde Bucal (the National Oral Health Survey) (Projeto SB BRASIL) found that an average of 27.53 decayed or missing teeth were identified among the 65 to 74 year age group, in which the component "missing" was responsible for 92% of the indices of this age group. In this same study and age group it was found that only 46.1% of the Brazilian population and 55.3% of the population of the northeast of the country do not use dentures, while 92.7% of people in Brazil and 96.1% in the northeast region require their use³.

However, the access of the elderly population to timely and integral dental care offered by the state is often frustrated by insufficient coverage, meaning they do not have universal access to services, guaranteed treatments or effective oral health care⁴. The difficulty of access to oral services is influenced by geographic, physical and operational elements, the insufficient supply aimed at the elderly, and by socioeconomic and cultural conditions. While strengthening the capacity of the Family Health Program is one possible strategy for Brazil, focus and additional efforts are required⁵ to achieve universality and equity of care and attention in oral health.

In the elderly phase, people turn their attention to medical services and do not seek dental services.

However, it is at this stage that oral problems are exacerbated, considering the cumulative nature of the sequelae of oral diseases³. This behavior, especially among those who no longer have teeth or only use total dentures, may suggest a lack of perception of the need for oral care. However, the understanding of an elderly person's perception of their oral health and its influence on the use of dental services, oral self-care and impact on activities of daily life, especially in the poorest regions of the country and among those dependent on the Sistema Único de Saúde (the Unified Health System) (SUS), remains limited.

Unfortunately, while for many elderly people total or partial toothlessness has no impact on perceived quality of life⁶, the relationship between the absence of dentition (total or partial) and the use of dental services is unclear. Despite this, the increase in life expectancy in recent decades has resulted in a growing interest in the effect of oral health on overall health outcomes, especially those related to functionality and well-being⁷.

In this context, the present study aims to identify the scale and negative impact of poor oral health among the elderly, information which is considered essential for the provision of adequate health care. Similarly, the study can provide support so that health education can fulfill important roles in oral and general health as well as in communication, diet and nutrition, providing the elderly with a healthy aging process.

Therefore, the objective of the present study was to investigate the self-perception of elderly persons regarding their oral health, and its relationship with measures of self-care, the use of dentures and dental services, as well as dental complaints and impact on daily life.

METHOD

A cross-sectional, analytical study with a quantitative approach was performed. The research was conducted through home visits carried out in the area covered by the Centro de Saúde da Família Fernando Diógenes (the Fernando Diógenes Family Health Center) (CSFFD), located in the city of Fortaleza in the state of Ceará.

According to IBGE data⁸, the city of Fortaleza has a territorial area of 314,927 Km² and a population of 2,452,185 inhabitants, with a resident population of 237,076 people aged 60 years or more (10.55%).

The CSFFD is located in the Granja Portugal neighborhood, which is over a hundred years old. It has a population of 39,651 inhabitants and a demographic density of approximately 71 people per m², a mean per capita income of one minimum wage, a low social level, a lack of basic sanitation, ineffective health care and disorganized population growth which has occurred without specific guidelines, causing serious environmental impacts, such as floods associated with areas of risk^{9,10}.

The study population consisted of elderly people aged 60 years of age or older residing in the area covered by CSFFD team 551, which has a total of ten micro-areas and a population of 6,846 inhabitants¹¹.

For the sample calculation, a prevalence of the self-perception of oral health of very satisfied/satisfied of 50%, obtained through Project SB BRASIL³, was considered, along with a 95% confidence level, an error of 8% and a sample universe of 401 elderly people (through a survey carried out by the health agents in the region). A need for 110 interviewees was calculated.

A random simple sample design was applied, in which all the individuals in the population studied had an equal probability of being selected. Each element of the sample universe was assigned a unique number and a random draw of the components of the sample was carried out.

To be included in the study, the participants had to be 60 years old or older when they answered the questionnaire and be residents of micro-areas that possess health agents, as the sample universe was defined by the list provided by these professionals. The following exclusion criteria were applied: mentally handicapped elderly persons, evaluated through the Mini Mental State Exam (MMSE), which identified the individuals as oriented in time and space and capable of interacting during data collection, in order to provide reliability in the responses. The cutoff point for the elderly persons with up to four years of schooling was 24 points and

for illiterate individuals it was 17 points¹². Elderly persons who were not found at home after a second scheduled visit did not participate in the study.

The data was collected from February to April 2014. Two instruments were applied: the first a neuropsychological evaluation and the second a questionnaire addressing specific oral health issues, based on Projeto SB BRASIL³ and the studies of Bulgarelli¹³.

The questionnaires were applied verbatim to the elderly by a researcher on a home visit. Prior to this phase, a pre-test of the questionnaire was carried out with ten elderly people, in order to verify the clarity of the language, the understanding of the questions by the interviewee and the average time of application.

The independent variables included sex, age group, ethnicity, schooling, family income, self-care practices, use and need for dentures, dental complaints, impact on daily life and access to service and information, while the dependent variable was self-perception of oral health.

The variables dental complaints and impact on everyday activities are composite variables, resulting from self-reports of the presence or not of the discomforts listed in the form. The variable dental complaints resulted from the sum of self-reports of pain, missing teeth, discoloration, speech difficulties, gingival bleeding, dry mouth, soft teeth, crooked teeth, difficulty swallowing or chewing, discomfort in dentures, bad breath and injuries. Impact on everyday activities, meanwhile, resulted from the sum of the feelings of embarrassment, nervousness, difficulty in carrying out tasks of daily living, not being able to enjoy oneself and sleeping poorly due to oral problems. In each consolidated continuous variable, the self-reports had the same weight in the final summation, and were analyzed through measures of central tendency.

Simple and relative frequencies were calculated for the characterization of the sample, as well as the prevalence ratio, and the Chi-squared, Fisher's Exact and Mann-Whitney tests were applied for the identification of measures of association between exposures and outcomes. Multivariate regression

was performed to investigate the impact of age, number of complaints and impact on daily activities (the continuous variables of the study) on the self-perception of oral health. Statistical analysis included median (Md) and interquartile distances (Q1 and Q3). The normality of the data was verified, and as the distribution was not normal, the Mds were used to characterize the quantitative variables and the Mann-Whitney test was applied to compare them with self-perception of oral health. In all tests, the level of significance was set at 5% ($p < 0.05$).

The study design was approved by the Ethics Research Committee of the Universidade Estadual do Ceará (Ceará State University) under number N° 364.432 and all the ethical and legal guidelines contained in Resolution N° 466/12 were respected. The nature of the study was made clear to all the interviewees in advance and only those that signed a FICF (Free and Informed Consent Form) participated in the project.

RESULTS

Of the total of 110 elderly people to be interviewed, 95 questionnaires were completed effectively, as one elderly person had changed address, two had died, four refused to participate in the survey and two were not found at home on a second scheduled visit. In addition, six mentally impaired elderly persons were excluded from the sample following evaluation by the MMSE. The studied group therefore contained 95 elderly persons, whose age varied from 60 to 91 years with a mean of 67.9 (± 6.9) years.

Table 1 shows the sociodemographic characteristics of the elderly persons, the majority of whom were women ($n=62$; 65.3%), aged 60-70 years ($n=67$, 70.5%), brown-skinned (mixed race) ($n=94$, 98.9%), who had never studied or who had studied until the 4th grade ($n=71$, 74.8%) and had a family income of up to two minimum wages ($n=86$, 90.6%). The association between skin color/ethnicity and the outcome was not tested, as practically the entire sample consisted of people who declared themselves to be brown-skinned/mixed race. It is noteworthy that more women than men had an excellent/good self-perception of oral health ($p=0.044$) (Table 1).

Table 2 describes measures of self-care, with 63 (66.3%) elderly persons reporting performing oral cleaning once or twice a day. However, only two elderly persons (4.5%) used dental floss and seven (7.4%) used mouthwash. As only two elderly people used dental floss, this association was not calculated. When evaluating the relationship between the self-care variables and the self-perception of oral health, no variables demonstrated a causal relationship.

Table 3 focuses on the distribution of the presence of teeth/fixed prostheses and the use of dentures. It is demonstrated that more than half ($n=50$, 52.6%) of the elderly persons were totally edentulous, two thirds ($n=63$, 66.3%) used upper dentures and only one third ($n=31$, 32.6%) used lower dentures. None of the elderly interviewed still had all their teeth.

Regarding self-perception of the need for denture replacement, more than a third ($n=36$; 37.9%) believed that they did not need to change their dentures, and 33 (34.7%) described a need for replacement. However, 28 of the elderly persons (29.5%) reported that their dentures moved during chewing, 18 (18.9%) said that their dentures injured their mouths and 14 (14.7%) said that they made speaking difficult. There was a statistically significant difference between the elderly persons with natural teeth and those who did not have any teeth ($p < 0.001$). Elderly persons who did not have any teeth had a better evaluation of their oral health (PR=1.69). However, the self-perception of the majority (55.6%) of those with natural teeth considered their oral health to be very good or good. Those who used upper dentures had a better self-perception of oral health than those who did not ($p=0.057$ and PR = 1.32) (Table 3).

Table 4 examines self-perception of oral health versus access to dental services. It was observed that 87 (91.6%) of the elderly persons had not consulted a dentist in the previous six months, but presented a higher prevalence ratio in terms of considering their oral health as excellent or good (PR=1.56); 91 (95.8%) had no information about oral health, but presented a higher prevalence ratio in terms of considering their oral health as excellent or good (PR=1.54); Likewise, 91 (95.8%) did not visit the

Table 1. Simple and percentage frequencies and prevalence ratio of socio-demographic data by self-perception of oral health. Fortaleza, Ceará, 2014.

Variables	Self-perception		Total	Prevalence ratio (CI 95%)	P value
	Excellent/Good n (%)	Fair/Poor n (%)			
Sex					
Female	51 (82.3)	11 (17.7)	62 (65.3)	1.29 (0.97 - 1.71)	0.044*
Male	21 (63.6)	12 (36.4)	33 (34.7)	1.00	
Age group					
60 to 70	48 (71.6)	19 (28.4)	67 (70.5)	1.00	
71 or more	24 (85.7)	4 (14.3)	28 (29.5)	1.20 (0.97 - 1.48)	0.231*
Ethnicity+					
Black (Afro-Brazilian)	1 (100.0)	-	1 (1.1)		
Brown (Mixed-Race)	71 (75.5)	23 (24.5)	94 (98.9)		
Schooling (years)					
Never studied	21 (80.8)	5 (19.2)	26 (27.4)	1.1 (0.85 - 1.42)	0.776*
Four or fewer	33 (73.3)	12 (26.7)	45 (47.4)	1.00	
Five or more	18 (75)	6 (25)	24 (25.3)	1.02 (0.76 - 1.37)	
Family income (minimum salary)					
Less than one MS or no income	20 (83.3)	4 (16.7)	24 (25.3)	1.25 (0.76 - 2.05)	0.528**
1 to 2	46 (74.2)	16 (25.8)	62 (65.3)	1.11 (0.69 - 1.81)	
More than 2	6 (66.7)	3 (33.3)	9 (9.5)	1.00	

* Chi-squared test; ** Fisher's exact test; + Due to the homogeneity of the sample the prevalence ratio was not calculated.

dentist regularly, but presented a higher prevalence ratio in terms of considering their oral health as excellent or very good (PR=1.54).

The fact that the elderly did not regularly visit the dentist was attributed to the following main justifications: "do not feel pain, so do not need to go to the dentist" (n=62, 65.2%); "no longer have teeth and so no longer require dental care" (n=43; 45.2%); "cannot get access to dental care" (n=30, 31.5%); "difficulty getting to the dentist" (n=21; 22.1%); "fear of the dentist" (n=4, 4.2%); "no one to take me to the dentist" (n=2, 2.1%). There was no relation between the use of dental services and self-perception of oral health ($p>0.05$).

One third of the elderly persons (n=29; 30.5%) believed that oral health had an impact on their daily lives. Of these, one third (n=29; 30.5%) felt embarrassed when smiling or talking; 12

(12.6%) stopped enjoying themselves; seven (7.4%) reported nervousness or irritation; six (6.3%) slept poorly and three (3.2%) had difficulties performing daily tasks.

Table 5 shows the existence of a significant difference ($p<0.001$) between the median number of situations that have an impact on daily life and the self-perception of oral health. Elderly persons who reported an excellent or good oral perception of health experienced fewer situations that impacted on their daily life than those who reported a fair or poor perception of oral health.

Of the elderly persons interviewed, 81 (85.26%) had dental complaints. This indicator was based on the self-reported presence of pain, missing teeth, discoloration, speech difficulties, gingival bleeding, dry mouth, soft teeth, difficulty in swallowing or chewing, discomfort with dentures, bad breath and injuries.

Table 2. Simple and percentage frequencies and prevalence ratio of measures of self-care by self-perception of oral health. Fortaleza, Ceará, 2014.

Variables	Self-perception		Total	Prevalence ratio (CI 95%)	P value
	Excellent/Good n (%)	Fair/Poor n (%)			
How often do you clean your teeth each day?					
Don't clean	5 (83.3)	1 (16.7)	6 (6.3)	1.27 (0.81 - 2.01)	0.376**
Once or twice	50 (79.4)	13 (20.6)	63 (66.3)	1.21 (0.89 - 1.65)	
Three times or more	17 (65.4)	9 (34.6)	26 (27.4)	1.00	
Do you use dental floss every day?+					
Yes	2 (100)	-	2 (4.5)		
No	22 (52.4)	20 (47.6)	42 (95.5)		
Do you use mouthwash?					
Yes	5 (71.4)	2 (28.6)	7 (7.4)	1.00	0.675**
No	67 (76.1)	21 (23.9)	88 (92.6)	1.07 (0.66 - 1.73)	
How often do you clean your dentures?					
Not every day	2 (66.7)	1 (33.3)	3 (4.2)	1.00	0.587**
Once per day	14 (87.5)	2 (12.5)	16 (22.9)	1.31 (0.58 - 2.98)	
Twice or three times per day	42 (82.4)	9 (17.6)	51 (72.9)	1.24 (0.55 - 2.78)	
What do you use to clean your dentures?					
Toothbrush and toothpaste	53 (85.5)	9 (14.5)	62 (65.3)	1.37 (0.79 - 2.36)	0.132**
Others	5 (62.5)	3 (37.5)	8 (34.7)	1.00	

* Chi-squared test; ** Fisher's exact test; + Due to the homogeneity of the sample the prevalence ratio was not calculated.

Table 3. Simple and percentage frequencies and prevalence ratio of presence of natural teeth and use of dentures by self-perception of oral health. Fortaleza, Ceará, 2014.

Variables	Self-perception		Total	Prevalence ratio (CI 95%)	P value
	Excellent/Good n (%)	Fair/Poor n (%)			
How many natural teeth and/or fixed prosthetic teeth do you have					
Has natural teeth	25 (55.6)	20 (44.4)	45 (47.4)	1.00	<0.001*
Has no teeth	47 (94.0)	3 (6.0)	50 (52.6)	1.69 (1.29 - 2.22)	
Upper dentures					
Use	52 (82.5)	11 (17.5)	63 (66.3)	1.32 (0.99 - 1.77)	0.057
Don't use	20 (62.5)	12 (37.5)	32 (33.7)	1.00	
Lower					
Use	27 (87.1)	4 (12.9)	31 (32.6)	1.24 (1.01 - 1.53)	0.125
Don't use	45 (70.3)	19 (29.7)	53 (55.8)	1.00	

* Chi-squared test; ** Fisher's exact test.

Table 4. Simple and percentage frequencies and prevalence ratio of access to dental services by self-perception of oral health. Fortaleza, Ceará, 2014.

Variables	Self-perception		Total	Prevalence ratio (CI 95%)	P value
	Excellent/Good n (%)	Fair/Poor n (%)			
Have you been to the dentist in the last six months?					
Yes	4 (50)	4 (50)	8 (8.4)	1.00	0.075*
No	68 (78.2)	19 (21.8)	87 (91.6)	1.56 (0.77 - 3.15)	
Have you had access to information about oral health?					
Yes	2 (50)	2 (50)	4 (4.2)	1.00	0.246**
No	70 (76.9)	21 (23.1)	91 (95.8)	1.54 (0.57 - 4.13)	
Do you go to the dentist regularly?					
Yes	2 (50)	2 (50)	4 (4.2)	1.00	0.246**
No	70 (76.9)	21 (23.1)	91 (95.8)	1.54 (0.57 - 4.13)	

*Chi-squared test; **Fisher's exact test.

Table 5. Inference between dental complaints, impacts on daily live and self-perception of oral health. Fortaleza, Ceará, 2014.

Variables	Self-perception de saúde bucal		P value
	Excellent/Good Median (1°Q - 3°Q)	Fair/Poor Median (1°Q - 3°Q)	
Complaints	2 (1 - 3)	4 (3 - 5)	<0.001
Impact on daily activities	0 (0 - 0)	1 (0 - 3)	<0.001

Mann-Whitney Test.

An association was identified between the median number of dental complaints and the self-perception of oral health ($p < 0.001$). Elderly patients who reported an excellent or good perception of oral health presented a lower number of complaints (Table 5).

To try to understand the relationship between the continuous variables age, number of dental complaints and impact on daily activities and the self-perception of oral health, regression analysis was carried out, with the outcome the self-perception of oral health and the other exposure variables. The equation generated had an adjusted r^2 of 0.247 ($p < 0.001$), showing that 24.7% of the variation in self-perception could be explained by the equation (which had a constant of 2.389765; $p < 0.001$), specifically by the variables number of dental complaints (coefficient 0.0928273,

$p = 0.011$) and impact on daily activities (coefficient 0.1709774; $p = 0.008$), although the influence of age was not significant ($p = 0.399$). As such, the greater the number of dental complaints and the more severe the impact on daily activities, the worse the self-perception of oral health.

DISCUSSION

One differential of the present study is that it was carried out based on homes in an area covered by a Family Health Strategy, unlike most studies with elderly persons, which use institutionalized populations. The study of this environment, together with the simple random sample design, allows a more precise characterization of a low income elderly population in the periphery of a large urban center.

As with other studies^{12,14-16}, there were greater numbers of elderly women than elderly men in the present study. This greater female presence can be explained by the fact that male mortality is higher than female mortality in younger age groups⁸.

Other expected realities were the low levels of schooling and income of the sample population. Low schooling is predictable in populations over 60 years of age in Brazil, as school access was historically restricted¹³. The low incomes of the interviewees are because the study was carried out with residents of a region with a mean per capita income of one monthly minimum wage¹⁰. Similar results were observed in a study by Xavier et al.¹⁷. A higher income can directly reflect on active aging, as it allows financial autonomy when dealing with health, social and alimentary needs.

Knowledge about the self-assessment of the health of the population is important in dentistry so that people's behavior and how they assess their needs can be understood, in order to assist them to adhere to healthy behaviors. This knowledge is even more important in relation to the elderly, considering that one of the main reasons why this group does not seek dental service is their own lack of perception of their needs¹⁸, together with social, cultural, lifestyle and economic issues¹⁹.

The self-perception and self-assessment of health is understood as the interpretation that a person makes in relation to their state of health and their experiences of daily life, based on the information and the knowledge about health and illness available, which are also influenced by previous experiences and the social, cultural and historical contexts of each individual¹⁸.

When studying the self-perceptions of oral health conditions, SB Brasil³, Martins et al.¹⁸ and Lima et al.²⁰ identified positive self-perceptions of oral health despite high edentulism. Haikal et al.¹⁴ found that of a group of elderly persons with an average of only 4.8 teeth present in their mouths, 60% did not perceive a need for treatment or dental care.

These findings corroborate the regression analysis of the present study, which had an

outcome of self-perception of oral health and other exposure variables, with a greater number of dental complaints and a higher impact on daily activities associated with a lower self-perception of oral health. A total of 75.7% of such elderly people perceived their oral health as excellent or good, although 95.7% of those interviewed said they had few or no teeth.

In a study carried out in the south of Brazil, Gabardo et al.²¹ concluded that there was a greater chance of a lower self-perception of oral health among women, elderly women, those with a lower quality of life and social support scores, individuals with poor eating habits, smokers, and residents of low-income census tracts.

A study by Bulgarelli¹³ concluded that oral health care declined with advancing age and that the elderly described feeling satisfied with their oral health conditions. The same study reported that being completely edentulous did not necessarily mean assigning negative values to this condition. Saintrain and Souza²² found that elderly persons identified two dimensions of their oral health: one with a negative impact when describing the difficulties after the loss of their teeth and the other with a positive impact in terms of pain relief, concluding, therefore, that clinically defined needs are not always the same as subjective needs.

To explain the fact that elderly persons with poor oral health conditions perceive their oral health in a positive manner, Haikal et al.¹⁴ reported that such individuals passively accept the deterioration of their oral condition, adopting a kind of inertia about the situation, which they consider "natural". Agostinho et al.²³, meanwhile, identified an association between the self-perception of oral health and the actual condition, but found that prosthetic rehabilitation did not contribute to the improvement of people's perception.

Bulgarelli¹² believes that working with people about the idea of feeling good about oral health is fundamental, as in order to live satisfactorily in society, individuals must be able to chew, have an aesthetically acceptable appearance, the absence of disorders and pain, and access to good nutrition,

and so oral health should be included in the construction of meanings about health. In another study on the elderly, Mestriner et al.²⁴ concluded that self-perception of oral health and income affect the impact of oral health on quality of life. Rigo et al.²⁵ identified that elderly persons with higher levels of satisfaction with life exhibited a better self-perception of oral health.

The facts that the present study focused on a single health unit and that the sample calculation was performed for a prevalence study and not for a study of association are limitations, which prevent the results from being extrapolated to other populations. However, it is hoped that this study can be used as a base for the development of preventive, educational and care programs that value oral health, provide clarity on self-care, promote health and prevent oral diseases among the elderly, whose oral health reality is the reflection of the invasive and inaccessible dentistry practices to which they were submitted in the past.

CONCLUSION

While the predominance of edentulism and the use, need and replacement of dental prostheses

demonstrate the precarious condition of the oral health of the elderly persons interviewed, they reported an excellent or good perception of their oral health.

A greater positive self-perception in oral health was associated with older women, older elderly persons, with lower levels of schooling, irregular access to dental services and with fewer dental complaints and situations that impacted their daily activities.

Population aging, the growing numbers of patients with chronic diseases, and the need for these patients to access public health services require greater efforts by the Unified Health System to train and improve its health units to ensure safe, universal access and to treat users equitably. Thus, it is hoped that the results of this study can be used as a base for the development of preventive, educational and care programs that value oral health, provide clarity on self-care, promote health and prevent oral diseases among the elderly, so that they can maintain the oral health conditions necessary to live this stage of life with quality.

Annex A

QUESTIONNAIRE

Date: ____/____/____

Questionnaire N°:
DATE: ____/____/____

GENERAL INFORMATION		
1. DATE OF BIRTH:	2. AGE (YEARS):	3. SEX: () M () F
4. ETHNICITY: () WHITE () YELLOW (Asian-Brazilian) () BLACK (Afro-Brazilian) () INDIGENOUS () BROWN (Mixed Race)		
5. SCHOOLING (COMPLETE YEARS): () NEVER STUDIED () ≤4 YEARS () 5 TO 8 YEARS () ≥9 YEARS		

SELF-PERCEIVED ORAL HEALTH AND IMPACT ON DAILY LIFE	
16. HOW IS YOUR HEALTH? () EXCELLENT () GOOD () FAIR () POOR () VERY POOR	
17. HOW IS YOUR ORAL HEALTH? () EXCELLENT () GOOD () FAIR () POOR () VERY POOR	
18. DO YOU WORRY ABOUT YOUR ORAL HEALTH? () YES () NO	
19. DO YOU THINK YOU CURRENTLY NEED DENTAL TREATMENT? () YES () NO () DON'T KNOW () DOES NOT APPLY	
20. DO YOU THINK YOU NEED TO CHANGE THE DENTURES THAT YOU CURRENTLY USE? () YES () NO () DON'T KNOW () DOES NOT APPLY	
21. IN THE LAST SIX MONTHS, HAVE YOU): FELT EMBARRASSED ABOUT YOUR TEETH OR YOUR MOUTH WHEN SMILING OR SPEAKING? () YES () NO FELT NERVOUS OR IRRITATED BECAUSE OF YOUR TEETH? () YES () NO HAD DIFFICULTY CARRYING OUT YOUR DAILY TASKS BECAUSE OF YOUR TEETH? () YES () NO STOPPED GOING OUT, ENJOYING YOURSELF, OR GOING TO PARTIES OR ON TRIPS BECAUSE OF YOUR TEETH? () YES () NO STOPPED SLEEPING OR SLEPT BADLY BECAUSE OF YOUR TEETH? () YES () NO	

ACESSO AOS SERVIÇOS ODONTOLÓGICOS	
22. HAVE YOU VISITED A DOCTOR IN THE LAST SIX MONTHS? () YES () NO	23. HAVE YOU VISITED A DENTIST IN THE LAST SIX MONTHS? () YES () NO
24. HAVE YOU HAD ACCESS TO INFORMATION ABOUT ORAL HEALTH? () YES () NO	25. DO YOU VISIT THE DENTIST REGULARLY? () YES () NO
26. IF YOU DO NOT VISIT THE DENTIST REGULARLY, WHAT IS THE REASON? () FEAR OF DENTIST () NO ONE TO TAKE ME TO THE DENTIST () DIFFICULTY GETTING TO DENTIST () CANNOT GET ACCESS TO DENTAL CARE () NO LONGER HAVE TEETH AND SO NO LONGER REQUIRE DENTAL CARE () DO NOT FEEL PAIN, SO DO NOT NEED TO GO TO THE DENTIST () OTHER REASONS () DOES NOT APPLY	

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Conceptual equivalence of items and semantic equivalence of the Brazilian version of the EORTC QLQ-ELD14 instrument to evaluate the quality of life of elderly people with cancer

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Abstract

Objective: to describe the process of semantic equivalence, the first stage in the validation of the EORTC QLQ-ELD14 instrument for Brazilian Portuguese. *Method:* Direct and independent translations of the instrument into Portuguese were carried out and validated by a meeting of experts to generate a synthesis version. The version chosen was submitted to reverse translations into English, and the form was pre-tested with patients. At the conclusion of the process, a summary version was presented. The pre-test and the final version of the instrument were applied to a total of 28 patients at a high complexity oncology treatment center. *Result:* after completion of the first round of pretesting, some adjustments for the next phase of the study were necessary by the expert committee. After these adjustments, in the second phase of pre-testing, the instrument was well-accepted by the population. *Conclusion:* the Portuguese summary version of the EORTC QLQ-ELD14 instrument for assessing the quality of life of elderly cancer patients is ready to be submitted to the next stages of the evaluation of its psychometric properties.

Keywords: Aged. Neoplasms. Quality of Life. Cross-Cultural Comparison.

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INTRODUCTION

Cancer is a worldwide health care problem. According to Globocan 2012, part of the International Agency for Cancer Research, there were 14.1 million newly diagnosed cancer cases and 8.2 million deaths due to cancer around the world in 2012¹.

In Brazil, cancer-related problems constitute a pressing health issue. Approximately 596,000 new cancer cases are estimated to occur in 2016, with similar estimates for 2017².

In recent decades, population ageing has had a significant role in the progressive increase of cancer prevalence in Brazil and around the world. The World Health Organization (WHO) estimates the annual global cancer burden will rise to no fewer than 21.4 million new cases in 2030. In low and medium-income countries, more than half of those who die due to cancer are aged 70 or older^{2,3}.

The stigma of having cancer and the condition of being older contribute to the complexity of care in this population. There are specific psychological, social and biological needs that need to be properly addressed among older people⁴. As social, health and well-being aspects are different among older adults, there is a need to employ instruments specifically designed to evaluate the quality of life of this population^{5,6}. Thus, there is increasing agreement about the importance of cooperation between geriatrics and oncology, not due to the increasing incidence of cancer among older people but also due to the need to explore modifications in oncological treatment as a result of the physiological changes in this age group⁷.

The importance of evaluating health-related quality of life has been increasingly acknowledged in health care contexts. Quality of life, as defined by the WHOQOL Group, is the “individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”⁸. Such definition makes quality of life a broad concept, affected by physical and psychological health, level of independence, social relations, individual beliefs and relationship to the environment.

A number of issues, such as progressive weakness and consumption, the inability to autonomously perform daily activities, stress, ageing and the possibility of death, together significantly impair quality of life among cancer patients⁹.

EORTC QLQ-C30 is a widely used and internationally validated instrument designed to evaluate the quality of life of cancer patients, with complementary modules that allow improved evaluation of specific situations¹⁰⁻¹². EORTC QLQ-EL14 is one such module, and was recently developed in pursuit of the evaluation of the quality of life of cancer patients over the age of 70 years. It has not yet been validated for use in Brazil¹³.

As few Brazilian studies have supported or used questionnaires that permit the evaluation of different aspects of the lives of patients with chronic-degenerative diseases, the translation, cross-cultural adaptation and posterior validation of instruments that assess quality of life in older people is of great importance. Adapting and validating the EORTC QLQ-ELD14 for use in Brazil will ensure new resources in data collection and analysis when evaluating the effectiveness of therapeutic procedures in the promotion of the quality of life in this age group, in addition to potentially revealing areas where further scientific investigation is required.

The present study therefore aims to perform the first step in the cross-cultural adaptation of the Brazilian version of EORTC QLQ-ELD14.

METHODS

This study describes the development of the Brazilian version of the EORTC QLQ-ELD14. To this end, convenience sample of 28 patients, with a mean age of 68 years, was selected. It should be noted that the sample group was selected, at each pre-test stage, in order to identify a pattern of response or difficulty in understanding the questionnaire. Therefore, as this is a study whose central element is internal validity, there was no need to perform a sample size calculation. From this assumption, the sample was then selected to include clinical and surgical and palliative and non-palliative patients, and

the process was conducted by theoretical saturation, according to which data collection was interrupted when it was found that no new theoretical elements arose that changed or generated corrections in the version of the instrument¹³.

The Brazilian version of the EORTC QLQ-ELD14¹⁴ is the result of a cross-cultural adaptation process performed in agreement with the procedures recommended by the EORTC Quality of Life Group. The process to ensure semantic and conceptual equivalence follows the Herdman universalist approach¹⁵, which was introduced in Brazil by Reichenheim¹⁶. This study was authorized by the authors via electronic communication (e-mail) in February 2014.

As part of the process of conceptual and item equivalence, a broad literature review was performed. This included the concepts on which the formulation of the original instrument was based, and the applicability of these in a Brazilian context. Next, an expert committee was formed with an epidemiologist, four nurses with oncological expertise and a psychiatrist. The committee evaluated the adequacy of the discussed concepts and of the items that formed the questionnaire.

The original questionnaire was translated into Portuguese independently by a physician and a biomedicine professional; both were English native speakers and fluent in Portuguese. Each of these translations (T1 and T2) were back-translated by two other independent translators, one physician and one professional translator, both native Portuguese speakers, fluent in English and with ample knowledge of health care vocabulary. These back-translations were coded R1 and R2.

EORTC QLQ-ELD14 is composed of 14 items distributed into five subscales, which evaluate mobility, worries about the future, worries about others, maintaining purpose and the burden of disease domains – and two individual items, which assess joint stiffness and family support. The format is a Likert scale with four response options for all items¹³.

The ample experience of the members of the expert committee in oncology and their proficiency in English were used in the formal evaluation of the two previously mentioned back translations, which was performed by comparing the two versions and by comparing both of these with the original instrument. The decision of the committee was to evaluate referential meaning (R) using scores of 0 to 100% in each question. Regarding general meaning (G), the decision was to rank each question in one of four categories: unaltered (UN), little altered (LA), much altered (MA) and completely altered (CA).

The committee evaluated the adequacy of structural modifications in some questions, in order to simplify phrasing and facilitate comprehension. All issues were exhaustively debated with the aim of achieving consensus. After all the alterations were made, the preliminary version was formulated and tested. During the first pre-test, the collection of results was by self-completion; during the second, an interview technique was adopted.

It is worth mentioning that the participants possessed clinical conditions that allowed them to respond adequately to the questions. This condition was evaluated based on the characteristics described by the Karnofsky Performance Index. Patients were interviewed at the time of initial hospitalization, so that hospitalization time could not be considered as a selection bias factor.

Testing was performed in two rounds of pre-testing in a convenience sample of 28 inpatients in a high-complexity oncology center in Rio de Janeiro. The pre-testing rounds were the foundation for further evaluation of recruitment strategies, scale structure and item comprehension assessment (Figure 1).

This study was approved by the Research Ethics Committee of the José Alencar Gomes da Silva National Cancer Institute and the approval number was 863.339. All respondents freely agreed to participate and signed an Informed Consent Form. All were approached on a timely basis in a manner that would not result in embarrassment in front of family members or other patients, and at a moment when they were not being submitted to any test or evaluation.

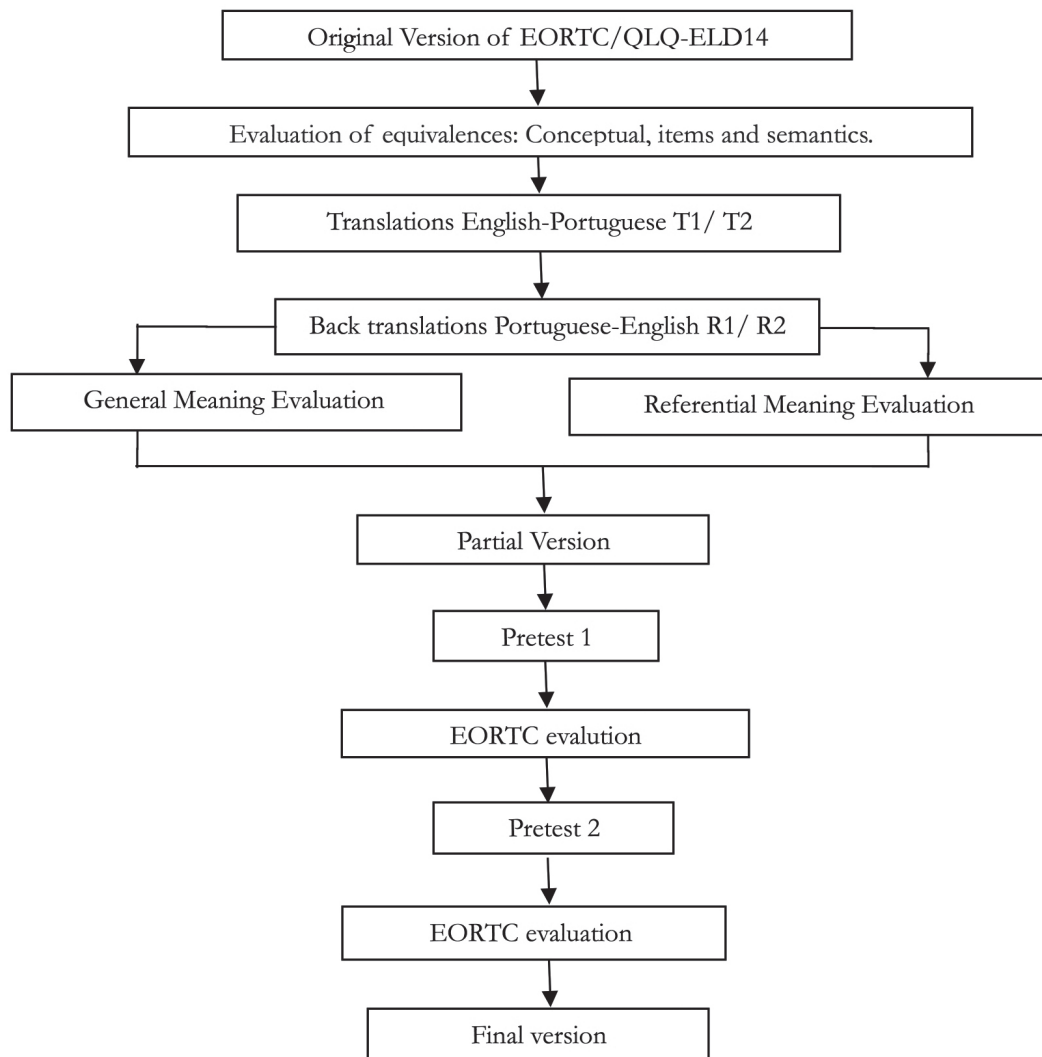


Figure 1. Stages of semantic equivalence of EORTC ELD 14 instrument for Brazilian Portuguese Rio de Janeiro, RJ, 2016.

RESULTS

Semantic equivalence evaluation is expressed from the results of two back translations and the respective general and referential meanings, as well as those of the original instrument (table 1).

In general, there was appropriate equivalence when the items of the two back-translations were compared with the original items. In most of the items, the referential meaning score was between 90 and 100%. The most striking dissimilarities between R1 and R2 were noted in item 10, where the referential meaning score in R1 was 60%, and it was found that there was a major change in item

meaning. The remaining items had good equivalence regarding general and referential meaning.

Table 2 shows the original items, the T1 and T2 translations into Portuguese and the preliminary Portuguese version. The expert committee analyzed the T1 and T2 versions and chose the one that was easier to understand and more accurately expressed the meaning of the original item. Alterations in the formulation of the preliminary version consisted in verb tense changes only. Items were re-written in the past simple, as opposed to the present perfect, in order to emphasize the time frame, which was the week before answering the questionnaire.

Table 1. Comparison between the original version (in English) and back translations of instrument QLQ-ELD14. Rio de Janeiro, RJ, 2016.

Item	Original	Translation 1 Back translation 1	General meaning	Referential meaning	Translation 2 Back translation 2	General meaning	Referential meaning
1	Have you had difficulty with steps or stairs?	Have you had difficulty with steps or stairs?	UN	100%	Have you had difficulty with steps or stairs?	UN	100%
2	Have you had trouble with your joints (e.g. stiffness, pain)?	Have you had problems with your joints (for example, stiffness or pain)?	UN	95%	Have you had problems in your joints (for example: stiffness, pain)	UN	95%
3	Did you feel unsteady on your feet?	Did you feel unsteady on your feet?	UN	100%	Did you ever miss balance?	LA	70%
4	Did you need help with household chores such as cleaning or shopping?	Have you needed help with the household chores, such as doing the cleaning or shopping?	UN	95%	Did you ever need help with your domestic activities such as, for example, cleaning or shopping?	UN	90%
5	Have you felt able to talk to your family about your illness?	Have you been able to talk to your family about your disease?	UN	95%	Have you felt comfortable to talk to your family about your illness?	LA	80%
6	Have you worried about your family coping with your illness and treatment?	Have you been worried about whether your family will handle your disease and treatment?	LA	90%	Have you worried about the way that your family will deal with your disease and treatment?	LA	80%
7	Have you worried about the future of people who are important to you?	Have you worried about the future of people who are important to you?	UN	100%	Have you worried about the future of people who are important to you?	UN	100%
8	Were you worried about your future health?	Were you worried about your future health?	UN	100%	Were you worried about your future health?	UN	100%
9	Did you feel uncertain about the future?	Did you feel uncertain about the future?	UN	100%	Were you worried about your future health?	IN	100%
10	Have you worried about what might happen towards the end of your life?	Have you been worried about what could happen in your life from now on?	MA	60%	Have you cared for what might happen at the end of your life?	IN	90%
11	Have you had a positive outlook on life in the last week?	Have you had a positive outlook on life in the last week?	UN	100%	Have you had a positive outlook on his life last week?	IN	95%
12	Have you felt motivated to continue with your normal hobbies and activities?	Have you been feeling motivated to continue with your usual hobbies and activities?	UN	95%	Have you felt motivated to continue with your activities and hobbies?	IN	95%

to be continued

Continued from Table 1

Item	Original	Translation 1 Back translation 1	General meaning	Referential meaning	Translation 2 Back translation 2	General meaning	Referential meaning
13	How much has your illness been a burden to you?	How much has your disease been a burden to you?	UN	95%	How much has your illness been a burden to you?	IN	100%
14	How much has your treatment been a burden to you?	How much has your treatment been a burden to you?	UN	100%	How much has your treatment been a burden to you?	IN	100%

UN: unaltered; MA: much altered; LA: little altered; CA: completely altered.

Table 2. Translation into Brazilian Portuguese and partial version of instrument. Rio de Janeiro, RJ, 2016.

Item	Original	Translation	Selected version	Partial Version
1	Have you had difficulty with steps or stairs?	(T1) Você tem tido dificuldade com degraus ou escadas? (T2) Você tem tido dificuldade com degraus ou escadas?	T1=T2	Você teve dificuldade com degraus ou escadas?
2	Have you had trouble with your joints (e.g. stiffness, pain)?	(T1) Você tem tido problemas com as articulações (por exemplo, rigidez, dor)? (T2) Você tem tido problemas com as articulações (por exemplo, rigidez, dor)?	T1=T2	Você teve problemas com as articulações (por exemplo, rigidez, dor)?
3	Did you feel unsteady on your feet?	(T1) Você já sentiu falta de equilíbrio? (T2) Você tem sentido falta de firmeza nas pernas?	T2	Você sentiu falta de firmeza nas pernas?
4	Did you need help with household chores such as cleaning or shopping?	(T1) Você já necessitou de ajuda com suas atividades domésticas como, por exemplo, limpeza ou compras? (T2) Você tem precisado de ajuda com as tarefas domésticas, como fazer a limpeza ou as compras?	T2	Você precisou de ajuda com as tarefas domésticas, como fazer a limpeza ou as compras?
5	Have you felt able to talk to your family about your illness?	(T1) Você se sente confortável para conversar com sua família sobre sua doença? (T2) Você tem se sentido capaz de falar com sua família sobre a sua doença?	T2	Você se sentiu capaz de falar com sua família sobre a sua doença?

to be continued

Continued from Table 2

Item	Original	Translation	Selected version	Partial Version
6	Have you worried about your family coping with your illness and treatment?	(T1) Você se preocupa com a forma que sua família lidará com sua doença e tratamento? (T2) Você tem se preocupado se a sua família vai conseguir lidar com sua doença e tratamento?	T2	Você ficou preocupado(a) imaginando se a sua família vai conseguir lidar com sua doença e tratamento?
7	Have you worried about the future of people who are important to you?	(T1) Você tem se preocupado com o futuro das pessoas que são importantes para você? (T2) Você tem se preocupado com o futuro das pessoas que são importantes para você?	T1=T2	Você ficou preocupado(a) com o futuro das pessoas que são importantes para você?
8	Were you worried about your future health?	(T1) Você está preocupado com sua saúde futura? (T2) Você estava preocupada(o) com sua saúde no futuro?	T2	Você ficou preocupado(a) com sua saúde no futuro?
9	Did you feel uncertain about the future?	(T1) Você já sentiu incerteza sobre o futuro? (T2) Você está insegura(o) sobre o futuro?	T2	Você se sentiu inseguro(a) sobre o futuro?
10	Have you worried about what might happen towards the end of your life?	(T1) Você tem se preocupado com o que pode acontecer daqui para diante em sua vida? (T2) Você se preocupa em o que poderá acontecer no final de sua vida?	T2	Você se preocupou com o que poderá acontecer no final de sua vida?
11	Have you had a positive outlook on life in the last week?	(T1) Você teve uma visão positiva sobre a sua vida na semana passada? (T2) Você tem olhado a vida com otimismo nesta última semana?	T2	Você olhou a vida com otimismo nesta última semana?
12	Have you felt motivated to continue with your normal hobbies and activities?	(T1) Você se sente motivado a continuar com suas atividades e hobbies? (T2) Você tem se sentido motivado(o) para continuar com seus passatempos e atividades normais?	T2	Você se sentiu motivado(a) para continuar com seus passatempos e atividades normais?
13	How much has your illness been a burden to you?	(T1) O quanto sua doença tem sido um fardo pra você? (T2) O quanto a sua doença tem sido um peso para você?	T2	O quanto a sua doença foi um peso para você?
14	How much has your treatment been a burden to you?	(T1) O quanto o seu tratamento tem sido um fardo para você? (T2) O quanto o seu tratamento tem sido um peso para você?	T2	O quanto o seu tratamento foi um peso para você?

In the first round of pre-testing, 12 patients answered the questionnaire, with the aim of evaluating general aspects regarding acceptance by the target population, difficulties in patient recruitment and phrasing comprehension.

Firstly, we asked the patients to complete the questionnaire by themselves, with no help from family members or friends. The mean questionnaire completion time was 5 minutes and 34 seconds in the first round of pre-testing. Most respondents were female (58.3%). Regarding educational level, 33.3% had less than eight years of primary education, 25% had completed primary education only, 16.6% had completed secondary education; and 16.6% had no schooling. Oncological treatment intent was palliative in 58.33% of cases and curative among 41.66% of individuals.

In the original questionnaire, there are two sentences with instructions to respondents, which were translated literally. The third sentence was about circling the best option in each item, and was omitted since it did not apply to the interview format used to fill the questionnaire (differing from the initial recommendation of the EORTC). This decision was made as, during pilot testing, it was observed that it was very difficult for respondents with less schooling and/or visual or writing issues to complete the questionnaire by themselves.

It should be noted that, in the beginning, the general ease of understanding of some items was impaired, requiring the paraphrasing and explanation of each item of the partial version.

In the first round of pre-testing there were serious issues in comprehension in most (11) of the items, with items 2 and 4 the most troublesome.

In item 1, to have “difficulty” with steps and stairs was not clearly understood and explanation about the difficulty being related to climbing steps or stairs was required. This was altered before the second round of pre-testing.

In item 2, less literate patients had difficulties understanding the word “joint” (in Portuguese, “articulação”), even after using synonyms, and in some cases, even after giving examples. As joint

symptoms occur frequently in older people in general we considered that researchers should exercise caution regarding the comprehension of less literate people when using this item.

In item 4 the patient is asked about the need for assistance when doing housework, which was troublesome to those who had been hospitalized for longer periods of time. Additionally, some understood that mobility issues were inevitable during their stay in the hospital and spontaneously answered based on their capacity to perform housework before hospital admission.

The Portuguese version of Item 5 was “did you feel capable of talking to your family about your disease?”, but often required explanation, as “Do you feel you could you talk to your family about your disease?”. The expert committee altered this to “were you able to talk to your family about your disease?”, which was well understood in the second round of pre-testing.

In item 6 there was some difficulty with the word “coping” (in Portuguese, “lidar”), so the expert committee substituted this with “reagir”, which is more colloquial and maintained the original meaning of the sentence.

In item 9, we noticed that “uncertain” (“inseguro(a)”) was poorly understood among less literate respondents, so the committee changed it to “fear” (“medo”).

Item 10 was well understood but some patients became emotional and even worried when thinking about the future. We feel this is an issue of which researchers should be aware.

In item 11, the T2 translation “Did you have an optimistic approach to life recently?” entailed confusion regarding the meaning of the word “optimism”, so that explanation was often needed. Thus, the expert committee chose to use the T1 translation, “Did you have a positive outlook on life in the last week?”, which was equivalent to the original phrasing of the original item.

In item 12, “hobbies and activities” was substituted with a more colloquial expression, “things that you like to do”, aiming at greater comprehension among the respondents.

In items 13 and 14, “burden” was poorly understood by a minority of less literate participants, apparently due to its abstract connotation. On the other hand, some patients observed that the treatment had indeed been hard, but not to the extent that they felt it was a “burden”, which they considered to be applicable only in extreme circumstances. These people felt that the item did not offer an appropriate option for them to express how they felt. In most cases, though, the item was understood, and thus the expression “burden” was maintained.

Items 3, 7 and 8 were easily understood and remained unchanged.

After the first round of pre-testing the expert committee re-evaluated the questionnaire, having made the necessary alterations and changes to the general structure of the scale. The minor changes in

some terms allowed greater objectivity and, a more colloquial style, resulting in greater comprehension and acceptability of the instrument.

We performed a second round of pre-testing with 16 patients to evaluate item comprehension. Table 3 shows the similar characteristics of respondents participating in rounds 1 and 2. One foreign participant was excluded for experiencing difficulty with cultural and conceptual issues. The sample was then reduced to 16 volunteers, with a mean age of 65 years and a mean test answering time of 6 minutes and 13 seconds. This was also a convenience sample, and most participants were female (62.5%). As in the first sample a significant number of patients had a level of schooling of below primary (37.5%) (Table 3). Most of the patients were undergoing palliative treatment.

Table 3: Socio-demographic and clinical characteristics between pretest 1 and pretest 2. Rio de Janeiro. RJ. 2016.

Variable	Pretest 1 (n=12) Mean (+dp)	Pretest 2 (n=16) Mean (+dp)	<i>p</i> value*
Age	69.1 (±7.96)	65.0 (±6.54)	0.47
Interview Duration	5min01s (±1min36s)	5min15s (±1min43s)	0.89
Variable	N (%)	N (%)	
Sex			
Male	07 (58.33)	10 (62.5)	0.56
Female	05 (41.66)	06 (37.5)	
Skin color/Ethnicity			
White (Caucasian)	04 (33.33)	05 (31.25)	0.88
Black (Afro-Brazilian)	06 (50.00)	09 (56.25)	
Yellow (Asian-Brazilian)	02 (16.66)	02 (12.5)	
Literacy			
Illiterate	02 (16.66)	01(6.25)	0.84
Primary School	07 (58.33)	09 (56.25)	
High School	02 (16.66)	03 (18.75)	
Higher education (complete)	01 (8.33)	03 (18.75)	
Marital Status			
Single	03 (25)	04 (25)	0.83
Married	04 (33.33)	07 (43.75)	
Widower	04 (33.33)	03 (18.75)	
Divorced	01 (8.33)	02 (12.5)	
Therapeutics			
Curative	05 (41.66)	07 (43.75)	0.92
Palliative	07 (58.33)	09 (56.25)	

**p* value was calculated from Fisher's exact test (categorical variable) and Mann Whitney test (continuous variable)

In the second round, after the alterations made by the committee, the items were easily understood and the previously noted comprehension issues were resolved, although attention should be paid to items 2 and 4 when applying the questionnaire.

When specifically asked whether any item was offensive or uncomfortable to answer at the end of the interview, all the patients said no. However, it was observed that some were moved by the questions, especially in items about worries about

the future, family support and death. Examiners should therefore be attentive and offer appropriate support when needed.

The evaluation performed after the second round of pre-testing was that the instrument was easily understood regarding semantics, the structure was appropriate and that the interview format should be used in the Brazilian population. The final version of the instrument is seen on Table 4.

Table 4: Final version - EORTC QLQ-ELD14. Rio de Janeiro, Brasil, 2016.

Às vezes os pacientes relatam que têm os seguintes sintomas ou problemas. Por favor, indique o quanto cada um desses sintomas ou problemas esteve presente durante a última semana.

Item	Durante a última semana:	Nada	Um pouco	Moderadamente	Muito
1	Você teve dificuldade para subir ou descer degraus ou escadas?	1	2	3	4
2	Você teve problemas nas articulações/dobras/juntas, por exemplo, dificuldade em mexer ou dor?	1	2	3	4
3	Você sentiu falta de firmeza nas pernas?	1	2	3	4
4	Você precisa de ajuda com as tarefas domésticas, como fazer a limpeza ou as compras?	1	2	3	4
5	Você conseguiu conversar com sua família sobre a sua doença?	1	2	3	4
6	Você ficou preocupado/a em como sua família vai reagir à sua doença e ao seu tratamento?	1	2	3	4
7	Você ficou preocupado/a com o futuro das pessoas que são importantes para você?	1	2	3	4
Item	Durante a última semana:	Nada	Um pouco	Moderadamente	Muito
8	Você ficou preocupado/a com sua saúde no futuro?	1	2	3	4
9	Você teve medo do que pode acontecer no futuro?	1	2	3	4
10	Você ficou preocupado/a com o que pode acontecer no final da sua vida?	1	2	3	4
11	Você teve uma visão positiva sobre a vida na semana passada?	1	2	3	4
12	Você teve vontade de fazer as coisas que você gosta?	1	2	3	4
13	O quanto a sua doença foi um peso para você?	1	2	3	4
14	O quanto o seu tratamento foi um peso para você?	1	2	3	4

DISCUSSION

The importance and impact of cancer on older people have been widely emphasized in scientific publications, and in the last two decades quality of life has become a fundamental issue in

cancer treatment^{17,18}. The lack of research studies, however, represents a lack of proper attention to cancer among older populations¹⁸.

Quality of life has been a focus of interest in scientific research in recent years, especially regarding older people with chronic diseases. A

significant number of scales and questionnaires aiming at evaluating quality of life have been developed and used. There are general instruments, appropriate for assessing a number of health problems, and specific instruments, designed to evaluate aspects that are exclusive to selected diseases and/or treatments^{19,20}.

Furthermore, health-related quality of life assessment is as important as routine clinical evaluation²¹. Older cancer patients are often treated with non-curative intent and may be vulnerable to the toxic side effects of treatment¹⁹. Quality of life assessment is helpful in adequately balancing treatment benefits and side effects, providing the instrument used in the evaluation is valid and reliable^{13,19}.

Some studies have already investigated quality of life evaluation among this specific population. Wedding et al.¹⁹ offers a brief review, concluding that many studies about older people with cancer have used questionnaires not specifically designed for this population, resulting in possible bias in their findings.

The use of quality of life instruments in older people with cancer is not usually preceded by a conceptual evaluation of the relevance of the domains assessed in this population. Some issues remain a challenge, such as the underrepresentation of older people in clinical trials, the proper validation of quality of life instruments, the use of these instruments in methodologically rigorous research, and the homogeneous definitions of at what age people are considered “older”^{5,22}.

Some studies suggest the use of a more specific tool, the Comprehensive Geriatric Assessment (CGA), to estimate life expectancy, tolerance to treatment and the identification of factors that potentially interfere with cancer treatment, such as depression, malnutrition, anemia, neutropenia and a lack of support to caregivers, all of which potentially diminish quality of life in this population^{6,17,21,22}.

Di Maio and Perrone²³ state that good quality of life should be a primary goal in cancer treatment, but that this assessment may be hindered by illiteracy, lower resilience, limited acceptance of the questionnaires used, comorbidities and the use of non-validated instruments among the older population.

Thus, the present study describes the first step in the cross-cultural adaptation of the EORTC QLQ-ELD14 to Brazilian Portuguese. We identified the characteristics of the study population, especially those related to the quality of life of older people with cancer, which is the purpose of the study.

Some difficulties were experienced during the study, most of which related to the characteristics of the study population. The original instrument¹⁴ was self-applied by the respondents but in the population of the present study, medical and schooling characteristics were an obstacle to the self-completion of the questionnaire. We concluded that this instrument should be used in an interview format in Brazilian patients. Despite this, the study was well accepted by the respondents, which allowed the investigation to be performed in accordance with EORTC guidelines. It is important to emphasize that, regarding the manner of use of the questionnaire, the EORTC does not determine values for the evaluation of quality of life as adequate or inadequate. It is recommended, however, that the instrument is used longitudinally, so that, despite the lack of a cut-off point, it is possible to evaluate the evolution of the quality of life of patients.

One limitation of the study is that the field of research was a reference institute, the population of which does not correspond to the general population. However, considering the diversity of patients, it is possible to say that the sample does correspond to the target population of the questionnaire, precisely because it is a reference institute. Moreover, it is worth remembering that the main concern of studies of semantic equivalence is internal validity, that is, the consistency of the findings in the investigated group. Thus, the undertaking of the study in an institute that does not represent the general population (because it provides care to more serious or rare cancer cases than do general hospitals) does not compromise the validity of the study. Thus, the EORTC QLQ-ELD14 instrument adapted to Brazilian Portuguese aims to help professionals by improving the quality of healthcare research and, more specifically, research into the quality of life of older people with cancer.

CONCLUSION

It is considered that the present study achieved its established objectives, insofar as the stages of the conceptual equivalence of items and operational semantics were performed, together with the subsequent pre-test for the cross-cultural adaptation of the QLQ-ELD14 instrument to the

The Brazilian version of the EORTC QLQ-ELD14 is promising. Psychometric evaluation of the reliability and validity of this instrument

is currently being performed to complement the cross-cultural adaptation of this questionnaire to Brazilian Portuguese.

Quality of life evaluation is useful as a strong indicator of survival, and for allowing discussion with the patient about issues raised by the questionnaire. This reflection may help multi-professional healthcare teams to better assess the burden of symptoms and their relative importance, and consequently to better plan and modify treatment strategies.

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Impact of the diagnosis of diabetes and/or hypertension on healthy food consumption indicators: a longitudinal study of elderly persons

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Abstract

Objective: to evaluate if the prevalence of healthy food consumption indicators among elderly persons with the self-reported diagnosis of diabetes *mellitus* and/or systemic arterial hypertension (DM and/or SAH) improved after diagnosis of these diseases, and to compare if the prevalence of such indicators was more frequent among elderly persons with DM and/or SAH than in elderly persons without these diseases. **Method:** a longitudinal study of 1,197 elderly persons aged 60-104 years, living in Florianópolis, Santa Catarina, Brazil, was performed, considering as an outcome the self-reported diagnosis of diabetes and/or hypertension. Healthy consumption indicators (exposures) were considered the maintenance and/or acquisition of the intake of fruit and vegetables ≥ 3 and ≥ 2 times/day, respectively, the consumption of fatty meat < 2 times/week, and fried foods < 2 times/week. Data was analyzed in terms of absolute and relative frequencies, and Poisson Regression was used to obtain the crude and adjusted prevalence of food consumption indicators. Values of $p \leq 0.05$ were considered statistically significant. **Results:** when comparing the prevalences of the indicators of healthy food consumption among elderly persons with DM and/or SAH with those without these diseases, it was observed that only the consumption of fried foods changed positively between the periods 2009-2010 and 2013-2014. This result was statistically significant only for women, with maintaining/acquiring the infrequent consumption of fried foods (< 2 times/week) 8.2% higher among elderly women with DM and/or SAH, $p = 0.043$. **Conclusion:** The prevalence of healthy food consumption indicators was low and there was almost no difference between older adults with and without DM and/or SAH.

Keywords: Older adults.
Food Consumption. Diabetes Mellitus. Hypertension.
Longitudinal Study.

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INTRODUCTION

Chronic noncommunicable diseases (CNCDs) such as diabetes mellitus (DM) and systemic arterial hypertension (SAH) have been identified as the main causes of death and disability among the elderly. Globally, it is estimated that 25% of elderly persons are carriers of DM and that half have SAH^{1,2}. In Brazil, a time series survey, the Pesquisa Nacional por Amostras de Domicílios (the National Household Sampling Survey) (PNAD), based on a representative sample of around 40,000 elderly people, identified a significant increase in the prevalence of self-reported DM (from 10% to 16%) and SAH (from 44% to 53%)³. These values, although high, are less severe than high-income countries such as the USA, where the prevalence of DM and SAH among the elderly is estimated at 21.1% and 70.8%, respectively⁴.

Due to their chronic nature and the severity of complications, the treatment of these diseases does not only include intervention with medication, but above all, lifestyle modification⁵. In addition to regular physical activity, the avoidance of tobacco and alcohol use, and weight control, the World Health Organization (WHO)^{5,6} emphasizes the importance of the adoption of healthy eating habits (a greater consumption of fruits and vegetables, and lower consumption of sodium, sugars and saturated fats) as an important means of controlling these CNCDs and their secondary complications for health.

Although literature, mainly international⁶⁻⁸, emphasizes the importance of adopting healthy eating habits as one of the most effective means of secondary prevention of DM and SAH, there is still little information in Brazil about the dietary habits of elderly persons with these diseases through population studies⁹.

Considering the importance of this type of information for health planning, especially in middle-income countries such as Brazil, where CNCDs are responsible for the majority of the spending of the country's public health system on medicines and hospitalizations¹⁰, the primary objective of the present study was to estimate the prevalence of indicators of healthy and unhealthy

food consumption among elderly persons living in southern Brazil, comparing those with and without the self-reported diagnosis of DM and/or SAH. The main aims of this study were to evaluate whether the prevalence of healthy food consumption indicators among elderly men and women with self-reported diagnosis of DM and/or SAH improved following the diagnosis of these diseases, and to compare whether the prevalence of these indicators was more frequent among elderly persons with DM and/or SAH than among elderly persons without these diseases.

METHODS

A prospective, population-based and home-based cohort study was carried out, the research sample of which consisted of elderly individuals aged 60 years or older residing in Florianópolis, Santa Catarina, in the south of Brazil. The study is part of a comprehensive longitudinal survey entitled EpiFloripa Idoso (EpiFloripa Elderly) (<http://www.epifloripa.ufsc.br>).

EpiFloripa Elderly began in 2009-2010 (baseline) with the objective of examining the living and health conditions of a representative sample of the elderly population of Florianópolis. The initial survey included non-institutionalized elderly people living in the urban area of the city, a population group that represented approximately 10.8% of the total population of Florianópolis in that year (44,460 elderly persons, 18,844 of whom were men and 25,616 of whom were women). In 2013-2014, with the aim of continuing the investigation, the second phase of the study was carried out.

The sample size of EpiFloripa Elderly at base line was calculated to estimate the prevalence of each health outcome investigated in the survey, considering 44,460 elderly individuals aged 60 years or older as a reference population in 2009, a 95% confidence level, a 50% prevalence of unknown outcomes, a sampling error of 4.0 percentage points, a design effect (deff) of 2.0 (due to conglomerate sampling) and an estimated percentage of losses of 20%. Considering also the multiple objectives of the study and the need

for adjustment for possible confounding factors, the sample size was increased by a further 15%, resulting in a minimum sample of 1,599 individuals.

The sample selection process was carried out by the clustering method in two stages. In the first stage, all 420 urban census tracts in Florianópolis were placed in increasing order of the average monthly income of the head of the family (R\$314.76 to R\$5,057.77), allowing 80 of these sectors to be systematically drawn (eight in each income decile). The units of the second stage were households. To select these, the number of private households inhabited in each unit was first updated, as the registration of households in each sector dates to the year 2000 (the last census conducted before the study). After the recount (amplitude of 61-725 households per sector), sectors with less than 150 households were grouped, while those with more than 500 households were divided in two, considering their respective income deciles. This procedure resulted in 83 census tracts and reduced the initial coefficient of variation from 52.7% to 35.2%. Next, 60 households were randomly selected by census tract, with all the elderly persons residing in the households being considered eligible (an estimated average of one elderly person in every three households or 102 persons per census tract).

In 2009-2010, all the elderly persons living in the randomly selected households were invited to participate in the study ($n=1,911$). Losses were considered elderly persons who were not located after four visits (with at least one visit at night and one visit at the weekend), and refusals those who refused to answer the questionnaire, resulting in a final sample of 1,705 elderly persons interviewed at baseline.

The second stage of EpiFloripa Elderly was carried out in 2013-2014. In this phase, all the elderly interviewed in 2009-2010 were considered eligible for a new interview. Hospitalized elderly persons, those who had moved from the city and those who were not located after four attempts (at least one visit at night and one at the weekend) were considered to be losses. Individuals who refused to answer the questionnaire by personal choice were considered refusals. The final sample resulted in 1,197 elderly people interviewed in the second phase of the study.

It is noteworthy that in both study phases the interview could be answered by a caregiver and/or family member in cases where the elderly person was identified as suffering cognitive impairment. However, in the present study, such elderly persons were excluded from the data analysis stage ($n=49$), to avoid the occurrence of information bias.

With respect to data collection, in both phases of the study the interviews were carried out by a team trained in home interviews, and the questionnaires used were pretested. Control of the consistency and quality of the weekly data was also performed, with key questions repeated by telephone among a random sample of 10% of the respondents in both 2009-2010 and 2013-2014. Kappa values for all quality control questions ranged from 0.5-0.9 in both phases of the study.

The dependent variable was established based on the following questionnaire questions: "Has any doctor or health professional ever told you that you have diabetes?"; "Has any doctor or health professional ever said that you have hypertension (high blood pressure)?". Yes and no answers were accepted. The answers of both questions were grouped, thus establishing the outcome variable: self-reported diagnosis of DM and/or SAH, categorized as yes or no. This variable refers to the self-reporting of a CNCD made by the participant at the baseline of the EpiFloripa Elderly study in 2009-2010.

The independent variables, meanwhile, (i.e. the indicators of healthy or unhealthy food consumption) were collected by the EpiFloripa Elderly study in 2009-2010 and in 2013-2014, using the same food questionnaire used in the national study *Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* (Surveillance of Risk and Protection Factors for Chronic Diseases by Telephone Inquiry) (VIGITEL). This instrument includes questions about the daily and weekly frequency of the consumption of food, such as fruit, vegetable, fatty meat/chicken and fried foods¹¹. Monteiro et al.¹² also reported in a study that the indicators of food consumption used by the VIGITEL survey are reproducible (Kappa between 0.6-0.8) and comparable to three 24-hour recalls, thus

achieving satisfactory validity for the majority of the indicators evaluated (sensitivity and specificity of approximately 80% for indicators of unhealthy food consumption and 42-80% for indicators of healthy food consumption).

From the questions of the food frequency questionnaire, polytomous variables indicative of changes or otherwise in food consumption between the 2009-2010 and 2013-2014 phases were determined. As an indicator of healthy food consumption, a daily dietary intake of fruit (≥ 3 times/day) and vegetables (≥ 2 times/day) was considered. A positive diagnosis for this variable refers to the consumption of fruit and vegetables on each of the seven days of the week and at the above mentioned frequency (≥ 3 times/day for fruit and ≥ 2 times/day for vegetables)^{5,13}. Therefore, this variable was categorized as: maintained consumption of < 3 times/day for fruit and < 2 times/day for vegetables between phases, reduced consumption to < 3 times/day for fruit and < 2 times/day for vegetables between phases, maintained consumption of ≥ 3 times/day for fruit and ≥ 2 times/day for vegetables between phases, and, increased consumption to ≥ 3 times/day for fruit and ≥ 2 times/day for vegetables between phases.

Polytomous variables indicative of unhealthy food consumption were also determined. The regular consumption of fatty meat (both red fatty meat and fatty chicken) and the regular consumption of fried foods (foods considered sources of saturated fat) were considered as the consumption of unhealthy food^{5,13}. A negative diagnosis of each of these two variables was determined as consumption ≥ 2 times/week. Therefore, both variables were categorized as: maintained consumption at ≥ 2 times/week between phases, increased consumption to ≥ 2 times / week between phases, maintained consumption at < 2 times/week between phases, reduced consumption to < 2 times/week between phases.

Finally, a scale of indicators of healthy food consumption was created based on the three variables established above. On this scale, one point was assigned for the maintenance and/or acquisition of a daily food intake of fruit and vegetables (≥ 3 and ≥ 2 times/day, respectively), one point was given for

the maintenance and/or acquisition of the infrequent consumption of fatty meats (< 2 times/week), and one point was given for the maintenance and/or acquisition of the infrequent food consumption of fried foods (< 2 times/week). Thus, a scale of zero to three points was established, where zero represented no indicators of healthy food consumption, and three represented all the indicators of healthy food consumption. The scale was established by considering the positive changes in food consumption indicators between the baseline and the second phase of the study in the construction of the variables (healthy food consumption associated with a lower risk of CNCs or the health complications arising from the same)^{5,13}.

Demographic and socioeconomic variables such as age (60-69, 70-79, ≥ 80 years), self-reported skin color (White/Caucasian, Black/Afro-Brazilian, Yellow/Asian-Brazilian and indigenous), schooling (0-8, 9-11, ≥ 12 years) and monthly family income per capita (in 2013-2014, upper tercile: $> R\$2000.00$, intermediate tercile: $\leq R\$2000.00$ to $> R\$ 774.00$, lower tercile: $\leq R\$774.00$), were used in the present study as confounding variables.

To describe the characteristics of the sample, descriptive analyzes were performed, presenting the results in absolute and relative frequencies with their respective 95% confidence intervals (95% CI). The chi-squared test with Rao-Scott correction was used in these analyzes.

Poisson regression was used to obtain the crude and adjusted prevalence of food consumption indicators among elderly persons with and without the self-reported diagnosis of DM and/or SAH. Demographic and socioeconomic variables that presented a p-value < 0.20 in the bivariate association analysis were included in the adjusted analysis as possible confounding factors. The analyzes were further stratified according to gender, assuming that this variable may exert an important modifying effect on the associations between CNC status and food consumption^{14,15}. The level of statistical significance adopted in all analyzes was $p \leq 0.05$.

The EpiFloripa Elderly study was approved by the Ethics Committee for Human Research of the Universidade Federal de Santa Catarina (Santa

Catarina Federal University) (protocol n° 352/2008 at base line and CAAE n° 16731313.0.0000.0121 for the second phase) and all the participants signed a Free and Informed Consent Form. No conflict of interest was declared.

RESULTS

A total of 1,705 elderly persons were interviewed at the baseline of the EpiFloripa Elderly study in 2009-2010. Of these, 1,197 elderly people were located and interviewed again in 2013-2014 (70.2% of baseline respondents). Between the first and second phases of the study (Table 1), there was no selective lost to follow-up, except for the age variable, a fact explained by the aging of the population evaluated and the

high number of deaths in the sample (n=217) (not shown in the table).

Regarding the characteristics of the study participants, Table 2 shows that in both phases, women presented a higher percentage of self-reported diagnosis of DM and/or SAH than men ($p < 0.001$). In addition, data in this table shows that the majority of respondents did not reach the recommended frequency of daily consumption of fruit and vegetables (≥ 3 and ≥ 2 times/day, respectively). Furthermore, the percentage of men and women that consumed or began to consume fatty meat and fried foods with a frequency ≥ 2 times/week between 2009-2010 and 2013-2014 was high ($p=0.031$ and $p < 0.001$, respectively).

Table 1. Description of characteristics of sample of EpiFloripa Elderly survey, comparing baseline interviews in 2009-2010 and those in the second phase of the study in 2013-2014. Florianópolis, Santa Catarina, Brazil, 2014.

Variables	Baseline 2009-1020		2nd phase 2013-2014		Value- <i>p</i>
	n	% (IC95%)	n	% (IC95%)	
Gender					0.469
Male	614	36.1 (32.4 - 40.1)	419	36.9 (33.6 - 40.3)	
Female	1088	63.9 (60.9 - 66.7)	778	63.1 (59.7 - 66.4)	
Age (years)					<0.001
60 to 69	841	49.6 (46.2 - 53.0)	412	34.4 (29.9 - 39.3)	
70 to 79	615	36.3 (32.5 - 40.2)	509	42.5 (38.1 - 46.9)	
≥ 80	239	14.1 (10.1 - 19.3)	276	23.1 (18.3 - 28.6)	
Self-reported skin color					<0.001
White/Caucasian	1441	85.5 (83.6 - 87.3)	980	85.9 (83.6 - 88.0)	
Brown/Mixed-race	131	7.8 (3.7 - 13.6)	100	8.8 (4.2 - 16.4)	
Black/Afro-Brazilian, Yellow/Asian-Brazilian and indigenous	113	6.7 (3.1 - 13.5)	60	5.3 (1.0 - 13.9)	
Schooling (years of study)					0.021
12 or more	386	23.4 (19.2 - 27.9)	287	23.9 (19.2 - 29.4)	
9 to 11	231	14.0 (9.7 - 18.9)	181	15.1 (10.1 - 20.9)	
0 to 8	1031	62.6 (59.5 - 65.5)	729	60.9 (57.3 - 64.5)	
Per capita family income					0.421
Upper tercile	552	33.3 (29.4 - 37.4)	399	33.4 (28.7 - 38.2)	
Intermediate tercile	550	33.2 (29.3 - 37.4)	416	34.8 (30.3 - 39.7)	
Lower tercile	554	33.5 (29.5 - 37.5)	381	31.9 (27.1 - 36.7)	
Self-reported diagnosis of DM and/or SAH					<0.001
No	614	36.1 (32.4 - 40.1)	360	30.1 (25.3 - 35.0)	
Yes	1088	63.9 (60.9 - 66.7)	836	69.9 (66.7 - 72.9)	

p-value of Chi-squared test; CI95%: Confidence interval of 95%; n: absolute frequency; %: relative frequency; DM: diabetes mellitus; SAH: systemic arterial hypertension.

Table 2. Description of sample characteristics related to chronic diseases (diabetes mellitus and/or systemic arterial hypertension) and changes in food consumption indicators between 2009-2010 and 2013-2014, stratified by gender (EpiFloripa Elderly survey 2009-2010 and 2013-2014). Florianópolis, Santa Catarina, Brazil, 2014.

Variables	Men		Women		Value-p
	n	% (IC95%)	n	% (IC95%)	
Self-reported diagnosis of DM and/or SAH 2009-2010 (n=1702)*					<0.001
No	277	45.1 (41.2 - 49.1)	337	30.9 (28.2 - 33.7)	
Yes	337	54.9 (50.9 - 58.8)	751	69.1 (66.3 - 71.8)	
Self-reported diagnosis of DM and/or SAH 2013-2014 (n=1197)					<0.001
No	198	48.0 (42.4 - 53.7)	241	31.8 (27.8 - 35.8)	
Yes	221	52.0 (46.3 - 57.6)	537	68.2 (64.1 - 72.1)	
Changes in daily consumption of fruit (≥3 times/day) and vegetables (≥2 times/day) (n=1193) **					0.154
(≥2 vezes/dia) (n=1193)**					
Maintained consumption at <3 for fruit and <2 for vegetables	341	79.0 (73.7 - 83.5)	550	71.9 (67.5 - 76.9)	
Reduced consumption to <3 for fruit and <2 for vegetables	23	6.4 (4.4 - 9.3)	67	7.6 (5.5 - 10.4)	
Maintained consumption at ≥3 for fruit and ≥2 for vegetables	10	3.3 (1.3 - 7.9)	42	5.8 (4.0 - 8.3)	
Increased consumption to ≥3 for fruit and ≥2 for vegetables	44	11.3 (7.9 - 15.7)	116	14.7 (11.5 - 18.6)	
Changes in the consumption of fatty meat (times/week) (n=1194)***					0.031
Maintained consumption at ≥2	98	22.8 (17.0 - 29.9)	98	13.6 (8.5 - 21.0)	
Increased consumption to ≥2	61	19.1 (12.8 - 27.5)	141	19.8 (14.5 - 26.4)	
Maintained consumption at <2	169	42.1 (33.7 - 50.8)	361	46.5 (38.2 - 55.0)	
Reduced consumption to <2	90	16.1 (12.0 - 21.2)	176	20.1 (15.1 - 26.3)	
Changes in the consumption of fried foods (times/week) (n=1194) *					<0.001
Maintained consumption at ≥2	74	16.5 (12.6 - 21.4)	64	7.4 (5.4 - 10.1)	
Increased consumption to ≥2	39	9.5 (6.3 - 14.2)	63	7.1 (5.4 - 9.3)	
Maintained consumption at <2	192	48.9 (41.8 - 56.1)	495	66.5 (61.4 - 71.1)	
Reduced consumption to <2	113	25.0 (19.8 - 31.0)	154	19.0 (15.6 - 22.9)	

%; prevalence of food consumption indicators; CI95%: Confidence interval of 95%; p-value of Chi-squared test; * Variables with data ignored; ** Seven days/week consumption; *** Includes the consumption of fat of red meat fat and chicken skin; DM: diabetes mellitus; SAH: systemic arterial hypertension.

Table 3, meanwhile, shows the changes that occurred in the food consumption indicators of the sample, comparing participants with and without the self-reported diagnosis of DM and/or SAH. Regarding the consumption of fruits and vegetables, the results show that regardless of the diagnosis of DM and/or SAH, most of the sample did not consume fruit or vegetables at the recommended daily frequency, and the percentage

of elderly persons who consumed or began to consume fatty meat two or more times a week was high. Despite their relevance, it should be noted that these results were not statistically significant. Contrastingly, the percentage of elderly persons with DM and/or SAH who stopped consuming fried foods regularly (≥2 times/week) was 21.9% (95% CI: 17.8-26.1), while 6.2% (95% CI, 4.1-8.3) acquired this habit (p=0.018).

Table 3. Description of changes in food consumption indicators between 2009-2010 and 2013-2014, stratified according to chronic disease status (diabetes mellitus and/or systemic arterial hypertension) (EpiFloripa Elderly Study 2009-2010 and 2013-2014). Florianópolis, Santa Catarina, Brazil, 2014.

Variables of change in food consumption between 2009-2010 and 2013-2014 phases	Without DM and/or SAH		With DM and/or SAH		Value- <i>p</i>
	n	% (IC95%)	n	% (IC95%)	
Changes in daily consumption of fruit (≥ 3 times/day) and vegetables (≥ 2 times/day) (n=1193) **					0.184
Maintained consumption at < 3 for fruit and < 2 for vegetables	334	78.2 (73.7 - 82.7)	557	72.2 (68.4 - 76.1)	
Reduced consumption to < 3 for fruit and < 2 for vegetables	27	5.8 (3.5 - 8.0)	63	8.1 (5.1 - 11.0)	
Maintained consumption at ≥ 3 for fruit and ≥ 2 for vegetables	16	3.2 (1.6 - 4.9)	36	5.9 (2.8 - 8.9)	
Increased consumption to ≥ 3 for fruit and ≥ 2 for vegetables	61	12.8 (8.8 - 16.7)	99	13.8 (10.5 - 17.2)	
Changes in the consumption of fatty meat (times/week) (n=1194) ***					0.669
Maintained consumption at ≥ 2	79	18.7 (12.3 - 25.1)	117	15.9 (10.6 - 21.2)	
Increased consumption to ≥ 2	73	19.2 (13.0 - 24.7)	129	19.7 (13.3 - 26.1)	
Maintained consumption at < 2	191	43.2 (34.4 - 52.1)	339	45.9 (37.7 - 54.1)	
Reduced consumption to < 2	95	18.9 (13.1 - 24.7)	171	18.5 (13.9 - 23.1)	
Changes in the consumption of fried foods (times/week) (n=1194) *					0.018
Maintained consumption at ≥ 2	65	12.8 (8.8 - 17.0)	73	9.5 (6.9 - 12.2)	
Increased consumption to ≥ 2	45	10.9 (7.2 - 14.7)	57	6.2 (4.1 - 8.3)	
Maintained consumption at < 2	234	56.2 (48.6 - 63.7)	453	62.3 (57.5 - 67.2)	
Reduced consumption to < 2	94	20.0 (15.5 - 24.6)	173	21.9 (17.8 - 26.1)	

%; prevalence of food consumption indicators; CI95%: confidence interval of 95%; p-value of Chi-squared test; * Variables with data ignored; ** Seven days/week consumption; *** Includes consumption of red meat fat and chicken skin; DM: diabetes mellitus; SAH: systemic arterial hypertension.

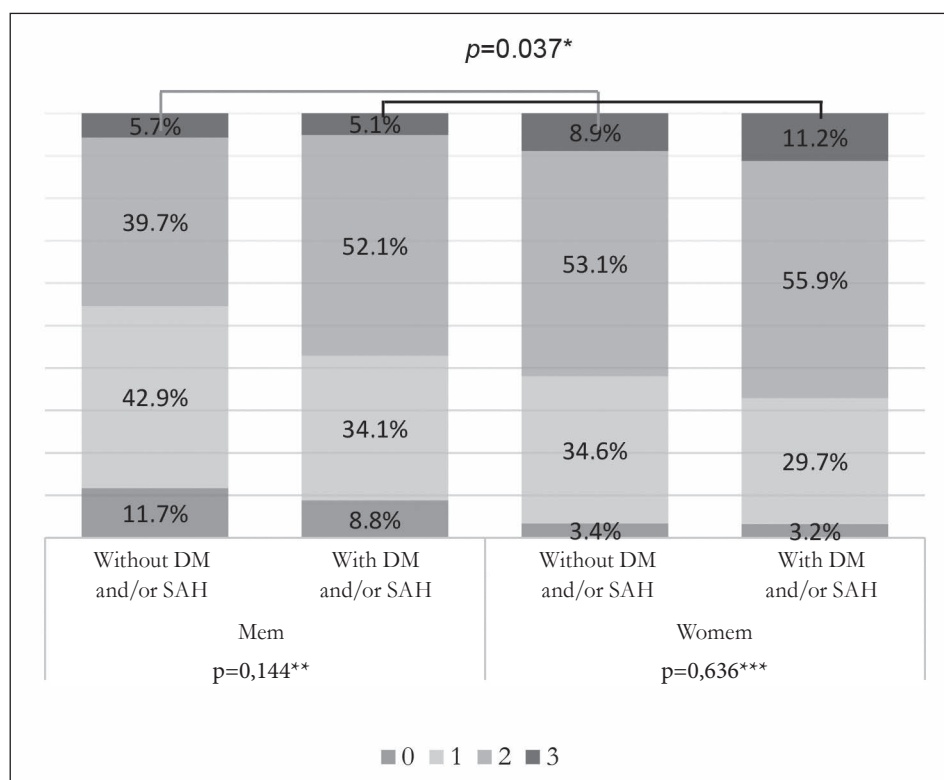
Table 4 shows the results of the crude and adjusted associations between the food consumption indicators and chronic disease status. In men, in both the crude and the adjusted analysis, the maintenance and/or acquisition of a healthy food consumption of fruits and vegetables, fatty meat and fried foods was more prevalent among elderly persons with DM and/or SAH than among elderly persons without such diseases. However, the differences between these groups were not statistically significant. Among women the maintenance and/or acquisition of the infrequent consumption of fried food (< 2 times/week) in the adjusted analysis was 8.2% higher among those with DM and/or SAH than among elderly persons without these diseases ($p=0.043$). However, none of the results found were statistically significant.

Finally, Figure 1 shows the healthy food consumption indicator scale. Irrespective of gender and self-reported DM and/or SAH, only a small percentage of the elderly persons reported all the indicators of healthy food consumption evaluated in both study phases (8.6% of the sample, 95% CI 6.5-10.7, $p=0.037$, data not shown in the figure). The majority of the elderly persons reported only one or two indicators of healthy food consumption. A higher percentage of men without DM and/or SAH maintained and/or acquired healthy food consumption (5.7%) than those with these diseases (5.1%). Meanwhile, elderly women diagnosed with DM and/or SAH exhibited a higher percentage of the maintenance and/or acquisition of a healthy food intake in both phases of the study (11.2%).

Table 4. Crude and adjusted prevalence of consumption of healthy food among elderly persons with and without self-reported diagnosis of diabetes mellitus and/or systemic arterial hypertension, stratified according to gender (EpiFloripa Elderly study 2009-2010 and 2013-2014). Florianópolis, Santa Catarina, Brazil, 2014.

	Type of analysis	Men			Women			Value-p
		Without DM and/or SAH (n=198) % (IC95%)	With DM and/or SAH (n=220) % (IC95%)	Value-p	Without DM and/or SAH (n=240) % (IC95%)	With DM and/or SAH (n=535) % (IC95%)		
Maintenance and/or acquisition of daily consumption of fruit (≥3 times/day) and vegetables (≥2 times/day)**	Crude	13.9 (8.9 - 19.0)	15.1 (8.1 - 22.2)	0.777	17.9 (12.0 - 23.7)	21.8 (17.3 - 26.2)	0.282	
	Adjusted*	12.8 (7.8 - 17.7)	13.8 (7.7 - 19.8)	0.802	16.5 (11.3 - 21.8)	23.0 (18.3 - 27.7)	0.079	
Maintenance and/or acquisition of infrequent consumption of fatty meat (<2 times/week)***	Crude	56.1 (45.9 - 66.2)	60.1 (49.5 - 70.6)	0.472	67.4 (56.7 - 78.1)	66.3 (57.2 - 75.4)	0.829	
	Adjusted*	55.8 (45.0 - 66.5)	60.3 (50.1 - 70.6)	0.430	68.9 (57.5 - 80.4)	65.6 (56.9 - 74.4)	0.510	
Maintenance and/or acquisition of infrequent consumption of fried foods (<2 times/week)	Crude	69.3 (61.2 - 77.4)	78.2 (72.5 - 84.0)	0.105	82.3 (77.0 - 87.7)	86.9 (84.1 - 89.7)	0.134	
	Adjusted*	68.4 (60.4 - 76.3)	78.0 (72.3 - 83.7)	0.080	80.9 (75.3 - 86.6)	87.5 (85.0 - 90.1)	0.043	

%; prevalence of healthy food consumption indicators; CI95%: confidence interval of 95%; P-value of Poisson Regression test; *; Analysis adjusted for age, per capita family income, level of schooling and self-reported ethnicity/skin color; **Seven days/week consumption; *** *** Includes consumption of red meat fat and chicken skin; DM: diabetes mellitus; SAH: systemic arterial hypertension.



Points attributed: one point for maintenance and/or acquisition of daily food consumption of fruit and vegetables (≥ 3 times/day and ≥ 2 times/day, respectively), one point for the maintenance and/or acquisition of infrequent food consumption of fatty meat (< 2 times/week); and one point for the maintenance and/or acquisition of infrequent food consumption of fried foods (< 2 times/week). As such, 0=no indicators of healthy food consumption, and 3=all indicators of consumption of healthy food consumption. The three variables considered the maintenance or acquisition of healthy food consumption between baseline (2009-2010) and the second phase of the study (2013-2014). * p -value of Chi-squared test comparing indicators of healthy food consumption among participants of study with and without DM and/or SAH; ** p -value of Chi-squared test comparing the indicators of healthy food consumption of men with and without DM and/or SAH; *** p -value of Chi-squared test comparing the indicators of healthy food consumption of women with and without DM and/or SAH.

Figure 1. Scale of indicators of healthy food consumption among elderly persons with and without self-reported diagnosis of diabetes mellitus and/or systemic arterial hypertension (DM and/or SAH), stratified according to gender (EpiFloripa Elderly story 2009-2010 and 2013-2014. Florianópolis, Santa Catarina, Brazil, 2014).

DISCUSSION

The present study represents the first Brazilian longitudinal study to investigate healthy food consumption indicators among elderly people living in the community with and without the diagnosis of DM and/or SAH. The results revealed that after a three-year follow-up period elderly men and women with DM and/or SA did not generally modify their food consumption as a means of supporting the secondary treatment of these diseases. In addition, the results of the study showed that there were no statistically significant differences in the prevalence of food consumption indicators among elderly

persons with and without DM and/or SAH, except for the consumption of fried foods among women, thus corroborating previous results in literature^{8,9,16}.

In Brazil, a cross-sectional survey with representative data of elderly persons from 26 Brazilian state capitals ($n=5007$) showed that among participants with hypertension, eating habits that are harmful to health, such as the low consumption of fruits and vegetables and the high consumption of saturated fats and sodium, continued even after diagnosis of this disease⁹. A similar finding was also found in a longitudinal study in the United States,

where elderly persons also reported no change in their diet in terms of the consumption of saturated fats, fruit and vegetables after the diagnosis of diabetes⁸. Another longitudinal study in the United States, with data from the National Health and Nutrition Examination Survey (NHANES 2001-2006), found that 74.0% of participants with DM and/or SAH reported an inadequate regular dietary intake of fruits and vegetables, without any differences between participants with and without such CNCs in terms of adherence to a healthy lifestyle¹⁶.

These results are troubling, considering that studies show that a regular intake of fruits and vegetables and the infrequent consumption of foods that are sources of saturated fat can reduce both blood pressure levels and blood glucose levels¹⁶⁻²⁰. An example of this is the findings of the American Associations of Cardiology¹⁹ and Diabetes²⁰ which show a possibility of reduction of up to 3 to 6 mmHg in blood pressure, as well as an important reduction in insulin resistance (more than 40% in 20 years) following the adoption of healthy food consumption.

Despite this evidence, data from the Pesquisas de Orçamentos Familiares (Family Budget Surveys) survey in Brazil shows that in the last three decades there has been an excessive increase in the acquisition of food sources of saturated fat and refined sugar (300-400%), while the consumption of fruit and vegetables has remained below the recommended level (representing only 3.0% total dietary calories)²¹.

Considering this, and considering that studies in literature^{10,22} have associated these negative changes in food consumption patterns with the increase in the prevalence of other CNCs in Brazil, increasing attention has been paid to the health behavior of the population in recent decades. In 2011, to control and reduce the occurrence of chronic diseases, the Brazilian Ministry of Health launched the "Strategic Action Plan for Coping with Chronic Noncommunicable Diseases in Brazil, 2011-2022"²³. Three years later (in 2014), in a new Ministry of Health initiative, a new edition of the "Food Guide for the Brazilian Population"¹³ was published, aimed at promoting healthier dietary habits among the population and consequently the primary and secondary prevention of CNCs. This

is because CNCs do not only have harmful effects on the health of individuals, but have a major impact on the Brazilian public health system. It is estimated that in Brazil, CNCs represent an approximate annual cost of R\$3.8 billion for outpatient services and R\$3.7 billion for hospitalizations¹⁰.

As a result, changes in lifestyle are fundamental. However, it is necessary to consider that even in the face of the seriousness of the issue of CNCs, promoting changes in eating habits is not always an easy task. According to Viebig et al.²⁴, in Brazil, differences in gender, income and schooling are determining factors for the adoption of a balanced diet. These findings may help to explain to a large degree the results of the present study, which identified higher prevalences among women than men, as well as changes in indicators for the consumption of fried foods after adjustment for income and schooling. Another study carried out in the city of Florianópolis identified healthier eating habits among women than men²⁵. Although the findings of the aforementioned study are not directly comparable to those of the present study because the sample included only adults, the results of both studies seem to indicate a behavior of healthier eating among women (including those with DM and/or SAH), which probably begins when young and tends to continue until more advanced ages.

Despite the strengths of the present study, such as the longitudinal design that allowed changes in the food consumption indicators of elderly persons after diagnosis of DM and/or SAH to be identified, and the representative sample of the elderly population of Florianópolis, which guarantees the internal validity of the results, it is not free of limitations. One of these is the short three-year follow-up period of the sample, as well as the fact that a questionnaire was used to obtain food consumption data^{11,12}. As the sample features an elderly population, and considering that the food frequency questionnaire depends on the memory of the interviewee, it is not possible to disregard the possibility of memory bias in the study. However, to minimize this limitation, data collection was performed by interviewers trained to apply the instrument. Another limitation of the study related to food consumption data is the lack of analysis of other foods which are considered

to negatively affect the secondary prevention of the diseases investigated, such as ultra-processed products (foods high in refined sugar, sodium and saturated fat). Finally, as a further limitation of the study, there is the diagnosis of fruit and vegetable consumption as healthy at a frequency of ≥ 3 times/day for fruit and ≥ 2 times/day for vegetables, as an approximate representation of the recommendations of official bodies (≥ 3 servings/day for fruit and ≥ 2 servings/day for vegetables)^{5,13}.

CONCLUSION

In conclusion, the results of the present study revealed that the prevalence of healthy food consumption indicators among elderly persons

in Florianópolis with and without the diagnosis of diabetes mellitus and/or systemic arterial hypertension was low. Furthermore, the longitudinal investigation allowed the finding that there were no significant changes in dietary intake between the baseline and the second phase of the study. Considering that changes in lifestyle, especially in relation to eating habits, are a fundamental part of the secondary treatment of diseases such as diabetes and hypertension, it is recommended that more effective public health actions directed at individuals with chronic diseases are elaborated, involving both those responsible for public policies and professionals in different areas of health, with the aim of reaching this population more effectively, in order to improve the prognosis of these diseases and quality of life.

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Epidemiological, clinical and evolutionary aspects of tuberculosis among elderly patients of a university hospital in Belém, Pará

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Abstract

Objective: To evaluate the epidemiological, clinical and evolutionary aspects of tuberculosis in elderly patients of a university hospital in Belém, Pará. *Method:* A cross-sectional study was conducted in a university hospital, where 82 records of cases of tuberculosis in elderly patients were analyzed. The data was analyzed by applying the G-test, assuming a level of $\alpha=0.05$ (5%) and a value of $p=0.05$. *Results:* Most of the elderly patients were male (64.6%), aged 60-69 years, especially among men (64.2%). Most were new cases of tuberculosis (95.1%), with a pulmonary clinical form (75.6%), associated diseases (69.5%) and a length of stay exceeding 21 days. Fever (67.1%), dyspnea (64.6%), weight loss (61.0%), productive cough (59.8%), chest pain (51.2%) were the main signs and symptoms. Regarding treatment, there was a high percentage of adverse reactions (50%), predominantly gastrointestinal events (70.7%). Most patients were cured (59.8%), but mortality from tuberculosis was considered high (15.9%). In terms of the exposure variables and outcome, there was a statistically significant difference for the age group ($p=0.017$), length of stay ($p=0.000$) and adverse reactions ($p=0.018$) only. *Conclusion:* The clinical presentation and therapeutic management of tuberculosis among the elderly has characteristics peculiar to this group, making it important to strengthen strategies that facilitate early identification of suspected cases of TB among elderly persons in the community, which should take place mainly through the primary care system.

Keywords: Elderly.
Tuberculosis. Diagnosis.
Drug Therapy Combination.

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INTRODUCTION

Tuberculosis is an infectious disease transmitted predominantly through the air. The evolution of the disease is chronic, affecting mainly the lungs, and its etiological agent is the *Mycobacterium tuberculosis* (MT) bacterial species. According to the World Health Organization (WHO), it is estimated that a third of the world's population is infected with MT, with more than eight million new cases and three million deaths from the disease every year¹.

Brazil reported 68,000 new cases of tuberculosis in 2014. This high incidence puts the country in 16th position among the 22 countries with a high disease burden, in terms of number of cases. There were around 4,600 deaths caused by tuberculosis in 2013, and it remains the third highest cause of death due to infectious diseases and the number one cause of death among infectious diseases in AIDS patients².

In Brazil, demographic and subsequent epidemiological transition has occurred in an atypical form, characterized by the reemergence or constant presence of infectious and parasitic diseases, as well as by the higher prevalence of non-transmissible chronic diseases and disorders³.

In this context, the loss of cellular immune reactivity to MT often occurs among the elderly, making them more vulnerable to both exogenous infection and the reactivation of foci containing latent bacilli⁴.

In addition, the symptoms of the disease are difficult to measure among the elderly due to the frequent concomitance of respiratory, cardiovascular and systemic diseases, which present a similar clinical picture, combined with the difficulty elderly persons experience in reporting complaints due to memory deficit, confused states, senility and problems with verbalization, which results in delayed diagnosis⁵.

The treatment of tuberculosis demonstrates the same efficacy among elderly and young people, and with the correct and timely use of medication, a cure can be expected in both groups. However,

there are peculiarities inherent to the elderly, such as memory deficit, polypharmacy and the frequent occurrences of adverse effects in this population group. It is therefore essential that treatment is supervised to enable the early detection of adverse effects, guarantee the intake of medication and consequently increase indicators of cures⁶.

The objective of the present study was to evaluate the epidemiological, clinical and evolutionary aspects of tuberculosis among the elderly.

METHOD

An epidemiological cross-sectional study was performed. The research was carried out in a university hospital in Belém, Pará, Brazil, using records of cases of tuberculosis diagnosed from 2009 to 2013. As a complementary form of obtaining data, the database of the Sistema Nacional de Agravos de Notificação (the National System of Notifiable Diseases) (SINAN) and the Secretaria de Estado de Saúde Pública (the State Public Health Department) (SESPA) were consulted.

The following inclusion criteria were adopted: aged 60 years or older, represent a new case or recurrence or re-admission after the cessation of treatment for pulmonary or extrapulmonary tuberculosis, and having started treatment at the institution where the survey was performed. Incomplete medical records were defined as exclusion criteria, as was the closure of the case due to a change in diagnosis.

A total of 2,458 cases of tuberculosis were reported at the institution where the study was carried out during the study period, of which 148 involved hospitalized elderly persons. When the inclusion and exclusion criteria mentioned above were applied, a final sample of 82 elderly people was defined and had their medical records analyzed.

Data collection was performed by the nurse who coordinated the study and a previously trained and supervised nursing student, through the application of a research instrument on the medical records

of the patients diagnosed with tuberculosis, and a search for the evolution of the cases in SINAN.

The data collection instrument was based on the terminology used by SINAN and was previously tested on 15 medical records (three for each year of the study). The variables studied were socio-demographic data (age, gender, level of schooling and municipality of origin), epidemiological data (hospital stay, type of entry, clinical form of disease, associated diseases and use of medications), clinical signs and symptoms (adverse reaction to anti-tuberculosis drugs, post-discharge follow-up and outcome).

The data was analyzed through descriptive and analytical statistics, using the G-test, adopting a level of $\alpha=0.05$ (5%) and a $p\leq 0.05$ value, in order to identify the statistical significance in the differences between the categories of variables studied.

The study plan was approved by the Ethics Research Committee of the Núcleo de Medicina Tropical (Tropical Medicine Center)/Universidade Federal do Pará (Pará Federal University), under record n° 1.081.347. As the study used secondary data, the use of a Free and Informed Consent Form

(FICF) was not required, however, the use of the data was authorized by the institution.

RESULTS

There was a predominance of male patients among the 82 medical records evaluated. The mean age was 69.8 (± 7) years, with a concentration in the age range of 60-69 years in both genders, most notably among men. Most elderly persons had a complete or incomplete elementary education and came from Belém, Pará or its metropolitan area (Table 1).

Most of the patients were new tuberculosis cases, were not institutionalized and had pulmonary tuberculosis. There was a predominance of elderly individuals who reported having at least one associated disorder at the time of admission, with smoking, alcoholism, diabetes mellitus and hypertension most notable. It was found that the majority of the elderly persons used between one and four medications. The mean hospitalization time was 21.9 (± 15.9) days, with the period over 21 days predominating (Table 2).

Table 1. Sociodemographic data of elderly persons with tuberculosis, by gender (n=82). Belém, Pará, 2009-2013.

Variables	Male n (%)	Female n (%)	<i>p</i>
Gender	53 (64.6)	29 (35.4)	
Age range			0.009
60-69	34 (64.2)	13 (44.8)	
70-79	16 (30.2)	13 (44.8)	
80-89	3 (5.7)	0 (0.0)	
≥ 90	0 (0.0)	3 (10.3)	
Level of schooling			0.074
Illiterate	4 (7.5)	6 (20.7)	
Elementary complete/incomplete	37 (69.8)	19 (65.5)	
High school complete/incomplete	5 (9.4)	0 (0.0)	
Not recorded	7 (13.2)	4 (13.8)	
Municipality of origin			0.528
Belém/metropolitan area	38 (71.7)	23 (79.3)	
Countryside of state	14 (26.4)	6 (20.7)	
Other state	1 (1.9)	0 (0.0)	

Medical records of patients; *p* value ≤ 0.05 ; G test.

Table 2. Epidemiological data of elderly persons with tuberculosis (n=82). Belém, Pará, 2009-2013

Variables	n (%)
Type of entry	
New case	78 (95.1)
Relapse	3 (3.7)
Reentry after abandonment	1 (1.2)
Institutionalized*	
Yes	4 (4.9)
No	78 (95.1)
Clinical form	
Pulmonary	62 (75.6)
Pleural	10 (12.2)
Ganglionic	1 (1.2)
Bone	1 (1.2)
Peritoneal	1 (1.2)
Combination of forms **	7 (8.5)
Associated disorders***	
Yes	57 (69.5)
No	25 (30.5)
Disorders identified□	
Smoking	28 (49.1)
Alcoholism	21 (36.8)
<i>Diabetes Mellitus</i>	21 (36.8)
Arterial hypertension	20 (35.1)
AIDS	2 (3.5)
Number of medications □□	
≥5	22 (26.8)
1 to 4	57 (69.5)
None	3 (3.7)
Time of hospitalization (days)	
≤7	15 (18.3)
8-15	24 (29.3)
16-21	5 (6.1)
≥21	38 (46.3)

Medical records of patients; *Patients in prison, asylum, orphanage and psychiatric hospital; **Pulmonary and pleural (85.21%), pulmonary and ganglionic (14.29%); ***Reported, at time of admission, at least one associated disorder; □ Considering only those patients who presented at least one disease; □□ Medications during hospitalization.

The main signs and symptoms presented by the elderly persons with tuberculosis were fever, dyspnea, weight loss, productive coughing and chest pain (Table 3).

Half of the elderly persons presented an adverse reaction to the specific drug regimen, the most common of which were gastrointestinal manifestations. Few, however, needed to suspend

or replace their treatment regimen. A minority of the elderly persons with tuberculosis underwent Directly Observed Treatment (DOT) following discharge or sputum smear microscopy for treatment control. Regarding the outcome, more than half of the cases resulted in a cure, however, the high number of deaths specifically caused by tuberculosis is also noteworthy (Table 4).

Table 3. Clinical data of elderly persons with tuberculosis (n=82), Belém, Pará, 2009-2013.

Variables	n (%)
Signs and symptoms	
Fever	55 (67.1)
Dyspnea	53 (64.6)
Weight Loss	50 (61.0)
Productive cough	49 (59.8)
Chest pain	42 (51.2)
Fatigue	24 (29.3)
Dry cough	20 (24.4)
Hyporexia	19 (23.2)
Hemoptoic sputum	18 (22.0)
Sweating	8 (9.8)

Medical records of patients.

Table 4. Evolutionary data of the elderly with tuberculosis (n=82). Belém, Pará, 2009-2013.

Variables	n (%)
Adverse reaction	
Yes	41 (50.0)
No	41 (50.0)
Type of adverse reaction*	
Gastrointestinal manifestations	29 (70.7)
Neurological manifestations **	14 (34.1)
Rheumatological manifestations ***	11 (26.8)
Hepatotoxicity	10 (24.4)
Dermatological manifestations	9 (22.0)
Cardiovascular manifestations	3 (7.3)
Nephrotoxicity	1 (2.4)
Management of reaction	
Suspension of treatment	13 (31.7)
Replacement of therapeutic regimen	2 (4.9)
Post-discharge follow-up	
Directly Observed Treatment	23 (31.9)
Sputum smear microscopy	20 (50.0)
Final outcome	
Cure	49 (59.8)
Abandonment	2 (2.4)
Death due to tuberculosis	13 (15.9)
Death due to other causes	6 (7.3)
Transfer to another state	1 (1.2)
Multidrug-resistant tuberculosis	1 (1.2)
No information	10 (12.2)

Medical records of patients; *Considering only patients who exhibited an adverse reaction; ** Peripheral neuropathy, headache, insomnia, psychosis, convulsive crisis, disorientation, dizziness, paresthesia of the lower limbs and drowsiness; *** Joint pain, low back pain and neck pain; □ Hypotension and tachycardia.

Table 5. Exposure variables by outcome (n=62). Belém, Pará, 2009-2013.

Variables	Cure n (%)	Death by tuberculosis n (%)	* <i>p</i>
Age range			0.017
60-69	33 (67.3)	4 (30.8)	
70-79	14 (28.6)	6 (46.2)	
80-89	2 (4.1)	1 (7.7)	
≥90	0 (0.0)	2 (15.4)	
Gender			0.343
Male	31 (63.3)	10 (76.9)	
Female	18 (36.7)	3 (23.1)	
Time of hospitalization (days)			0.000
≤7	4 (8.2)	7 (53.8)	
8-15	18 (36.7)	0 (0.0)	
16-21	3 (6.1)	1 (7.7)	
>21	24 (49.0)	5 (38.5)	
Associated disorders			0.789
Yes	32 (65.3)	9 (69.2)	
No	17 (34.7)	4 (30.8)	
Adverse reaction			0.018
Yes	20 (40.8)	10 (76.9)	
No	29 (59.2)	3 (23.1)	
Directly observed treatment post-discharge			0.123
Yes	18 (36.7)	2 (15.4)	
No	31 (63.3)	11 (84.6)	

Medical records of patients; **p* value ≤0.05; G test.

In terms of the relationship between the exposure variables and the outcome, it was found that cure occurred more frequently among elderly persons in the 60-69 year age group, whereas death was more frequent in patients in the 70-79 year age range. This relationship was statistically significance. There was no statistical significance between the outcome and the variables gender, associated disorders and DOT. Patients who died due to tuberculosis had a shorter hospital stay (≤7 days) and an adverse reaction to the specific tuberculosis treatment regimen (Table 5).

DISCUSSION

The majority of the elderly persons were male, which can be explained by the fact that male subjects are less careful about their health, and are therefore more likely to require hospitalization⁷.

In addition, tuberculosis historically affects men more than women, across all age groups. According to Ministry of Health data, 66.8% of tuberculosis cases registered in 2014 involved men, a percentage very close to that found in this study².

These gender differences may be due to the greater presence of men in the labor market, their lower utilization of health services, and a higher prevalence of HIV infection, alcoholism and drug abuse, conditions that make them more vulnerable to infection and tuberculosis⁸.

In terms of age group, there was a predominance of elderly persons aged between 60-69 years, and the mean age was 69.8 (± 7) years. This is close to the findings of a study carried out in South Korea which had an average patient age of 72 years⁹.

In terms of the level of schooling, the majority of men and women had a complete or incomplete elementary education. In the case of tuberculosis, schooling is an extremely important factor, as illiteracy and a low level of education are more likely to be related to the abandonment of treatment, due to the more limited understanding and access of such individuals to information about the disease¹⁰.

Regarding the municipality of origin, the majority of elderly persons of both genders came from the metropolitan area of Belém, Pará. This was expected, considering that the largest number of cases of tuberculosis in the state are concentrated in this region. Tuberculosis, in general, is concentrated in urban centers, as its distribution influenced by factors such as land use extension, disordered population growth and the concentration of people in the peripheries¹¹.

The vast majority of the elderly patients were new cases, that is, they had never been treated for tuberculosis or had received such treatment for a period of up to 30 days. Previous treatment history is of fundamental importance, considering that retreatment of tuberculosis is one of the main risk factors associated with the development of drug resistance¹². In the present study, 95.1% of the elderly persons were new cases, which may explain the reduced percentage of drug resistance identified, which was only 1.2%.

Pulmonary tuberculosis was the predominant clinical form in 75.6% of the elderly persons studied, proportional to that reported in the literature for this age group⁶. Such a result was expected, given that the lung is the entry point for MT and that from there the bacillus can spread by contiguity (causing the pleural form), or by lymphatic (lymph node) or hematogenic (pleural, ganglionic and other extrapulmonary forms) routes, especially in cases of immunosuppression¹³, as in the case of the present study, in which extrapulmonary forms or a combination of forms were responsible for 24.4% of cases, notably pleural tuberculosis (12.2%).

Regarding the presence of disorders associated with tuberculosis, 69.5% of elderly persons reported having at least one such condition. Among the disorders identified were smoking, alcoholism, diabetes mellitus, hypertension and AIDS.

Smoking, specifically, has been found to more prevalent in patients with tuberculosis than among the general population, and may be associated with a higher rate of disease recurrence and with a longer sputum smear conversion period. The inhalation of smoke can alter the defense mechanisms of the respiratory system, thus reducing the concentration of blood oxygen, contributing to the increased severity of necrotizing lesions and slowing the cicatrization process, and so generate more extensive pulmonary sequelae¹⁴.

The problems related to alcohol consumption in the elderly are common yet little known, and as a result are described by some authors as an "invisible epidemic." Excessive alcohol consumption increases the chance of the development of adverse effects and hepatotoxicity, as well as being a factor that predisposes a treatment regimen to unfavorable results¹⁵.

The presence of Diabetes Mellitus predisposes an individual to tuberculosis infection, since hyperglycemia and insulin reduction interfere with immune response, acting directly on the cellular function of macrophages and lymphocytes and altering chemotactic function, phagocytosis and antigen presentation. While the clinical presentation of tuberculosis in diabetics is similar to that traditionally presented by the disease, the control of diabetes is often difficult, and the radiological image may appear atypical, making diagnosis difficult¹⁶.

In relation to the number of drugs used by the elderly, it was found that the majority used between one and four medications. However, a significant percentage (26.8%) used five or more drugs. According to the criteria of the Centro Ibero-Americano para a Terceira Idade (the Ibero-American Center for the Elderly) this number represents polypharmacy¹⁷. If the four drugs that make up the tuberculosis treatment regimen are taken into account, it can be considered that 96.7% of the elderly persons are employing polypharmacy.

The majority of the elderly persons were hospitalized for an average of around three weeks, with about one third of patients hospitalized for two weeks, which may reflect a slower response to antituberculostatic therapy in these patients, or the presence of underlying diseases requiring

compensation, such as diabetes mellitus, making hospitalization more prolonged. In addition, a long hospital stay is associated with the occurrence of hospital infection, which makes the elderly person more vulnerable and fragile due to their lower physiological capacity to overcome such conditions¹⁸.

Regarding clinical characteristics, the clinical manifestation most reported by the elderly was fever (67.1%). However, a study in Rio de Janeiro, comparing clinical manifestations of tuberculosis among the elderly and non-elderly, found that the presence of fever was more common among the latter (69.3%) than the former (55.4%) group⁵.

Dyspnoea was identified in 64.6% of the elderly, which represents a considerably higher percentage than the findings of another study which involved both this age group and the general population⁵. This result indicates that most of the elderly persons in the present study were hospitalized at a late stage of the disease and in a highly aggravated state.

Weight loss was reported by 61% of patients. Findings in literature on weight loss in elderly persons with tuberculosis are controversial. A study carried out in Rio de Janeiro, for example, identified this clinical manifestation in 79.1% of the elderly⁵. This can be associated with the duration and the extension of the disease, as these are proportional to weight loss¹.

The presence of productive cough (59.8%) was more prevalent than dry cough (24.3%), which confirms the late diagnosis of the elderly, considering that coughing, which becomes aggravated over time, can evolve into coughing with expectoration. However, it should also be considered that the high percentage of elderly persons with a history of smoking may mask the number of coughs resulting from tuberculosis.

Adverse reactions affected 50% of the elderly, as identified in a similar study carried out with pulmonary tuberculosis at the Instituto de Doenças do Tórax (Institute of Chest Diseases) of the Universidade Federal do Rio de Janeiro (Rio de Janeiro Federal University), where adverse reactions occurred in 45.9% of elderly persons¹⁹.

A systematic review that investigated risk factors for the development of adverse reactions to the treatment of tuberculosis in the period 1965 to 2012 identified that being aged over 60 years was one such risk factor, due to the elderly having a slower metabolism, caused by reduced enzyme activity, decreased hepatic clearance, and reduced availability of essential endogenous cofactors²⁰.

Gastrointestinal manifestations were observed in 70.7% of the elderly. Such manifestations are the most frequent adverse reactions to tuberculosis treatment and may be caused by rifampicin, isoniazid, pyrazinamide and ethambutol^{20,21}. In a study of tuberculosis patients, gastrointestinal effects were found to be related to elderly individuals, revealing that the treatment toxicity associated with the use of other continuous medications and the presence of comorbidities increased the frequency of adverse events in this age group²¹.

Neurological manifestations (peripheral neuropathy, headache, insomnia, psychosis, convulsive crisis, disorientation, dizziness, paresthesia of the lower limbs and somnolence) occurred in 34.1% of elderly persons who suffered an adverse effect. These manifestations are commonly related to the intake of isoniazid, with peripheral neuropathy the most frequent complaint, requiring the daily oral supplementation of pyridoxine (50 mg), especially in elderly individuals, aimed at minimizing polyneuropathy²².

Rheumatologic manifestations (joint pain, low back pain and neck pain) occurred in 26.8% of elderly patients who presented adverse reactions. Joint pains are considered minor side effects and, when unrelated to hyperuricemia, are often associated with the use of pyrazinamide, and less with the use of isoniazid, as pyrazinoic acid (the main metabolite of pyrazinamide) acts to inhibit the tubular secretion of uric acid, causing an increase in serum concentration, and consequently joint pain²⁰.

Rheumatologic manifestations resulting from adverse reactions should be carefully analyzed, however, so as not to confuse them with the predisposing conditions for this symptom, such as underlying diseases (arthritis, arthrosis and osteoporosis), lack of movement due to bed rest and advancing age.

Hepatotoxicity corresponded to 24.4% of adverse reactions. Literature supports this finding, as in a systematic review carried out on the subject, an age lower than 60-65 years was found to be a protection factor for the development of drug-induced hepatotoxicity²⁰.

According to the Ministry of Health classification, hepatotoxicity is a major adverse effect and may be caused by pyrazinamide, or more frequently, by isoniazid and rifampicin²¹. The incidence of hepatotoxicity induced by isoniazid or rifampicin in isolation is low (0.6% and almost zero, respectively), but increases by 2.7% when both drugs are combined²³. The high levels of alcoholism in this study may be one of the factors related to the development of hepatotoxicity in the elderly.

Temporary withdrawal from treatment is recommended when hepatic transaminase levels increase five times or more above normal, until the resolution of symptoms or the return to baseline liver enzyme levels, with the subsequent separate reintroduction of the drugs over a period of three days to one week, seeking to identify which drug was responsible for the adverse effect, and carry out its substitution⁶.

Despite the high percentage of elderly patients who exhibited adverse reactions, only 31.7% needed to discontinue treatment, and 4.9% had their treatment replaced by a special regimen, a result very similar to a study of the general population carried out in São Paulo, in which the modification of therapy due to adverse effects occurred in 3.7% of cases²³.

The need to discontinue treatment was not higher in the present study because the majority of adverse reactions were less severe (gastrointestinal). In these cases, interventions such as counseling, the rescheduling of the administering of medication, and the use of symptomatic medication are sufficient for the control of signals and symptoms^{21,23}.

The early detection of adverse reactions is of fundamental importance, and relatives and caregivers should be advised about the appearance of such reactions, especially in cases where the elderly person has difficulty with verbalization, the perception of symptoms or cognitive deficit.

Although post-discharge DOT was performed in 31.9% of the elderly, it should be applied to every such individual, as the memory deficit, polypharmacy and frequent occurrences of adverse effects among this population group require that treatment is supervised, as a form of early detection of adverse effects, the guarantee of medication intake and the subsequent increase of cure indicators⁶.

However, it should be considered that the supervision of the treatment of the elderly may have been delegated to the patient's family members or caregiver by the health professional, and in these cases, such individuals should be advised of the correct dose and times for drug administration, drug interaction, and adverse effects.

Sputum smear microscopy for the control of treatment was performed in only 50% of patients initially treated with bacilli. The monthly sputum smear is indispensable in the second, fourth and sixth months, being an important criterion for monitoring the effectiveness of treatment and consequent confirmation of a cure, the need to extend the treatment for another three months, or the suspicion of non-tuberculosis mycobacterial infection or drug resistance²¹.

Regarding treatment outcome, the majority of patients were cured (59.8%), and the abandonment rate was 2.4%. These results were considerably lower than the national average for the general population, which was 11.1% in 2013².

However, the high percentage of deaths due to tuberculosis (15.9%) should also be highlighted. This finding was similar to those of a study conducted in Rio de Janeiro, in which the proportion of deaths was much higher in the elderly group than among the non-elderly¹⁹.

When the age range was related to the outcomes, it was found that the highest proportion of cured cases were in the age group between 60-69 years, while those who died were in the age group of 70-79 years. This difference was statistically significant. A prospective cohort study of the period 1995-2004 showed that older patients with tuberculosis have a higher mortality rate, but this difference is minimized if diagnosed early and properly treated²⁴.

Regarding the relationship between hospitalization time and outcome, a statistically significant difference was found, with most of the patients who died from tuberculosis hospitalized for a period of up to seven days, indicating that these patients were in an aggravated state when hospitalized, as can be verified by the high percentage of elderly people with dyspnea.

Adverse reactions were more frequent in patients who died as a result of the disease than in those who were cured, and the difference between the two groups was statistically significant. This situation is possibly due to a more severe clinical condition, indicating the need for immediate intervention in these cases.

The main limitations of the study are that data collection was retrospective and documentary, which generated information bias, with the loss of some records. The characteristics of the association between comorbidities and illnesses and the phenomenon of polypharmacy represent a challenge for the management of tuberculosis in the elderly. Due to the reduced sample size, the results cannot be

generalized and should be interpreted with caution. Case control or large cohort studies are therefore needed to better understand the peculiarities of tuberculosis in this population.

CONCLUSION

The majority of the elderly patients were new cases, who suffered from pulmonary tuberculosis, were carrying bacilli, had illnesses and disorders associated with the disease, used polypharmacy, and were at an advanced stage of the disease. It is worth noting that a considerable percentage suffered adverse reactions, mainly gastrointestinal and neurological manifestations, however, discharge following a cure occurred in the majority of cases, despite the significant death rate due to tuberculosis.

Considering the above, it is important to strengthen strategies that allow the early identification of elderly persons suspected of tuberculosis in the community, which should occur mainly in the Primary Care system.

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Evaluation of risk factors that contribute to falls among the elderly

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Abstract

Objective: to determine the incidence of falls among the elderly population of the city of Barbacena in the state of Minas Gerais, together with causal factors, circumstances and major consequences. *Methods:* a cross-sectional study was performed through questionnaires applied to 206 patients over the age of 60, from November 2014 to February 2015 in the city of Barbacena, in the state of Minas Gerais. Risk factors related to falls were analyzed, as well as the incidence of falls and the consequences for the lives of elderly persons. The existence of a relationship between the reporting of falls and possible risk factors was determined by the Chi-squared and Fischer's exact tests as indicated. *Results:* an incidence of falls of 36.41% was observed among the elderly, 45.95% of which occurred outside the home. A total of 85.71% of respondents had previously suffered strokes and 39.78% were taking medication. Among elderly persons who have fallen and suffered fractures (18.67%), 50% had suffered strokes, 50% were suffering from chronic kidney disease, and 61.54% could not perform their activities of daily living after the fall. *Conclusion:* it was concluded that the incidence of falls among the elderly was 36.41%, while the most correlated factors were drug use, stroke victims and people with chronic kidney disease. Among those who suffered fractures, 61.54% failed to perform activities of daily living. Preventing falls is a public health concern, and simple changes can reduce its prevalence.

Keywords: Aged. Drug Evaluation. Fractures, Bone.

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INTRODUCTION

Aging is a natural, gradual and continuous process, which begins at birth and continues through every phase of life. The national policy for the elderly¹ (Law N°8.842) defines an elderly person as an individual aged 60 years or over. In Brazil, the number of people in this age group has risen sharply, characterizing the aging process that many other developing countries are also experiencing to a greater or lesser degree². This new Brazil needs to accept the challenge of caring for health, not merely dealing with disease, and supporting families so that this becomes possible^{2,3}. Among the problems of the elderly, falls are common events⁴, with multiple causes progressively increasing with age due to changes in gait, mechanisms of posture maintenance and muscle strength, which result in greater chances of stumbling and, consequently, falls^{5,6}. Falls are a significant event among the elderly, as they can lead to incapacity, injury and death. Their social cost is immense and becomes greater when the elderly person has reduced autonomy and independence or needs to be institutionalized⁷.

Falls are the sixth most common cause of death among the elderly and account for 70% of accidental deaths among those aged 75 years or more⁵. They therefore represent a major public health problem, as they can provoke fractures and trauma, as well as affecting the quality of life of the elderly due to psychosocial consequences, provoking feelings such as fear, frailty and lack of confidence, and often functioning as the beginning of the degeneration of the overall health profile of the elderly⁷⁻¹¹.

Due to the importance of understanding the profile of falls among the elderly and the need to implement health policies that minimize the morbidity and mortality of elderly people who suffer from these events, the present study aimed to investigate the incidence of falls among the elderly of the city of Barbacena, Minas Gerais, correlating them with causal factors, the circumstances in which they occur and their main consequences.

METHOD

The present study took the form of a cross-sectional observational analysis. The sample was selected by blocks based on the elderly residents in the area covered by the Estratégia da Saúde da Família (the Family Health Strategy) (ESF) of the Vilela Unidade Básica de Saúde (the Vilela Basic Health Unit) (UBS) in the city of Barbacena, Minas Gerais. This unit was chosen as it had a wider coverage of the elderly population (938) than the other UBS in the city. Elderly persons represented 14.43% of the overall population (6,500) covered by the Vilela UBS.

The UBS cited was duly informed about the study and gave permission for the survey to be performed, which involved a total of 14 Community Health Agents. The health agents from the ESF teams agreed to carry out the work and were trained by researchers regarding the correct application of the questionnaires during home visits, which occurred from November 2014 to February 2015.

They were advised that each item of the questionnaire should be put verbally by the community agents to the elderly persons or caregivers in a clear and easy to understand manner, using lay vocabulary. The answers were scored by the community health agents themselves in an assertive or dissertative manner, depending on the item in question.

Individuals older than 60 years were included in the study and, when there was some difficulty with communication and/or the memory of the elderly person, the companions or caregivers who were present at the moment of the survey were interviewed.

Those individuals under 60 years of age and those with memory and/or communication difficulties who were not accompanied by persons who could respond to the questionnaire were excluded from the study.

The questionnaire was developed by the researchers of this study and consisted of 14 questions adapted from previously validated questionnaires^{12,13} which included age, gender, occurrence of falls in the previous year, location of fall, occurrence of

fractures, number of fractures and their anatomical location, requirement of hospitalization due to the fall, the presence of difficulty or the impediment of performing daily activities after a fall, the use of medications, environmental risk factors and the presence of comorbidities associated with this phase of life. These questions were formulated to avoid technical vocabulary, using lay terms, to facilitate the understanding of the research participants. A cerebrovascular accident was referred to as a stroke, for example, to facilitate the understanding of the health agents who applied the questionnaire and the elderly persons or caregivers who responded. The questionnaires were applied following the signing of a Free and Informed Consent Form (FICF).

The sample size calculated for this study was 196 elderly persons, based on a population of 126,284 inhabitants counted in the Demographic Census of 2010¹⁴, and a maximum percentage of elderly persons of 15% of the population, with a confidence interval of 95% and a margin of error of 5%.

Frequency distributions were constructed and the mean, standard deviation and percentage were calculated for each variable. The existence of a relationship between the reports of falls and possible risk factors (comorbidities, drug use and

environmental factors) were assessed using the Chi-squared and Fischer's exact tests as indicated. Differences with a *p*-value less than or equal to 0.05 were considered significant.

The study was approved by the Ethics Research Committee of the Fundação Hospitalar do Estado de Minas Gerais (FHEMIG) (the Hospital Foundation of the State of Minas Gerais) under protocol number CAAE 30314514.8.0000.5156, on August 21, 2014.

RESULTS

After applying the questionnaires during the data collection period, information regarding 206 patients was obtained. Table 1 shows their sociodemographic characteristics. Of the interviews performed, 85.44% were answered by the elderly persons themselves while 14.56% were answered by their companions. In terms of the age of the patients enrolled in the study, it was observed that 45.66% of the patients were aged between 60 and 69 years old, 54.37% were between 70 and 98 years old, and the mean age of the elderly persons was 71.4 (± 7.5) years. With regard to gender and occupation, there was a predominance of women and retired elderly persons.

Table 1: Sociodemographic characteristics of elderly participants of study. Barbacena, Minas Gerais, 2015.

Characteristics Compared	No falls in previous year n (%)	Fall in previous year n (%)	X ² /F	<i>p</i>
Questionnaire answered by			2.80	0.094*
Elderly Person	116 (65.91)	60 (34.09)		
Companion	15 (50.00)	15 (50.00)		
Age Group (Years)			1.51	0.220*
60-69	64 (68.09)	30 (31.91)		
70-98	67 (59.82)	45 (40.18)		
Gender			3.12	0.078*
Female	84 (59.57)	57 (40.43)		
Male	47 (72.31)	18 (27.69)		
Occupation				0.713**
Retired	125 (63.13)	73 (36.87)		
Working	6 (75.00)	2 (25.00)		

* *p* value from Chi-squared test; ***p* value from Fisher's Exact Test.

Regarding the possible risk factors for the occurrence of falls, we evaluated the presence of comorbidities, the use of medications and environmental factors, such as the presence of steps and rugs, as well as whether the elderly person resided alone or not, as shown in Table 2.

Regarding the occurrence of falls in the previous year, the data showed that 36.41% of the elderly persons had suffered a fall. Of the elderly who had fallen, most had suffered only one fall. The

questionnaire applied also included where the fall occurred, with 45.95% of the elderly falling outside the home and 13.51% suffering falls both inside and outside the home. Among the elderly who fell at home, the places with the highest incidence of falls were: 21.95% in the bathroom, 19.51% in the external area of the house and 17.07% in the bedroom.

Regarding the consequences of falls, the first factor analyzed was the occurrence of fractures,

Table 2- Clinical, drug and environmental risk factor characteristics for falls among elderly persons. Barbacena, Minas Gerais, 2015.

Características Comparadas	No fall in previous year n (%)	Fall in previous year n (%)	X ² /F	p
Comorbidities				
Diabetes Mellitus	24 (53.33)	21 (43.67)	2.53	0.112*
Cerebrovascular accident	1 (14.29)	6 (85.71)		0.010**
Parkinson's	0 (00.00)	1 (100.0)		0.366**
Forgetfulness	16 (45.71)	19 (54.29)	5.70	0.017*
Hypertension	91 (59.48)	62 (40.52)	4.35	0.037*
Heart Attack	5 (45.45)	6 (54.55)		0.199**
Kidney disease	10 (55.56)	8 (44.44)	0.55	0.458*
Osteoporosis	24 (50.00)	24 (50.00)	4.99	0.025*
Arthrosis	30 (51.72)	28 (48.28)	4.91	0.027*
Arthritis	15 (48.39)	16 (51.61)	3.64	0.056*
Difficulty of movement	12 (33.33)	24 (63.67)	17.25	0.000*
Depression	20 (44.44)	25 (55.56)	9.12	0.003*
Visual impairment	40 (55.56)	32 (44.44)	3.09	0.079*
Use of medicines				
No	16 (84.21)	3 (15.79)		0.014**
Did not answer	6 (100.00)	0 (0.00)		
Yes	109 (60.22)	72 (39.78)		
Psychotropic drugs	34 (52.31)	31 (47.69)	7.28	0.026*
Hypoglycemic agents	23 (56.10)	18 (43.90)	1.24	0.265*
Antihypertensives	91 (59.87)	61 (40.13)	3.47	0.062*
Other Medications	55 (57.29)	41 (42.71)	3,08	0.079*
Environmental conditions				
Live alone	26 (66.67)	13 (33.33)	0.20	0.658*
Stairs				
None	46 (67.65)	22 (32.35)	2.10	0.552*
Up to 5	33 (67.35)	16 (32.65)		
6-10	28 (56.00)	22 (44.00)		
More than 10 steps	24 (61.54)	15 (38.46)		
Has rugs at home	46 (60.53)	30 (39.47)	0.49	0.484*

*p value from Chi-squared test; **p value from Fisher's Exact Test.

which affected 8.67% of the elderly. Regarding age, the study showed that the percentage of fractures in individuals aged 60-69 years was 23.33%, while among those aged 70-98 years it was 15.56%. As for gender, there was a higher incidence of falls among females, as shown in Table 3.

The clinical and environmental characteristics of the elderly patients who suffered fractures were also evaluated (Table 4). It was verified that those with frequent forgetfulness, followed by patients

with Diabetes Mellitus, visual disabilities and hypertension had a higher occurrence of fractures. It was also verified that 57.14% of the fractures occurred in the upper limbs, 28.57% in the lower limbs and the remainder in the pelvis or head (TBI). When asked about the environment where they suffered the fracture, the study showed that 20.00% of fractures occurred after falls suffered in the home, with the bedroom being the room where fractures occurred most frequently.

Table 3: Sociodemographic characteristics of elderly patients that suffered a fracture following a fall. Barbacena, Minas Gerais, 2015.

Characteristics Compared	No fracture n (%)	Fracture n (%)	X ² /F	<i>p</i>
Questionnaire answered by			2.66	0.103*
Elderly Person	51 (85.00)	9 (15.00)		
Companion	10 (66.67)	5 (33.33)		
Age Group (Years)			0.72	0.397*
60-69	23 (76.67)	7 (23.33)		
70-98	38 (84.44)	7 (15.54)		
Gender			0.06	0.803*
Female	46 (80.70)	11 (19.30)		
Male	15 (83.33)	3 (16.67)		
Occupation			1.33	0.249*
Retired	60 (82.19)	13 (17.81)		
Working	1 (50.00)	1 (50.00)		

* *p* value from Chi-squared test.

Another impact of falls evaluated in the study was the occurrence of hospitalization after the same. It was verified that 31.08% of patients who had fallen in the previous year were hospitalized as a result of the fall, with the majority being retired, male (44.44%) and

aged between 60 and 69 years (40%). Regarding the clinical, drug and environmental factors investigated, statistical significance was only found in patients with renal disease, who were associated with a 62.50% incidence of hospitalizations ($p=0.042$).

Table 4 - Clinical, drug and environmental risk factors for fractures among elderly persons after a fall. Barbacena, Minas Gerais, 2015.

Characteristics Compared	No fracture n (%)	Fracture n (%)	X ² /F	<i>p</i>
Comorbidities				
Diabetes Mellitus	24 (53.33)	21 (43.67)	2.53	0.112*
Stroke	3 (50)	3 (50)	4.22	0.040*
Parkinson's	1 (100)	0 (0)		1.000*

to be continued

continued from table 4

Forgetfulness	10 (52.63)	9 (47.37)	13.81	0.000*
Hypertension	53 (85.48)	9 (14.52)	4.06	0.044*
Heart Attack	5 (83.33)	1 (16.67)		1.000*
Kidney disease	4 (50)	4 (50)	5.79	0.016*
Osteoporosis	19 (79.17)	5 (20.83)	0.11	0.741*
Arthrosis	24 (85.71)	4 (14.29)	0.56	0.452*
Arthritis	12 (75)	4 (25)	0.54	0.464*
Difficulty of movement	19 (79.17)	5 (20.83)	0.11	0.741*
Depression	19 (76)	6 (24)	0.70	0.402*
Visual impairment	24 (75)	8 (25)	1.47	0.225*
Use of medicines			0.44	0.506*
No	2 (66.67)	1 (33.33)		
Yes	59 (81.94)	13 (18.06)		
Psychotropic drugs	26 (83.87)	5 (16.13)	0.22	0.636*
Hypoglycemic agents	15 (83.33)	3 (16.67)	0.06	0.803*
Antihypertensives	53 (86.89)	8 (13.11)	6.63	0.010*
Other Medications	30 (73.17)	11(26.83)	3.97	0.046*
Environmental conditions				
Live alone	10 (76.92)	3 (23.08)	0.20	0.654*
Stairs			2.09	0.554*
None	18 (81.82)	4 (18.18)		
Up to 5	12 (75)	4 (25)		
6-10	17 (77.27)	5 (22.73)		
More than 10 stairs	14 (93.33)	1 (6.67)		
Has rugs at home	26 (86.67)	4 (13.33)	0.94	0.333*

* *p* value from Chi-squared test.**Table 5** – General characteristics of patients in relation to daily activities following a fall. Barbacena, Minas Gerais, 2015.

Characteristics Compared	Following fall Stopped n (%)	Continued n (%)	Had difficulty n (%)	X ² /F	<i>p</i>
Questionnaire answered by				10.19	0.006*
Companion	6 (40)	3 (20)	6 (40)		
Elderly Person	7 (11.67)	37 (61.67)	16 (26.67)		
Stroke					0.003**
No	12 (17.39)	40 (57.97)	17 (24.64)		
Yes	1 (16.67)	0 (0)	5 (83.33)		
Arthrosis				7.60	0.022*
No	12 (25.53)	25 (53.19)	10 (21.28)		
Yes	1 (3.57)	15 (53.57)	12 (42.86)		
Difficulty Moving				11.29	0.004*
No	9 (17.65)	33 (64.71)	9 (17.65)		
Yes	4 (16.67)	7 (29.17)	13 (54.17)		

* *p* value from Chi-squared test; ***p* value from Fisher's Exact Test.

Regarding the impact of falls on the elderly in terms of the performance of their daily activities, 53.33% continued to perform their activities as they did prior to the fall, 29.33% began to present difficulties and 17.33% patients could no longer perform these activities. It was also verified that patients who reported having suffered a stroke, had arthrosis or had difficulty moving around, experienced problems performing daily activities after a fall more frequently than patients who did not suffer from these diseases, as shown in Table 5.

DISCUSSION

The occurrences of falls observed in the present study followed the patterns found in other studies performed in western countries. The incidence of falls of 36.41% was compatible with data found in Brazilian and non-Brazilian literature^{8,15,16}. In a cohort study performed in the city of São Paulo by Perracini and Ramos⁸, around 31.00% of elderly persons said they had fallen in the year before the survey. Similar values were found in other Brazilian and non-Brazilian studies, with the WHO also adopting a value of 30.00%¹⁷ as an estimate of falls in people over 65 years of age. It is worth noting that even in non-Brazilian studies, which generally adopt different ages as inclusion criterion for the elderly group, the results were equivalent.

The findings of the present study regarding the subdivision between female (68.45%) and male (31.55%), the mean age of the elderly interviewed (71.4 years) and the fact that the highest incidence of falls occurred among women (76.00%) were also verified in other works. According to a study carried out in the city of Ribeirão Preto by Fabricio et al.⁴, 66.00% of falls victims were female, while the average age of the elderly persons surveyed was 76 years and there was an incidence of falls among women of 66.00%. In several other studies, the variable of being a woman increased the occurrence of falls independently and significantly^{4,8,15,18,19}. The possible causes to explain this phenomenon may be related to the fact that the absolute number of elderly persons who fell was higher among elderly women, the greater physical frailty of women, the lower amount of lean mass and muscular strength compared to men of the same age⁸, the greater loss

of bone mass due to the reduction of estrogen²⁰, the greater occurrence of chronic diseases, as well as the greater involvement of women in domestic activities and their longer life expectancy. Contrary to expectations, in the present study there was no significant difference in gender in relation to fractures. This lack of significance may be related to the sample size, as the factors that contribute to fractures in women are relevant^{4,8,15,18,19,21}.

In terms of the impact of the neurological diseases evaluated on the incidence of falls, no statistically significant association was found between the incidence of Parkinson's and the occurrence of falls, a finding contrary to other studies²². The absence of this association is probably due to the sample, which included only one patient with the disease.

Studies indicate that the incidence of strokes increases with age, doubling with each decade of life from 55 years of age onwards. Among the complications that result from strokes are postural imbalance and depression, influencing elements of postural control and resulting in flaws in the process of sensory construction and the generation of motor responses²³. This explains the finding of a positive association with a previous history of strokes, referred to as such rather than cerebrovascular accidents in the applicable question, with 85.71% of patients having suffered falls in the last year, a significantly higher percentage than that found among the general population. The percentage found was similar to that observed in an Austrian study conducted by Homann et al.²² in which a prevalence of falls of 89% in patients with a previous history of strokes was recorded.

An association between frequent forgetfulness and the occurrence of falls was also found. Dementia, of which forgetfulness is an important component, is associated with a rate of falls of 60%^{22,24} which explains the association identified. Depression and dementia are two of the most recurrent diseases of geriatrics, as they frequently combine, with one even simulating the other, which can cause difficulties with diagnosis²⁴. A significant relationship was found between the occurrence of falls and patients who reported having depression. This association can be

explained by the incapacitation and subsequent functional decline observed in depressed elderly persons²⁵. It is worth mentioning that the association between falls and forgetfulness can also be explained by the frequent coexistence between depression and dementia. It is important to note that the rate of fractures was also higher in patients who self-reported frequent forgetfulness and depression. Falls were also more frequent in patients with osteoporosis, osteoarthritis and difficulty in movement. Falls are more frequent among those diagnosed with osteoporosis, since the presence of this pathology is associated with the female gender and advanced age²⁰. Contrary to expectations, the incidence of fractures in patients with osteoporosis was not higher. This is likely due to the sample size of the present study. As a fracture is a clinical consequence of osteoporosis, the occurrence of a fall would further favor the incidence of fractures in this group of patients, a finding presented in several studies²⁶.

No significant association was found between the previous occurrence of acute myocardial infarction (AMI), diabetes mellitus (DM), renal disease and visual impairment and the incidence of falls. Despite this, literature reports a higher incidence of falls in individuals with renal disease, especially those treated with hemodialysis²⁷.

When the occurrence of fractures was compared with the location of the falls, it was observed that most of the elderly persons who fell suffered fractures in the home (20.00%) and both indoors and outdoors (50.00%)²¹. Regarding the anatomical location, the majority of fractures were found in the upper limbs (57.14%), followed by the lower limbs (28.57%). This finding differs from that of a study by Hamra et al.²¹, in which there was a greater incidence of femoral fractures. Such a finding can be explained by the fact that the upper limbs, especially the wrist, provide support at the time of the fall and are more subject to the impact of the fall.

When the medication used by the elderly were analyzed, a significant difference was observed with the use of antihypertensive drugs. Such drugs can cause side effects such as postural hypotension, dizziness, the need to urinate more frequently,

among other effects, which can lead to falls and consequently fractures^{21,28-30}.

Another significant result was obtained in relation to the performance of daily activities after the fracture, which showed that the performance of such activities declined among the majority of individuals who suffered a fracture (61.54%). This finding contrasts with the study by Antes et al.¹⁹, which showed that among the elderly persons investigated, most maintained their performance of daily activities post-fall and post-fracture. It was observed that diseases that cause movement limitation and result in greater dependence on caregivers were more relevant in the study undertaken. After a fall, the highest percentage of elderly people who did not perform their daily activities were found in patients who had suffered a stroke and those with some previous movement difficulties²².

Regarding the sociodemographic characteristics of patients who were hospitalized after falls, it was observed that the incidence of hospitalization was higher in the group in which the questionnaire was answered by a companion. According to studies on the functional evaluation of elderly victims of falls and hospitalization, the observed decline in functional independence during the follow-up period when the elderly person was at home could be explained by family protectionism. In such situations, relatives perform such activities for the elderly person or request assistance from caregivers, believing the elderly person to be incapable of carrying out such activities themselves, or as a way of expressing enthusiasm and affection for the convalescent individual. It is believed that these factors can increase the probability of falls as they reduce the autonomy of the elderly, favoring the increase of hospitalization after the fall verified in the study³¹.

In terms of the clinical and medication related characteristics and the environmental risk factors related to the hospitalization of elderly patients who suffered falls, studies indicate that the main risk factors for falls in this population are related to functional limitation^{31,32}, a previous history of falls, increased age³³, muscle weakness³⁴, use

of psychotropic medications²⁹, environmental risks, the female gender^{4,8,15,18,19,21}, as well as visual impairment. Although the present study identified a greater occurrence of hospitalization due to falls in patients with renal disease, no studies were found in literature to verify this association. This fact may be justified, however, by chronic renal patients exhibiting systemic disorder characterized by anomalies of calcium, phosphorus, PTH and vitamin D in their metabolisms, which may cause skeletal changes³⁵.

CONCLUSION

The incidence of falls among the elderly in the present study was 36.41%, and the most correlated factors were medication use and being the victim of a stroke or a chronic kidney disease patient. Of those who suffered a fracture, 61.54% no longer performed their daily activities. The prevention of falls is therefore a public health concern and relatively simple changes can reduce the risk of their occurrence.

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Development of an application for mobile devices to identify the frailty phenotype among the elderly

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Abstract

Objective: to develop a mobile app to quickly and safely identify frailty syndrome features among the elderly. *Method:* a cross-sectional study was conducted. The application was developed for the Android platform in the Java programming language and XML markup. The study instrument was based on five frailty phenotype criteria. The tests were conducted with 20 elderly persons living in a long-term care facility. *Results:* the twenty elderly persons had a mean age of 76.55 (± 9.5) years. Thirteen were identified as frail, five were pre-frail and two were non-frail. The comparison of the results of the instruments of analysis coincided in the general evaluation of frailty and in the individual identification of the five criteria. *Conclusion:* the data suggests that the use of the application for the evaluation of frailty among the elderly was performed safely, with the advantage of quick access to allow the monitoring of the clinical status and prognosis of the patient.

Keywords: Software
Validation. Elderly. Frail
Elderly. Computer Systems.
Decision Making, Computer-
Assisted.

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INTRODUCTION

Frailty is a multifactorial geriatric clinical syndrome characterized by declining energy reserves, neuroendocrine dysregulation, impaired immune system functioning and decreased resistance to stressors¹.

The integration of these factors, coupled with the reduced self-regulation and homeostasis efficiency that is common in senescence, make the health of the elderly vulnerable². The interpretation and early diagnosis of indicators related to the physiological and pathological functional decline associated with aging should be prioritized to ensure a more effective intervention³.

New information technologies are constantly emerging, several of which have been integrated into the area of health. These instruments aim to increase access to health surveillance and clinical prediction data⁴. Thus, their use makes it possible to obtain indicators and create a population database for future epidemiological studies⁵, in addition to permitting the standardization of the data collected.

The development of an application arose as a strategy to introduce health professionals to the use of another instrument for measuring and diagnosing the health vulnerability of elderly individuals. Therefore, the objective of the present study was to develop an application for mobile devices in order to quickly and safely identify the characteristics of the syndrome of frailty among the elderly.

METHOD

A cross-sectional quantitative study was conducted of individuals aged over 60 years of age of both genders, who lived in a non-profit long-term care facility for the elderly (LTCFE). The initial population was composed of the 52 elderly persons residing in this LTCFE.

The study included elderly people who had lived in the LTCFE for more than six months; who did

not suffer from cognitive deficit, evaluated by the Mini Mental State Exam⁶; and who did not have permanent or temporary motor limitations that compromised the performance of walking tests (the use of walking stick or walker was allowed). The exclusion criteria were: localized loss of strength and aphasia due to severe cerebrovascular accident; severe impairments of speech motility; hearing loss or severe vision loss. All the elderly persons were approached and informed about the purpose and stages of the study.

After applying the eligibility criteria, 23 elderly persons were selected. Of these, two refused to perform some of the tests and one did not perform the hand grip test because of a fracture in the dominant upper limb. Therefore, the final sample of this study was composed of 20 elderly people. Data collection was carried out from March to October 2014.

The instrument of the study was based on the five criteria for the definition of the frailty phenotype described by Fried et al.¹: unintentional weight loss, self-reported fatigue, reduction of hand grip strength, low level of physical activity and reduction of gait speed. The researchers conducted the interviews personally with the volunteers, describing each test.

After data collection, four previously trained evaluators were divided into two pairs, one of which analyzed the data manually and the other used the application. The analyzes were performed independently and, if there were disagreements, the analysis was re-evaluated by a third evaluator. Data is presented as mean, standard deviation and relative and absolute frequency.

The study design was referred to the Ethics Committee for Human Research of the Universidade Estadual do Sudoeste da Bahia (the State University of the Southeast of Bahia), in accordance with National Health Council Resolution n° 466/12. It was approved under record n° 393.466. Data collection only began following approval. The volunteers were subjected to the study protocol after signing a Free and Informed Consent Form.

Analysis of printed questionnaire

The results were analyzed by the researchers based on predetermined cut-off points for each criterion. For non-intentional weight loss the criteria was weight loss of ≥ 4.5 kg or $\geq 5\%$ of body weight from the previous year, without dieting; fatigue was indicated by the answers always or almost always to two items of the Center for Epidemiological Study – Depression (CES-D)⁷, which asks about the reduction of energy when carrying out tasks during the previous week⁸; hand grip strength was evaluated by the average, in kilogram-force (kgf), of three consecutive measurements with a dynamometer, adjusted for gender and body mass index (BMI); gait speed was measured by the mean of three consecutive times (in seconds) required to walk 4.6 m in a flat location at usual pace, with the means adjusted by gender and height; weekly energy expenditure in physical exercises and in domestic activities was measured through the translated version of the Minnesota Leisure Time Physical Activity Questionnaire (MLTPAQ)⁹, consisting of 57 items, adapted from the original questionnaire of 63 items¹⁰, the cut-off was adjusted by gender: < 383 Kcal for men and < 270 Kcal for women.

The weekly energy expenditure calculation (WEE) used the specific metabolic equivalent of task (MET) of each activity. The evaluator consulted the individual MET score for each self-reported task described in the compendium of physical

activity¹¹. As such WEE (kcal/min) = 0.0175 (kcal. kg^{-1} min) \times MET¹¹ \times body weight (kg).

After analyzing the results of the tests and the questionnaires, elderly persons who scored positively in three or more criteria were classified as frail, in one or two as pre-frail and, in none, not frail.

Analysis with application

The smartphone application was specifically developed for the Android platform (the operating system created by Google) and was named Frágil Mobi (Frail Mobile). When actively responding to the questionnaire in the application, the evaluators could cancel and correct responses at any stage.

Initially, the researcher registers her name and password in the application. He or she is then directed to a screen with all the steps of the test that should be performed with the patient. Data entry begins with the identification of the patient and, later, the calculation of BMI and the corresponding classification. In the second stage, the researcher inserts data about weight loss in the previous year, then feeling of fatigue is verified from the two questions of the geriatric depression scale. In the fourth stage the weekly metabolic expenditure rate is reported, indicating the accomplishment of each physical exercise and each domestic task, as well as the time in minutes spent on each activity in one week (Figure 1).

Frágil Mobi
Identification of patient – BMI
Unintentional weight loss
Feeling of fatigue
Physical activity
Gait speed
Hand grip
See final result
Return

BMI: body mass index

Figure 1: Reproduction of Frágil Mobi application screen. Jequié, Bahia. 2014.

In the section on other activities, five exercises were added that were not included in the original questionnaire: hydrogymnastic/water aerobic exercises, light exercise bicycle with light, moderate and vigorous effort, and circuit training with an aerobic movement and minimum rest, which were inserted based on the reports of the elderly (Figure 2), making 62 items, divided into subcategories A to I. The gait speed and hand grip tests were repeated three times and the absolute values were

inserted. The adjustments were calculated from the data entered during patient identification.

After completing the fields in each screen, the researcher confirmed the data entered and advanced through the steps. The data was automatically saved and transferred to the mobile device memory. The application also allowed the researcher to perform isolated evaluations of the tests, after completing the personal data, although the diagnosis of frailty was only displayed after completing the questionnaire.

Frágil Mobi	
Section I – Others	
1 - Hydrogymnastic, water aerobic	
<input type="radio"/> No	<input type="radio"/> Yes
2 - Exercise bike, light effort	
<input type="radio"/> No	<input type="radio"/> Yes
3 - Exercise bike, moderate effort	
<input type="radio"/> No	<input type="radio"/> Yes
4 - Exercise bike, vigorous effort	
<input type="radio"/> No	<input type="radio"/> Yes
5 – Circuit training featuring aerobic movement with minimum rest	
<input type="radio"/> No	<input type="radio"/> Yes
Cancel	Confirm

Figure 2. Reproduction of Frágil Mobi application screen. Jequié, Bahia. 2014.

RESULTS

The age of the 20 participants ranged from 62 to 91 years, with a mean of 76.55 (± 9.5) years. In the stratification of the group based on the Fried criteria¹, 13 elderly persons were considered frail, five were pre-frail and two were non-frail (Table 1). When considering the criteria individually, four of the 13 elderly persons considered frail had five positive criteria; four participants had four positive criteria and five had three positive criteria. The five pre-frail elderly persons had two positive criteria.

After the printed questionnaire was screened, the data was reassessed and analyzed with the application and the scores were compared. When compared, there was no difference in the evaluations obtained

with the printed version and with the electronic version. The results coincided in all cases, both in the general evaluation of frailty and in the five individual criteria. In other words, the application agreed with the printed questionnaire, which is considered the gold standard.

The collected data was stored in the internal memory of the mobile device and the information could only be accessed through authorization via the login name and password of the health professional/researcher.

In the final sample, the patient's name was displayed with the initials of his or her first and last name, age, skin color/ethnicity, gender, body mass, height, BMI, the results of the five individual criteria and the conclusion: frail, pre-frail and non-frail (Figure 3).

Table 1. Results of frailty criteria. Jequié, Bahia. 2014.

Gender	Classification	n of elderly persons
Men	Non-frail elderly persons	2
Women		0
Men	Pre-frail elderly persons	4
Women		1
Men	Frail elderly persons	8
Women		5

Table prepared by authors.

Frágil Mobi	
Final Result	
Patient:	S Y
Age:	60
Skin color/ethnicity:	White/Caucasian
Gender:	Male
Weight:	60.0
Height:	1.74
BMI:	19.81
Weight loss:	Negative Criteria
Feeling of fatigue:	Negative Criteria
Physical Activity:	Positive Criteria
Gait Speed:	Negative Criteria
Hand Grip:	Positive Criteria
Conclusion	Pre-Frail Patient

Figure 3. Reproduction of Frágil Mobi application screen. Jequié, Bahia. 2014.

DISCUSSION

Elderly health surveillance, together with the detection of predisposing factors of diseases, is the key instrument in prevention strategies aimed at anticipating the occurrence of diseases and intervening directly in current and past pathologies, involving the patient in treatment and encouraging self-care¹².

Frail individuals are more susceptible to adverse health prognoses, such as disability and hospitalization due to the reduction of stress-related regulation, which predispose them to the onset of chronic diseases, loss of physical functionality and cognitive deficit¹⁻¹³. The monitoring of health conditions and the functional capacity of this population is crucial to the creation of a care and intervention plan¹⁴.

Agrigoroaei and Lachman¹⁵ point out that, at this stage, there is an increased loss of intellectual

functioning, motivation, social participation and subjective well-being. The combination of factors such as depression and/or losses with chronic diseases and functional disabilities is the main motivation described by the elderly for the ideation or attempt of suicide¹⁶. In such cases there is a need for effective care planning and clinical judgment that results in an improved prognosis and the resolution of the clinical picture, which can be associated with frailty.

In a study with health professionals regarding criteria to indicate frailty, it was noted that there were no uniformly determined criteria among such individuals, and that the data obtained was prone to subjectivity¹⁷, diverging from the most cited definitions in international literature^{1,18-21}. The use of the application can help in the identification of parameters for the evaluation of frailty, to reach a consensual and homogeneous definition.

Assessment of the degree of functional capacity should be performed with multidimensional instruments¹², as health decline in old age encompasses multiple factors¹⁹.

The health system and care models must adapt to the recent scenario of population aging. Care should be provided in a continuous, preventive manner, ensuring a more diffuse quality of life and well-being^{22,23}.

The implementation of other functionalities such as the hand grip test and the six-minute walk test are potential future focuses for this study, which aims to use software to perform all necessary measures for the classification of frail elderly persons.

In addition, more tools will be incorporated into the software to aid in differential diagnosis, such as anthropometric measures, waist and hip measurement, and the possibility of storing current and previous disease history and information about cardiovascular risk factors. In this way, the crossing of the results of the tests through the application, combined with the clinical examination, will result in a more comprehensive evaluation.

Given the lack of a validated protocol to authenticate an application in the area of health, the present study followed protocols already established in previous studies on frailty¹. This allows tests widely used in research to be applied in clinical and diagnostic practice. However, it is a limitation of the study that the application was tested only by the researchers.

CONCLUSION

The application was developed in support of a preventive strategy, as tests and protocols that are common in scientific research remain unusual in clinical care. Parameters of frailty, when identified early, can be minimized, hence the importance of early detection.

The mobile device test proved to be efficient in defining frailty, with the advantage of instant processing and access to information, as well as the presentation of the final result in a concise manner. The adoption of this method ensures a rapid diagnosis, which facilitates decision making, the monitoring of the clinical picture and the prognosis of the patient by the health professional.

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Old age and physical beauty among elderly women: a conversation between women

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Abstract

The concern with body care, image, and aesthetics in the context of ideals of beauty is a subject of great interest to people. A descriptive exploratory study with a qualitative approach was carried out with a group of 60-year-old women, aiming to discover their perception of physical beauty and the meaning addressed to it in old age. The focus group method was used in data collection and analysis. The results indicated that 60-year-old women recognize beauty based on social standards, even if they are from different sociocultural realities. They establish a judgment of taste based on what they perceive as pleasant to see, feel, and observe. The aesthetic experience of an individual reveals a duality of images that are appreciated and depreciated, while beauty in old age means caring for oneself and one's relationships. The results offer evidence for health professionals in the structuring of therapeutic plans and educational actions focused on the aging process, especially in a female context.

Keywords: Women. Female. Body. Old Age. Beauty.

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INTRODUCTION

From the beginnings of civilization physical beauty has been a goal sought by human beings, especially women. However, what was thought beautiful in previous decades is not necessarily considered so today. The curvaceous bodies and full forms that were contemplated and portrayed by the great artists of the past are today admired for the value of the art but not as a reference of physical beauty for contemporary women.

Today women are confronted with images that glorify youth and the exaltation of thinness^{1,2}. Patterns that define beauty vary between civilizations, cultures, the historical era, and the customs of peoples^{1,3}. However, the search for beauty persists, transcending generations, and is greatly influenced by the aesthetic standards in which it is inserted. Thus, concepts of beauty are aligned with how society behaves in relation to aesthetic standards^{4,6}. Adopting Jimenez's⁷ reading of aesthetics from a Kantian perspective, it can be said that society judges beauty through an impure judgment, as it attributes a concept of perfection based on the sociocultural values of the moment.

The theme of body and old age has led to the development of several studies. Some authors have discussed the meaning of the body in old age when the corporal transformations that come with the aging process deviate from the standards of beauty that prevail in society^{4,6}. Others have discussed how to live with aging in a society that values concepts such as the beauty of the body and the myth of eternal youth^{6,8} while at the same time seeming to avoid the experience of old age as the phase of closest proximity to death and the decrepitude of the body^{4,5}.

In addition to cultural and social aspects, it has been found that while age and socioeconomic factors are associated with body dissatisfaction, they can also have a reverse effect. Older women may experience less dissatisfaction with the body because of their maturity, accumulation of experiences, and positive self-esteem⁹. Thus, dissatisfaction with the body can decrease as aging is accompanied by a change of priorities, and, as the authors explain, health and the affirmation of one's identity become more important than appearance.

For health professionals, working with such issues is both challenging and necessary, as this theme, in matters of the healthcare of women, can go beyond the scope of aesthetics and be seen as something healthy and recommendable for a pathological plan, requiring medical intervention.

Appearance can have a strong impact on the quality of life, self-esteem and social life of young and middle-aged women at any stage of life. However, taking as a starting point the examination of the perception that elderly women have regarding physical beauty, the guiding question of the present study was: "what meaning do they attribute to physical beauty in old age?". It is important that health professionals in the fields of geriatrics and gerontology consider their answers, as intervention and health promotion measures can be anchored in studies of this nature. The purpose of the present study was to describe the meaning of physical beauty in old age in order to discover the understanding that older women have about such beauty, as well as analyzing and describing the meanings that they attribute to physical beauty in old age.

METHOD

An exploratory descriptive study with a qualitative approach was carried out. The sample comprised ten women aged between 60 and 69 years. The women were married, had varying levels of schooling and socioeconomic status, and lived in a city in the countryside of the north of the state of Rio Grande do Sul. The participants were divided into two groups. The first one (FG1), was composed of five women with twelve years of schooling and over, who earned a minimum of six times the minimum salary, lived in the central urban area, and attended an open university program linked to a university. The second group (FG2), consisted of five women with an education of 1 to 8 years of schooling who earned the minimum wage, lived in peripheral urban areas, and were members of a social group for the elderly.

The delimitation of the number of participants was due to the delineation of the study and the inclusion criteria applied, which were age group, participation in projects directed at the elderly and

different educational and socioeconomic levels. We chose the focus group (FG) method, as this technique seeks to capture the language forms, expressions and types of comments of a given segment, to achieve greater levels of understanding and achieve deeper awareness of a topic based on debates focused on specific subjects¹⁰. To form the FGs, the project was first presented to the respective coordinators, and the invitation was then extended to the groups at different times. The research proposal was also explained at this time, with a view to selecting the participants. Although the FG technique recommends a minimum of six components, each FG in the present study was composed of only five members, as adherence to the research proposal in the context from which FG1 was selected resulted in only five women, which led the researchers to opt a paired composition in FG2. When presenting the research proposal in the FG2 context, there was an excess of potential participants that met the inclusion criteria, and so an enrollment strategy was applied, establishing five places. The times, dates and locations of the FG sessions were defined in agreement with the participants and their respective coordinators. The FG meetings were independent and took place at different times, and were moderated by the researcher and as an observer, a person with full knowledge of the research project. The debate in the FG was guided by the moderator while the observer recorded verbal and non-verbal impressions with a field diary and an audio recorder. A script was adopted in accordance with the study objectives and the sessions were divided into two parts.

The initial part of the first session included the presentation of the study proposal, an explanatory reading of the Free and Informed Consent Form, and its formalization by means of a signature. The participants were then introduced, and a discussion about the theme beauty and physical beauty followed. At the beginning of the second session several images of elderly persons in various situations of daily life were shown on a large screen as a multimedia resource to stimulate the discussion about the theme of old age and beauty. Following the session of images, the question "what is beauty in old age?" was asked and then debated. Also in this session, in the second part, the imagination exercise technique me in front of the mirror was

used, in which participants were invited to spend a "moment of silence", closing their eyes and imagining themselves in front of a mirror. After a few minutes, the question was then asked: What did the mirror show? In the final meeting, a synthesis of the previous meetings was presented and the data was validated. This proposed development of the sessions was applied in both the locations selected. Three meetings took place with an average duration of 90 minutes each. In order to preserve the identity and anonymity of the participants, flower codenames were distributed at the beginning of the first session.

The Gatti¹⁰ FG perspective analysis was used for the analysis and interpretation of the data. The observer's notes, the summaries gathered in the sessions and the transcripts of the meetings were collected. The process of reading and rereading this material for coding purposes then began. The frequency of mentions in these units guided the script for the interpretation of the data. The analysis took place in an interactionist dimension and the interpretation was based on the constructed reference.

The data collection period was the first semester of 2013, following the approval of the project by the Research Ethics Committee of the Universidade de Passo Fundo (Passo Fundo University), record n° 254.318. All the participants signed a FICF.

RESULTS AND DISCUSSION

The perceptions of the women regarding physical beauty in old age expressed in the focus groups converged into three categories: beauty in words; the aesthetic experience in front of a mirror (revelations about beauty and old age); and the beauty of women in old age.

Physical beauty in words

Physical beauty can be expressed in several ways. In the present study, when the participants were asked to express themselves by means of words on this theme, several expressions emerged, as shown in Figure 1.

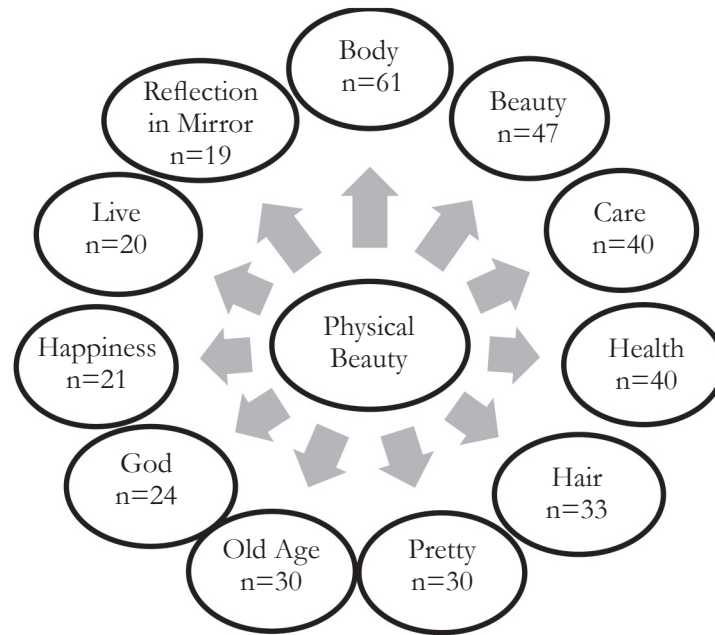


Figure 1. Physical beauty illustrated in words. Passo Fundo, Rio Grande do Sul, 2013.

The various indications regarding physical beauty evidenced in the study partly follow the thoughts of Eco¹¹, in expressing that beauty is linked to the various adjective indicators (joy, pretty, beauty/beautiful) of what represents the sensory and imaginary visuality of people, as well as the sensations of the sublime, the marvelous and the divine (God, living). However, the human being is vulnerable to sociocultural pressures in such a way that some of the words evoked reflect beauty as a model to be met (body, appearance, health, care), a response to the social standard. Society imposes on women the condition of avoiding old age, and does so by means of varied resources⁶, such as rigorous care of appearance, body, styled and dyed hair, in a demonstration of avoiding old age, which was suggested to us by the indications of such words in the FG (Figure 1).

There is a more or less constant manner of acting and perceiving the world in daily life, determined by a series of psychological and social factors and processes that determine our usual perception of what is beautiful or what is beauty. Duarte Jr¹² emphasizes that "what is beautiful for one is not so for another," as beauty is not an objective quality that certain objects possess. For the author, beauty inhabits the relationship that an individual maintains with an object, in this case, the body.

When dealing with physical beauty, the thoughts of Ferreira¹³ are worth noting. These affirm that the body is the main link between an individual and the world, is socially constructed and is a material representation of the subject versus society relationship. It is the space where symbolic conflicts represent the prevailing issues of reality in our existence. The summaries abstracted from the focus group demonstrate this:

"Everyone wants a beautiful person, slim, elegant, well dressed, with her hair done, by their side; but no one wants to be close to those who speak ill of others, are rude and bad humored; they'll never be admired [...] looking smart, with a nice hair style, wearing makeup, look how beautiful they are! What a beautiful old lady! Those who take care of their appearance get noticed in the street. Look at the pretty lady" (FG2).

In the vision of Beauvoir⁴, human beings never live in their natural state, because during old age, as in any age, their status is imposed by the society to which they belong.

The studies of Santos and Dias⁶ discuss the growing concern of women regarding the valorization of the youthful image, a healthy appearance and beauty linked to social models as an ideal to be sought after, patterns that are massively influenced by the media.

If the social context values a thin body model, corresponding to the standard of beauty, overweight and obesity cause embarrassment. The debate between the participants included comments such as:

“There are no clothes that look good on fat people, while all clothes look good on slim people, it’s the same with big feet; I get to the store and I’m ashamed because my shoe size is 39-40. I can’t buy beautiful shoes because they don’t fit. My daughter took me to the store to choose some boots and I had to take the cheapest because the better ones wouldn’t fit. When you look at fat people you see defects, but not in skinny people. Chubby people that aren’t too fat, and that look smart are attractive, but the really fat ones and the really skinny ones are ugly” (FG2).

The common perception of women expressed in FG2 reinforces the current cultural pattern of the valuing of leanness and lipophobic culture^{1,2}. Obesity is visually considered a problem, a feature that cannot be hidden, that clashes with beauty, and so is ugly. Perceptions about overweight are reinforced by the phenomenon of the social and cultural rejection of obesity. The shame referred to lies in the interpretation that women apply to their weight and large shoe size, a demonstration of how much the emotions are intertwined with the opinions we have about our bodies¹⁴.

The studies of Goldenberg¹⁵ warn that, in Brazil, society associates leaving the body in its natural state as synonymous with sloppiness and a lack of care, especially if the body is fat or aged. Thus, in recent decades, the concern of Brazilian women to remain young has grown absurdly because of the standard imposed by society, which emphasizes youth as an ideal.

The view and judgement elderly woman have of their bodies is guided by contemporary customs, which demand that a beautiful body should look youthful and be thin, hence clothes are designed to hide imperfections and localized fat^{2,3}. Clothes are the packaging that veils and unveils, simulates and conceals what should be hidden.

These social requirements also occur in the intrafamilial environment, as expressed by FG1. For this group, young people demand their elderly mothers care for their appearance, thus reinforcing the constructed and diffused social model.

“Nowadays I taking care of myself, because the children put pressure on me and they started giving me things and saying that I have to look pretty, that is, to make myself look smart, because for me anything was fine” (FG1).

Beauty is present in the essence of being and can be expressed by a person’s attitudes and the way they behave. In the present study, it was noticed that the participants of the two groups made judgments about beauty, endowed with subjectivity and feeling:

“A girl with a beautiful body, not because she takes care of her appearance, but the nature of the person, we notice if she cares for her skin and her hair, but it is the friendliness behind her eyes that shows the beauty” (FG1).

“The luminous golden radiance, along with resourcefulness and femininity. The sweet expression, the rhythmic way of walking that make beauty, good character manifesting itself” (FG1).

In this alignment, there are no rules regarding the bodily model, the perception of beauty expressed in the debates comes from the behavior of the person.

“A good way of communicating, hair nicely styled, appearance, a polite person, this is physical beauty” (FG2). “Politeness and good humor. Politeness first, knowing how to treat people, always be in a good mood and don’t pull faces. Making faces reflects ugliness and never beauty [...]. Ugly people don’t force people away, if she is friendly, polite, knows how to treat others, she becomes beautiful” (FG2).

Reflection on the judgments given by the sexagenarian women about physical beauty was supported by the Kantian conception of the judgement of taste, which deals with adherent beauty⁷. Kant, in the reading of Jimenez⁷, distinguishes two forms of beauty: the free and the adherent. In the Kantian conception⁸, free beauty is related to the judgment of taste, the feeling of the beautiful, while adherent beauty is linked to an end, a concept of perfection, and is considered an impure judgment. Judgment cannot depend on a desire, nor does it reduce something to the fact of being desired^{7,8}. The judgment of taste that relates beauty, expressing its experience, communicates a disinterested and pure satisfaction. For Kant, saying something is beautiful is different from saying that it is agreeable.

Physical beauty, described in the present study within this concept, deals with adherent beauty, as the judgment expressed in the FG is conditioned by the idea of what people should and must be. In Kant's conception, the manifestations of the women reflect an impure judgment, for they do not consider the aesthetic judgment of the beautiful and lack the pure contemplation of a work of art or an aesthetic sense of physical beauty, because the issue is the beauty of the human body, and not a truly aesthetic element.

The judgment is impure, because it expresses an interest in the manifestations of women. This interest is linked to that which is agreeable and what is good in the interaction with people of any age. The agreeable and the good have a relation with the faculty of desire. The question that arises, when one reaches old age, is what is good and agreeable to observe and what is desired of other people? What is suggested to us is that in the perception of the sexagenarian women beauty is in the way people communicate, in the communication of the "sweet expression", the "friendliness behind an expression", "politeness", or the "good humor", that we call good and agreeable. This is because, through language, the body presents itself as a bearer of meaning.

The meaning of the body is primarily the result of sociocultural factors, whose construction is interdependent with the form of interaction, thus reflecting the beauty highlighted in a context. If the sexagenarian women through their sensibility capture the feelings present in the contemporary worship of the youthful body, one can imagine how the older body is stigmatized. The judgment of taste regarding physical beauty does not follow Kantian rigor, nor is it aligned with what society establishes as a model of physical beauty: the young body, sculpted and well defined. Beauty is in what is thought agreeable to see, to feel and observe.

Aesthetic experience in front of the mirror: revelations about beauty and old age

To understand the perceptions of physical beauty in the FG and as a trigger element of the debate, an imagination exercise was carried out among the women. Believing that human expression

can be understood as always being symbolic, verbal or visual, an imaginal activity was performed, with the elderly women asked to close their eyes and imagine themselves in front of a mirror. After a few moments, the following debate question was asked: What did the mirror show? The reactions were varied and loaded with feeling. The perceptions derived from the reflected image in the mirror were grouped into appreciated and depreciated images, shown in Figure 2.

Figure 2 shows that in FG1 there was a predominance of appreciated images, in which the mirror revealed the harmony and symbolism in the marks of cutaneous expression, exhibiting self-affirmation, well-being and satisfaction with the body. In FG2, however, among the low-income women living in the urban periphery a mixture of melancholy and depreciation regarding the reflected image predominated.

Pereira¹⁶, in contributing to understanding aesthetic knowledge, states that we can have an aesthetic experience in relation to any object or event, whether it is art or not, or beautiful or not, or whether it exists or not. When the sexagenarians looked at themselves in the mirror, they established an aesthetic experience with the projected image.

If anything can be an aesthetic object, then the reflected image provides an aesthetic experience in the sense proposed by Duarte Jr¹², who manifests that "our feelings are touched" in an aesthetic experience. In revealing the appearance of the aging body, women confess their feelings about the aspects of the years lived, in an interweaving of beauty and ugliness.

Resignation is also expressed, as time passes and leaves marks, an appearance that is made visible by the trajectory of life. Pitanga¹⁷, argues that while these marks are inevitable, the ideal is the acceptance of the signs that come with old age in the best possible way, because, even when presenting characteristics of physical wear (wrinkled skin, a lack of tautness and firmness of the skin), these are compensated for by the inner glow of each subject. For some sexagenarians, this inner glow is the inner beauty itself, reflected in the energy and will to live, an acceptance of the signs of time and satisfaction with the appearance of the body.

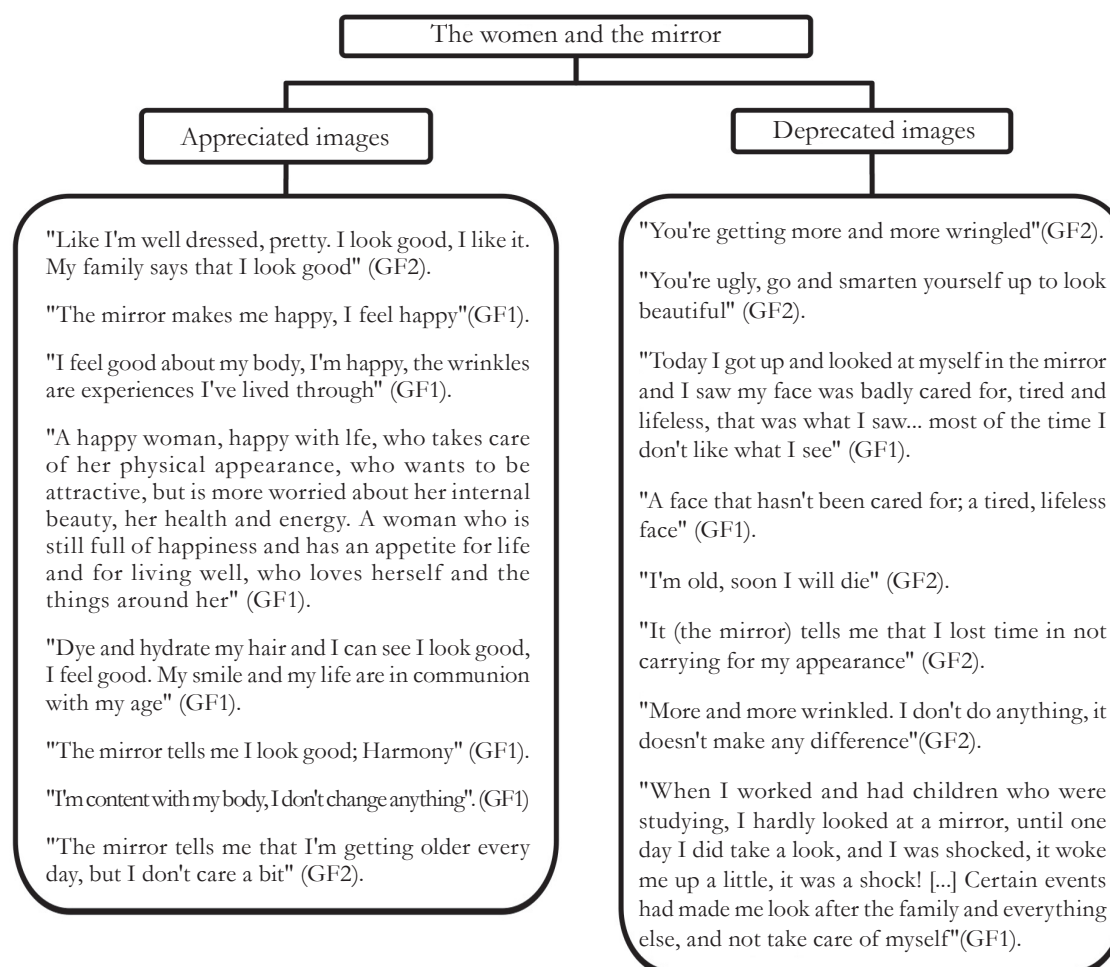


Figure 2. The revelations of the mirror. Passo Fundo, Rio Grande do Sul, 2013.

Care for one's appearance, even without the influence of the aesthetic standards applied by society, represents the self-affirmation and valorization of one's own beauty with the advance of time. For Blessmann⁵, women are principally responsible for changes to their image in old age. Without previous commitments, they are free to enjoy new experiences that have been deprived to them in the past, and when they reach old age, a period conducive to new discoveries and achievements begins.

If the image causes feelings of discomfort, it is because the image reflected by the mirror represents a misunderstanding and does not reflect all that we are¹⁸; it only represents us in an imaginary form and thus enables the appearance of what one does not want to see, something that is particular to each of us.

This perception of strangeness is influenced by the widespread diffusion of current aesthetic

standards¹⁹, which causes a reduction in the self-esteem and quality of life of the elderly women. For them the loss of the youthful traits and physical characteristics that are so highly valued by society is a sign of decrepitude and finitude.

The aging process can be expressed in two ways, one negative and one positive. People who consider old age as a negative stage of life do so by relating it to physical and mental degeneration, as well as inactivity, incapacity, selfishness, and ugliness, factors that provoke sadness, loneliness, depression, and moodiness²⁰. However, those who associate old age with a positive stage of life, value the physical and mental autonomy, independence, participation and integration with the beauty of the lived experience of the phase.

Schneider and Irigaray²¹ stress that even with so many resources that prevent disease and delay the cutaneous characteristics of old age, aging is still

feared by many people and seen as an unpleasant stage of life. For others²², the model of a body that does not meet the current standards of beauty in society reflects a loss of social value.

In front of the mirror, the sexagenarians, unlike an individual appreciating a work of art, express different ways of understanding the aesthetic experience in the duality of the image, which is both appreciated and depreciated. In the same way, they allow an opening to the different senses of the world of human beings that live and grow old, or in other words, ways of experiencing the reality of old age. From the dialoguing of their own experiences, like the individual appreciating art, they reveal themselves before the relationship with their own experience.

The beauty of women in old age

The relationship that women have with old age is reflected in the way they interpret and attribute meaning to beauty in this phase of life. Beauty in old age was related to health and to caring for oneself as much as to love and joy. The body is the limit and the extension of our contact and relationship with the world. Beauty inhabits this relationship, as Duarte Jr¹² argued. Caring for the body in old age can be a guarantee of remaining connected with the world. The body reveals the intricacies of personal history, and with this process comes transgression and the ability to react and self-assert oneself beyond appearance²³. In the circularity of this process, women demonstrate satisfaction with their own bodies, breaking potential prejudices regarding the aged body, attributing to it beauty and other noble characteristics, perhaps because they are linked to another internal image of themselves, as described by Peat et al,⁹ which are more important and intense than their external appearance. The following comments of the FGs reflect this:

“Health, if you have health if you can do anything, is essential, physical and mental health. Harmony” (FG1). “Health encompasses everything, if you have health, you will take care of the body without depending on the opinion of others. Health is essential for the beauty of the body, as well as feeling good about yourself and other people, that’s what beauty is” (FG2).

Ribeiro²⁴ points out that quality of life among the elderly is associated with the pleasure of having good health and encompasses several aspects of human life, among them the pleasure of interacting in society.

“Having your health, disposition, joy, being happy, going out, having friendships, sharing, solidarity, having a job, volunteering at institutions [referring to the institutions that offer shelter to the elderly] and dancing a lot is what makes people happy... if a woman is happy, she is beautiful, this is what makes a woman beautiful. If she loves herself, she cares for her body.” (FG1).

Health is an important factor for a sense of well-being and personal satisfaction of the elderly with their appearance⁹, so that successful aging occurs through the constancy of such factors²⁵. Comments reflecting this proposition arose during the debate:

“First comes good health, by maintaining good practices such as diet, walking, always taking care of yourself, and if you have a problem going to the doctor” (FG2).

“Physical beauty is part of the body, of living, we have to take care of ourselves, to do things right, to do physiotherapy of the knees, otherwise we can’t dance and we have to be active” (FG1).

If beauty is the property of a healthy body, a sick body presupposes ugliness. In the discussions emanating from the FG, disease is removed from the standards of beauty. “The bad thing is when you are sick, you have no desire to do anything, least of all take care of beauty” (FG2). Diseases are common occurrences of aging and thus express a relationship of reciprocity between old age and disease, which is so ingrained that it is difficult to remember that disease can affect anyone at any stage of life⁵. It is important to note that old age has been associated with several negative aspects, such as chronic diseases, dependency, frailty, disability and death^{25,26}. It establishes, then, a relationship between illness and ugliness, explaining the requirement and the incentive of care with the passing of the years.

Moreira and Nogueira⁸ highlight that the issue of age is perceived by many as a personal choice. In this concept, there exist individuals who grow old and

those who actively react against the signs of aging. Youth becomes a value to be earned and a benefit to be acquired, while old age becomes a matter of neglect on the part of those who have not engaged in motivational activities or consumed the products and services that combat aging. This is reflected in observations made in the FG:

“A woman has to look after herself, and exercise” (FG1).

“[...] health covers everything, you need to care for your body” (FG2).

“[...] use cream and take care of your diet” (FG2).

If, on one hand, when one reaches old age, care is the most important thing, on the other, there is an understanding of the participants that this care permeates the course of life:

“It is important that as a young person there is a concern with caring for your skin and your body so that when you reach this stage people do not spoil their faces with so many things” (FG1). “When you get pregnant, you can’t overdo it with eating, or caring for your skin, the care has to be overall” (FG2).

The perspective of the women is in line with the thinking of Foucault²⁷ in asserting that caring for oneself is a principle that is valid for anyone, at any time, and throughout life. Caring for oneself throughout life is characterized as a principle of the development of an individual, it must be practiced at all times of life, when one is young and one is old, during youth to prepare for life and in old age to remove the effects of time²⁸.

Quality aging must be seen as a continuous process of learning, intellectual, emotional and psychological growth, associated with moments of pleasure and personal satisfaction²⁴. Taking as a reference the discourse of the FGs, it can be seen, among other aspects, that beauty in old age is considered as a process that requires caring for oneself and one’s intra and interpersonal relationships.

“If you don’t love yourself, if you don’t have love for yourself, in the first instance. If I have love I’ll have optimism, health, the disposition to do what I want, but if I don’t love myself my body will be ugly” (FG2).

“If you feel good about yourself, you’ll live happily,

of course, taking care of yourself. (FG2) You have to care for your body; you have to love yourself, you have to take care of yourself” (FG1).

Physical beauty is part of the body, we have to look after ourselves, take care of our bodies and our souls” (FG1).

In the perspective of Foucault²⁷, the most important care one should take of oneself is an attentive look at the body and the soul. For this, it is necessary to maintain consistent attitudes about one’s own self, that is, it is fundamental to pay genuine attention and continuous vigilance to the self. In the understanding of the women, one has to take care of oneself, one’s body and one’s soul, this is what translates into beauty in old age. As Foucault himself puts it, the principal end to propose to oneself must be sought within the individual, in relation to himself or herself²⁸.

In order for an individual to take care of themselves, it is important to establish an intensity of self-relationships with oneself, in which they manage to consider themselves the object of knowledge and action, so their relations with themselves allow self-transformation and correction²⁸. If beauty in old age lies in self-care, then women must follow rules, behaviors, and principles. Thus, exercising, physiotherapy, dancing, keeping moving, seeking the doctor when one does not feel well, and even volunteering are indispensable precepts for caring for oneself and, therefore, for beauty in old age.

From this perspective, the words of Kant⁸, that perceptions are not passive, but are synthesized by the faculty of the imagination, are invoked. Therefore, the participants of the study, when judging beauty in old age to be based in taking care of oneself, seek concordance with this judgment. According to the Kantian conception, it is not expected that everyone perceives beauty in old age, which the participants refer to, but it is conjectured that everyone should perceive it, as for the elderly woman beauty is in her singularity, in self-appreciation and in self-love, which includes caring for oneself.

The limitations of the present study are its specific sociocultural context and the reduced number of participants, which restricts extending

the results for the purposes of generalization, making necessary further research pertinent to the subject, from the perspective of other visions.

CONCLUSION

The results of the present study allow us to conclude that the group of women, even if from different socioeconomic and cultural realities, recognize beauty as based on contemporary customs, with the influence of current esthetic standards.

Based on the Kantian conception, women's manifestations of physical beauty follow the proposition of adherent beauty, as they establish a judgment of taste in what they deem agreeable to see, to feel, and to observe. Thus, beauty is in the way people communicate, whether by a sweet, friendly expression, or by politeness in the way one treats people. It is through language that the body presents itself as a bearer of meaning.

The aesthetic experience of an expression reveals a duality between the appreciated and depreciated images expressed by different ways of understanding and feeling the reality of old age. In

unveiling the appearance of the aging body, women confess their feelings towards the experiences of the years lived in an interweaving of beauty and ugliness.

Beauty in old age is considered a process that requires caring for oneself and one's relationships. It is an attentive look at the body and soul, which follows rules, conduct and principles, such as exercising, maintaining a good mood, dancing, keeping moving, seeking the doctor when one does not feel well, and even volunteering. The perception of beauty is abstracted into the uniqueness of being by appreciation and love dedicated to oneself.

If, on the one hand, a limiting factor of the study is that it reflects only one social context, not allowing the results to be extended for the purposes of generalization, on the other, a possible echo of other realities can be inferred, which can provide health professionals with indications of how to structure therapeutic plans. This includes strategies of physical and psychic care, as well as educational actions aimed at thinking about the aging process, particularly in the female dimension. The replication of the study is recommended, extending the theme to other situations in order to corroborate it or add new findings.

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Quality of life of elderly people living in a municipality with rural characteristics in the countryside of Rio Grande do Sul, Brazil

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Abstract

Objective: to describe the quality of life of elderly residents of a rural municipality in the state of Rio Grande do Sul. *Methods:* a cross-sectional, descriptive study of a population of elderly persons was performed. Systematic probabilistic sampling was carried out. The sample was composed of 100 elderly persons, of whom 67 were female and 33 were male. Two questionnaires were used to collect the data, a sociodemographic and sample characterization survey, and the WHOQOL-BREF, in order to evaluate quality of life. The normality of the data was verified by the Kolmogorov-Smirnov test and analysis of mean and standard deviation was performed. Absolute and relative frequencies, Student T-test and Pearson correlation were also performed. *Results:* Quality of life in the physical domain was negatively impacted for both genders, whereas in the social relationships domain a good evaluation was identified, without significant difference between genders. The correlation of the WHOQOL-BREF domains with the age, weight and height of the women demonstrated, although weak, a positive and direct association in quality of life between environment and weight ($r=0.277, p=0.024$). When only men were evaluated, a strong inverse association with physical domain and age was found ($r=0.725, p<0.001$) as well as an inverse association of psychological domain with age ($r=0.371, p=0.033$). The psychological domain presented a positive association with BMI ($r=0.36, p=0.039$). *Conclusion:* It was concluded that elderly persons living in a rural environment who participated in this study had a good quality of life.

Keywords: Elderly. Quality of Life. Rural Population.

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INTRODUCTION

Among the factors that determine the health of the elderly population are the characteristics of their social context, which generate inequalities in exposures and vulnerabilities during the aging process and are directly related to the well-being, functional independence and quality of life of elderly persons¹.

The process of urbanization Brazil² acts directly on such social contexts, and gives population aging among the urban and rural elderly peculiar, differentiated characteristics, even though both groups were born and lived in the same time period. These differences include economic development, employment opportunities, cultural diversity and the availability and access to goods and services in urban and rural areas, as the greatest public investments in health are concentrated in urban scenarios³.

In contrast, a greater stability in personal relations has been perceived in rural environments, allowing greater solidification of the affective ties between the population³.

However, studies that consider the differences between elderly populations in urban and rural environments remain scarce and limited, indicating a need for studies that can contribute to health care planning by identifying the individual characteristics of each environment.

In view of this reality, the present study aimed to describe the quality of life of elderly people living in a municipality with rural characteristics in the state of Rio Grande do Sul.

METHODS

A cross-sectional, observational, descriptive study was carried out among the population of elderly residents in the municipality of Aratiba, located in the extreme north of the state of Rio Grande do Sul. This municipality is considered small, with an estimated population of 6,565 inhabitants in 2010⁴. A total of 1,283 people are elderly, of whom 591 are men and 692 are women⁵.

According to data from Alencar et al.⁶, considering a standard deviation of 2.3 for quality of life and a maximum error of the estimate of 0.5, in addition to a level of significance of 5%, a sample with a minimum of 80 elderly persons was calculated as necessary to estimate quality of life in rural areas. Another 25% was added to this value due to the possibility of obtaining incomplete data during the study, giving a total of 100 elderly persons. As criteria for inclusion, individuals were required to be aged 60 years or older, be resident in the city in question, and to have the necessary cognitive conditions to respond to the questionnaires or have a responsible caregiver who could answer on their behalf.

Systematic probabilistic sampling was performed, where the first street and the first house to be visited were randomly selected and thereafter, following each house visited by the researcher, the next two houses were excluded and the third was visited. Residences visited where there was no resident that met the inclusion criteria, or where no one answered the door at the time of the visit, were excluded from the study and the next residence was visited. Data collection was performed from March to July 2014.

Of the elderly persons, 67 were female and 33 were male. Two questionnaires were used for data collection. One was composed of sociodemographic questions and data to characterize the sample, such as questions related to age, weight, height, gender, ethnicity, body mass index (BMI), general health status, main disease reported and the use of medications to treat this disease, marital status, number of children, religion, occupation and smoking.

The second questionnaire was the WHOQOL-BREF, a validated instrument for assessing quality of life, composed of 26 questions divided into four domains: Physical, Psychological, Social Relationships and Environment⁷. The scores resulted in values from 4 to 20, based on a positive scale, or in other words, the higher the score, the better the quality of life. There are no cut-off points that determine a score below or above which one can evaluate the quality of life as good or bad⁸. The application time of the instruments was approximately 40 minutes.

The normality of the data was verified by the Kolmogorov-Smirnov Test. As the distribution was Gaussian, the quantitative data was presented in mean and standard deviation, while the qualitative data was presented in absolute and relative frequencies. The comparative inferential analysis between the female and the male genders was performed by the Student's t-test for independent samples, while the associations between the biophysical variables and the WHOQOL-BREF domains were verified through the Pearson Correlation Test. A level of significance of 5% was applied for all the analyses ($p \leq 0.05$).

The study was approved by the Research Ethics Committee of the Centro Universitário Metodista (IPA) of Porto Alegre, under protocol number 442-2009. All the participants signed a Free and Informed Consent Form in compliance with National Health Council Resolution 466/2012.

RESULTS

According to the sample data, most of the elderly persons interviewed were female, Caucasian, eutrophic and described suffering from a disease, for which they took medication, with cardiovascular diseases being the most prevalent in both genders. In addition, the clear majority said they did not use tobacco, as demonstrated in Tables 1 and 2 of the sample characterization.

According to the WHOQOL-BREF questionnaire, the quality of life for both genders was negatively impacted in the physical domain, while in the domain related to social relationships, a good quality of life was found, with no significant difference between men and women (Table 3).

Table 1. Mean age, weight and height of the sample of elderly persons evaluated in the municipality of Aratiba, Rio Grande do Sul, 2014.

Variables	Female n=67 Mean (sd)	Male n=33 Mean (sd)
Age (years)	70.49 (± 7.35)	70.36 (± 6.42)
Weight (Kg)	66.73 (± 10.46)	75.42 (± 14.95)
Height (m)	1.59 (± 0.06)	1.72 (± 0.06)

sd: standard-deviation;

Table 2. Characterization of sample of elderly persons evaluated in the municipality of Aratiba, Rio Grande do Sul, 2014.

Variables	Female n=67 n (%)	Male n=33 n (%)
Ethnicity		
White/Caucasian	55 (82.1)	31 (94)
Black/Afro-Brazilian	7 (10.4)	1 (3)
Others	5 (7.5)	1 (3)
Body Mass Index*		
Thin (< 22 kg/m ²)	7 (10.45)	7 (21.21)
Eutrophic (22-27 kg/m ²)	38 (56.72)	18 (54.54)
Obese (> 27 kg/m ²)	22 (32.83)	8 (24.24)
General state of health		
Reported a disease	57 (85.1)	21 (63.6)
Healthy	10 (14.9)	12 (36.4)

to be continued

continued from table 2

Main disease reported		
Cardiovascular diseases	41 (71.9)	7 (33.3)
Dyslipidemias	3 (5.3)	2 (9.5)
Diabetes <i>Mellitus</i>	2 (3.5)	4 (19.1)
Pulmonary diseases	0 (0)	2 (9.5)
Osteomuscular diseases	6 (10.5)	4 (19.1)
Neurological Diseases	2 (3.5)	2 (9.5)
Others	3 (5.3)	0 (0)
Medication taken for main disease reported		
Yes	55 (82.1)	21 (63.6)
No	12 (17.9)	12 (36.4)
Smoker		
Yes	1 (1.5)	2 (6.1)
No	66 (98.5)	30 (90.9)
Ex-smoker	0 (0)	1 (3)

n=absolute frequency; %=relative frequency; * BMI according to classification of Lipschitz et al.4 for the elderly.

Table 3. Description of WHOQOL-BREF values of elderly residents of the municipality of Aratiba, Rio Grande do Sul, 2014.

Domains	Female	Male	<i>p</i>
	Mean (sd)	Mean (sd)	
Physical	13,49 (±2,41)	12,73 (±2,86)	0,17
Psychological	14,63 (±1,94)	13,86 (±1,99)	0,068
Social relationships	15,30 (±2,14)	15,67 (±1,80)	0,378
Environment	14,50 (±1,55)	14,98 (±4,74)	0,454
Total	15,00 (±2,39)	14,54 (±3,05)	0,419

sd: standard-deviation; Gaussian distribution; Values expressed in mean and standard deviation; Student's t-test for independent samples ($p \leq 0.05$).

When correlating the WHOQOL-BREF domains with the age, weight and height of the evaluated women, we noticed a weak positive and direct association between quality of life in the environment domain and weight ($r=0.277$, $p=0.024$).

When men were evaluated separately, some significant correlations were identified. A strong and inverse association between the physical domain and age ($r=-0.725$; $p<0.001$) and an inverse association between the psychological domain and age ($r=-0.371$; $p=0.033$) were observed. Moreover, the psychological domain was positively associated with BMI ($r=0.36$; $p=0.039$).

DISCUSSION

In the present study, the great majority of the elderly persons referred to suffering from a disease, with women reporting more diseases than men. Cardiovascular diseases, which are the most frequent causes of death in the world⁹, were the most prevalent among the sample (71.9%). It is worth noting that another Brazilian study on the quality of life of the elderly found that cardiovascular diseases were the most frequent illnesses among this population group, notably systemic arterial hypertension (75.4%)⁸. Despite the expressive number of elderly persons who report suffering from disease, it is important to reiterate

that aging can cause changes in all the organs and systems of the human body, and diseases are not an automatic part of the aging process¹⁰.

To have a good quality of life over the years, avoiding smoking is of the utmost importance¹¹. This trend has been observed in Brazil over time, as in 1989 the prevalence of elderly smokers was 26.04%, decreasing to 15.4% in 2003¹². In the present study, 90.9% of elderly men and 98.5% of elderly women declared themselves non-smokers.

When quality of life was evaluated through the WHOQOL-BREF questionnaire, it was affirmed that the elderly persons evaluated in the present study have a good quality of life, as the final scores of the domains were very close to 20, the maximum value of the scale.

No significant differences were found in the quality of life scores between the genders, a finding similar to the results of a study by Costa et al.¹³, who also assessed the quality of life of the elderly using the WHOQOL-BREF scale. However, there was an association between advanced age and low physical and psychological scores among men. This result may suggest that men are more emotionally affected by aging than women, and that women are more "prepared" to accept the physical and emotional changes that aging brings. Other studies have also highlighted the relationship between advancing age and declining levels of quality of life for elderly men^{13,14}.

In this study, the lowest scores were registered in the physical domain, and such scores were directly related to old age. This can be explained by the increasing difficulty in maintaining balance, strength and functional independence among the elderly, caused by the physical and deleterious changes in the bones, muscles and joints systems produced by aging itself, which tends to be a negative factor for quality of life¹⁵.

However, a good score was obtained in the present study in the areas related to social relationships and the environment. It is suggested that this result is due to the hypothesis that the socio-affective involvement and differentiated rhythm of life in rural areas allow the elderly to maintain social relationships and a connection with the environment. While inhabitants of rural areas have less contact with people, such contact

is more direct and enduring than the relationships of those living in the city, allowing greater social integration and companionship¹⁶. There are also environmental differences, as rural dwellers have closer contact with nature, unlike urban populations living in the artificial environment of the city¹⁷.

When elderly women were separately evaluated, there was a positive correlation between the environment and weight, or in other words, the rural context seems to stimulate maintaining or gaining the latter. As with women, there was a positive association between the psychological domain and BMI among men.

The mean age of the sample was around 70 years, the period of life in which there is a decrease in body weight due to the gradual decrease of body height, loss of bone mass, increase of body fat, decrease of fat-free mass and its main components (minerals, water, protein and potassium), and also by the decrease of the resting metabolic rate¹⁸. However, the sample was eutrophic, with a BMI within the range of normality for age and gender, suggesting that, although advanced age promoted a reduction in body weight¹⁸, the rural environment contributed to the fact that these elderly people remained within the ideal weight range.

One limitation of the present study was the fact that it was not possible to visit all the residents, as some were not at home at the time of data collection, and these residences were excluded. The fact that the relationship between the causes and effects of the results could not be identified or affirmed was also a weakness.

CONCLUSION

The present study found that the rural environment provides a good quality of life for the elderly persons who live there. Exploring the quality of life of the elderly population and the domains affected by advancing age is fundamental for the elaboration of public policies and the planning of programs focused on the elderly. In view of this, we suggest further studies with the longitudinal monitoring of elderly populations in municipalities with distinct rural and urban characteristics, as well as the comparison between the quality of life of these populations.

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Anxiety disorder in elderly persons with chronic pain: frequency and associations

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Abstract

Objectives: to evaluate the frequency of anxiety disorders in older elderly persons with chronic pain and identify associated factors. *Method:* a descriptive, analytical and cross section study of the "Projeto Longevos" ("Long-Lived Elderly Persons Project") was carried out, featuring elderly persons living in the community who were aged 80 or over. Older elderly persons with chronic pain were selected, and data regarding their sociodemographic characteristics and factors related to pain was gathered, especially with regard to the multidimensional nature of pain, according to the "Geriatric Pain Measure-p" (GPM-p). Self-perception of health was also recorded and functionality assessments were carried out, along with the screenings for depression and anxiety disorders, according to the Geriatric Depression Scale and the State-Trait Anxiety Inventory, respectively. Associations were analyzed by Pearson correlation, the ANOVA Test and Tukey multiple comparisons. *Results:* the sample was composed of 41 elderly persons with a mean age of 85.7 years, most of whom were female, white, widowed and had a low education. A high prevalence of anxiety disorders was observed, being 53.6% and 68.3%, respectively, for trait and state anxiety. A significant, but not high, correlation was found between the anxiety trait and chronic pain according to the GPM-p ($r=31.5\%$; $p=0.048$), and there was a significant and high correlation between the same type of anxiety and depression ($r=61.3\%$; $p<0.001$). *Conclusion:* anxiety disorders were very prevalent in older elderly persons with chronic pain, and these correlated significantly with pain and depression, which could justify the need for varied multidisciplinary therapeutic measures against the persistent pain conditions of the elderly.

Keywords: Chronic pain.
Elderly. Anxiety. Depression.

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INTRODUCTION

Increased life expectancy has resulted in a greater number of elderly people with chronic diseases. These diseases are often associated with chronic pain, which in turn can lead to functional impairment, psychological distress (anxiety and depression), and sleep deprivation¹.

Around 80% of people with chronic pain report that it interferes in their activities of daily living, while about two-thirds of such individuals indicate that pain negatively impacts their personal relationships². Chronic pain also has biopsychosocial consequences, emphasizing the magnitude of the problem, especially among elderly persons with a greater prevalence of such pain. A Brazilian study found that 21.7% of patients with chronic pain suffered mood disorders³. Asmundson and Katz⁴, reviewing three studies about chronic pain and anxiety, found that 20% to 70% of patients with panic disorder reported suffering from chronic pain. More recently, it was found that the coexistence of depressive or anxiety disorders with chronic pain was associated with deteriorating clinical evolution, greater use of medical services and increased health care expenses⁵.

The period between 2000 and 2015 saw a growth in studies related to chronic pain and anxiety disorders. Few of these studies, however, involve elderly individuals, especially older elderly persons⁴, the fastest growing population in the world.

The objective of the present study was to evaluate the prevalence of anxiety disorders in elderly people with chronic pain and analyze the factors associated with such disorders.

METHOD

A descriptive, analytical and cross-sectional study was carried out. It was part of the "Projeto Longevos" ("the Long-Lived Elderly Persons Project") of the Geriatrics and Gerontology department of the Universidade Federal de São Paulo (the Federal University of São Paulo) (UNIFESP), which has monitored, since 2010, elderly persons aged 80 or over of both genders

living in the community in the city of São Paulo, in São Paulo state. The inclusion factor was functional independence in basic activities of daily living (BADL), and the exclusion factors were loss of autonomy according to clinical evaluations or cognitive tests, and the presence of severe acute or chronic decompensated illness.

A convenience sample of elderly persons with chronic pain from the "Projeto Longevos" was employed. The sample calculation, which included a statistical power of 80% and an alpha error of 5%, and was based on an anxiety disorder frequency of 20% (the minimum anxiety disorder frequency identified in a significant study on the subject of pain)⁴ and a universe of 69 elderly persons (the recent quantity of older elderly persons with chronic pain in the "Projeto Longevos")⁶, calculated a total of N of 41. Elderly patients with chronic pain that had lasted for at least six months and an intensity greater than or equal to three, according to the visual numeric scale (VNS) for pain⁷ were included in the study. Individuals with sensory or limiting cognitive deficits, debilitating or potentially serious or fatal clinical illnesses, a history of hospitalization in the last three months, or pain with a neoplastic etiology were excluded. Evaluations took place between April and December 2013.

Sociodemographic data (age, skin color/ethnicity, marital status and schooling) was collected, as well as data related to pain, such as location, duration, frequency and intensity according to the VNS, which evaluates pain on a scale from 0 to 10 (0 representing "no pain" and 10 indicating "worst pain imaginable")⁷. Pain was evaluated in a multidimensional manner according to the Geriatric Pain Measure-p (GPM-p), an instrument that has undergone cross-cultural adaptation for use in Brazil and has had its psychometric properties evaluated, meaning that it is considered reliable and valid for use among the elderly⁸. This instrument allows pain to be considered in accordance with its various dimensions: sensory-discriminative, motivational-affective and cognitive-evaluative. As such, the tool makes it possible to evaluate pain profiles beyond mere intensity, but also through the nature, discomfort and related disengagement of the pain (such as social isolation due to pain related to walking and more vigorous activity)⁹.

The functionalities that measure the capacity to execute BADL and instrumental activities of daily living (IADL) were evaluated using the Katz¹⁰ and Lawton¹¹ scales, respectively; as well as the self-perceptions of health (classified as poor, fair, good or very good)¹², and the presence of depressive disorders. The latter were evaluated using the Geriatric Depression Scale (GDS), which has a sensitivity of 81% and a specificity of 71% for the diagnosis of depression in the elderly, when a total score of 5 points is obtained¹³.

The tracking of anxiety disorders was carried out according to the State-Trait Anxiety Inventory (STAI) of Spielberger et al.¹⁴, one of the most commonly used tools for the quantification of subjective components related to anxiety. It is simple to apply and there is considerable evidence of the validity and reliability of the test. The STAI is based on a theoretic model of two distinct components divided into two subscales: one which evaluates anxiety as a state (STAI-S), referring to a transient emotional picture where feelings of apprehension and tension are consciously perceived, accompanied by an increase in the activity of the autonomic nervous system; and another that evaluates anxiety as a trait (STAI-T), referring to "tendencies" in reacting to situations perceived as threatening, or in other words, "acquired behavioral dispositions"¹⁵. The two subscales are scored separately, with a minimum and maximum score of 20 and 80, respectively, with higher scores indicating more intense levels of anxiety. The cut-off points are: <33, which is equivalent to the absence of symptoms of anxiety or mild anxiety, between 33 and 49, equivalent to average anxiety, and > 49, equivalent to a high level of anxiety.

In the present study, the prevalence of anxiety disorders was obtained based on participants with

moderate to severe symptomatology, who were then grouped together¹⁶. Davidson et al¹⁷. proposed a cut-off point for STAI scores of >39 to identify the presence of an anxiety disorder, a classification used in the present study.

Statistical analysis involved the calculation of mean, standard deviation, median, minimum and maximum values, as well as the confidence interval for the quantitative variables. For associations with the STAI, the Pearson correlation, Anova test and Tukey's multiple comparisons were used. A level of significance of 5% was adopted.

The project was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (the Federal University of São Paulo) (UNIFESP), under n° 250.104/2013, and all the participants signed a Free and Informed Consent Form.

RESULTS

The sample consisted of 41 elderly persons with a mean age of 85.7 years (ranging from 80 to 96 years), most of whom were female (85.3%), with white skin color/ethnicity (63.4%), widowed (58.5%), and had a low level of schooling (56.0% had only a primary level education) (Table 1).

The majority of the participants were functionally independent in ADL (97.6%) and IADL (51.2%). They self-perceived their health to be good or fair (43.9% and 42.7% respectively) (Table 1).

Depressive disorders were present in 36.6% of the elderly persons. The majority referred to their chronic pain as being severe in intensity, as defined by the VNS (56.1%), and moderate according to the GPM-p (53.7%) classification.

Table 1. Sociodemographic characteristics and general health conditions of elderly persons. São Paulo. state of São Paulo. 2013.

Variables	n (%)
Age (years)	
80	3 (7.3)
81–85	17 (41.5)
86–90	17 (41.5)
>90	4 (9.7)

to be continued

continued from table 1

Variables	n (%)
Gender	
Female	35 (85.3)
Male	6 (14.7)
Skin color/ethnicity*	
Black/Afro-Brazilian	2 (4.9)
White/Caucasian	26 (63.4)
Yellow/Asian-Brazilian	2 (4.9)
Brown/Mixed Race Brazilian	11 (26.8)
Marital Status	
Cohabiting	2 (4.9)
Married	10 (24.2)
Separated	1 (2.4)
Single	4 (9.8)
Widowed	24 (58.5)
Schooling	
Illiterate	6 (14.6)
Primary school (1-4 years)	23 (56)
Elementary school (5-8 years)	6 (14.6)
High school (9-11 years)	2 (5)
Higher education (>11 years)	4 (9.8)
Functionality – ADL	
Partial dependency	1 (2.4)
Independent	40 (97.6)
Functionality – IADL	
Severe dependence	1 (2.4)
Moderate dependence	13 (31.7)
Mild dependence	6 (14.6)
Independent	21 (51.2)
Self-perceived health	
Poor	4 (9.8)
Fair	17 (41.5)
Good	18 (43.9)
Very good	2 (4.9)
Depression – GDS	
No depression	26 (63.4)
Depression	15 (36.6)
Pain - VNS intensity	
Mild	4 (9.8)
Moderate	14 (34.1)
Severe	23 (56.1)
Pain - GPM-p classification	
Mild	4 (22)
Moderate	14 (53.7)
Severe	23 (24.4)

* Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics) (IBGE); ADL: basic activity of daily living; IADL: instrumental activity of daily living; GDS: geriatric depression scale; VNS: visual numeric scale; GPM-p: Geriatric Pain Measure-p.

According to the STAI of Spielberger et al.¹⁴ the prevalences of anxiety disorder were 73.2% and 68.3%, respectively, for the STAI-T and STAI-S. In terms of classifications, the frequencies of severe disorder were around 19.6% (STAI-T) and 4.9% (STAI-S) (Table 2). According to the STAI score cut-off point of Davidson et al.¹⁷, the prevalences of anxiety were lower (58.5% STAI-T and 39.0% STAI-S)

When analyzing the correlations between anxiety disorders and the variables in the study, a significant and positive association was identified

between the STAI-T and chronic pain as defined by the GPM-p. However, such association was considered low ($r=31.5\%$; $p=0.048$), with values between 20 and 40% (Table 3).

"Trait" type anxiety disorders were significantly and positively associated with the variable of depression. This correlation was considered to be good ($r=61.3\%$, $p<0.001$), with values between 60 and 80%

Statistically significant correlations between anxiety and functionality (ADL and IADL) and self-perceived health were not observed.

Table 2. Trait and State anxiety disorders, according to the STAI of Spielberger et al.¹⁴ and the STAI cut-off point of Davidson et al.¹⁷. São Paulo, state of São Paulo, 2013.

Variables	Anxiety-Trait N (%)	Anxiety-State N (%)
STAI-T		
Mean and standard deviation	40,8 ($\pm 10,70$)	
Median (Q25–Q75)	40 (32–46)	
Minimum	22	
Maximum	65	
STAI-S		
Mean and standard deviation	36,7 ($\pm 7,6$)	
Median (Q25–Q75)	37 (32–42)	
Minimum	20	
Maximum	51	
STAI - Spielberger et al. ¹⁴ score.		
<33: Anxiety absent or mild	11 (26,8)	11 (26,8)
33–39: Moderate anxiety	22 (53,6)	28 (68,3)
>39: Severe anxiety	8 (19,6)	2 (4,9)
STAI - Davidson et al. score ¹⁷ .		
>39: Anxiety present	24 (58,5)	16 (39,0)

STAI-T: Anxiety Inventory-Trait; STAI-S: Anxiety Inventory-State

Table 3. Associations between anxiety, pain, depression and functionality. São Paulo, state of São Paulo, 2013.

Variables	Anxiety-Trait		Anxiety-State	
	Correlation (r) (%)	p-value	Correlation (r) (%)	p-value
Pain – VNS intensity	-17,0	0,288	-29,3	0,063
Pain – GPM-p classification	31,5	0,048	11,2	0,493
Depression – GDS	61,3	<0,001	21,6	0,175
Functionality – BADL	-29,5	0,061	2,8	0,864
Functionality – IADL	-26,0	0,100	-19,8	0,215

VNS: numeric visual scale; GPM-p: Geriatric Pain Measure-p; GDS: geriatric depression scale; BADL: basic activity of daily living; IADL: instrumental activity of daily living.

DISCUSSION

A sample composed of 41 elderly people was obtained, most of whom were women. This corroborates the theory of the feminization of aging, especially among those aged 80 years or more^{18,19}. It has been suggested that women have higher risks of chronic pain, and in addition, describe more somatic disorders than men^{19,20}. Chronic pain was considered severe when evaluated in a unidimensional manner by the VNS (56.1%), which refers only to the intensity of pain, and moderate and severe when evaluated in a multidimensional manner by the GPM-p (78, 2%). Chronic pain defined by the GPM-p correlated significantly with the STAI-T, despite a low correlation ($r=31.5\%$, $p=0.048$). This indicates the possibility of deteriorating clinical evolution in conditions of pain, and subsequently the possibility of higher costs involved in treatment⁵.

Depressive disorders occurred in 36.6% of participants, and these correlated significantly and positively with the STAI-T; which represents an important correlation ($r=61.3\%$; $p<0.001$). A review of scientific literature verified that depression is frequently associated with chronic pain, resulting in a lower quality of life²¹. The prevalence of depression in individuals with chronic pain is generally high, as verified by a Chinese study where 41.6% of patients with chronic pain were depressed^{18,22}. Similar results were also found in a study in Taiwan, where depression disorders coexisted in 31.5% of participants with chronic pain²³. Elbinoune et al.²⁴ found that depression and anxiety were prevalent in individuals with chronic neck pain, and that these disorders were related to pain intensity. Also, Stubbs et al.²⁵ noted that any type of back pain, together with chronic pain in this region, are associated with an increased risk of anxiety, as well as depression and sleep disturbances.

The perception of pain may be amplified in the context of anxiety and depression. A study of patients with chronic low back pain has shown that the fear of painful exacerbations due to movements or the presence of catastrophizing ("emotional maladjustment") leads to more severe pain and greater disability²⁶.

The associations between psychiatric conditions and chronic clinical conditions, such as chronic pain syndromes, are of major importance. While much of the research into psychiatric symptoms and chronic clinical conditions is centered on depression, with apparently significant associations between these conditions being identified, there is growing evidence that anxiety also coexists with such chronic conditions, and furthermore, coexists with their complications and vice versa^{17,25}. Bener et al.²⁷ observed a significant association between psychological stress and low back pain. In this study, anxiety disorders occurred in 9.5% of subjects with low back pain versus 6.2% of those without pain ($p=0.007$), and depression was observed in 13.7% of those with low back pain versus 8.5 % of patients without pain ($p=0.002$).

In the present study, anxiety disorders were prevalent, and were even more frequent than depressive disorders, especially in terms of STAI-T, which were prevalent in 73.2% of elderly people with pain. This fact was also found when the scores of Davidson et al.¹⁷ for STAI-T screening were considered (58.5%).

Studies have shown that mood disorders such as anxiety and depression often coexist with chronic pain^{15,16,21,22}. In Brazil, the authors Brasil and Pondé³ found that almost half of patients with chronic neuropathic pain (46.3% of the studied sample), presented concomitant depressive and anxiety mood disorders, although there is no national data referring to the elderly population.

Both anxiety and depression are known to act as facilitators of the processing of pain at central levels. These disorders therefore participate in the pathogenesis of pain, sharing the same neurotransmitters (serotonin, noradrenaline, glutamate and adenosine) and sharing areas common in brain activation^{3,28}.

In terms of anxiety, it is known that there are relatively stable individual differences in the tendency to react to situations perceived as threatening, and that such tendencies are considered as STAI-T². Therefore, the idea remains that individuals with an anxious personality, not just an anxious emotional state (anxiety-state), suffer more chronic pain^{4,20}.

In general, it is expected that individuals with high STAI-T levels also have high STAI-S levels, as when the anxiety trait is present, the individual reacts to a wide range of situations as though they are very dangerous or threatening.

The present study had some limitations which should to be considered when interpreting the results. The cross-sectional design excluded the possibility of examining the causal relationships between pain, anxiety, and depression, and the sample was small, which does not allow the generalization of the results. However, the present study contributes unusual data involving chronic pain and mood disorders in older elderly people living in Brazil.

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CONCLUSION

High frequencies of anxiety disorders were identified in older elderly patients with chronic pain, and there were significant correlations between anxiety-trait and pain, as well as an association with depression. Frequent correlations between anxiety and chronic pain justify the need to apply varied and multidisciplinary measures, such as psychological intervention, in the therapeutic management of elderly people with persistent pain. Studies, which remain incipient, of this population group are important, due to its rapid growth and the prevalence of chronic and difficult to manage painful conditions.

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The perspective of caregivers of people with Parkinson's: an integrative review

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Abstract

Objective: to analyze scientific production regarding the process of caring for persons with Parkinson's Disease (PD) from the perspective of the caregiver. *Method:* a descriptive integrative review type study was performed, guided by the question: *How does the caregiver perceive the process of caring for a person with Parkinson's?* A search was performed of the Latin American and Caribbean Health Sciences, Nursing Database and Online Search System and Medical Literature Analysis databases, applying the cut-off points 2005 and 2015. *Result:* following Content Analysis three categories emerged: a) the process of caring for a person with PD; b) the positive and negative aspects associated with the process of caring for a person with PD; c) support for caregivers of people with PD: what can be done for them? *Conclusion:* The challenge of caring for a person with PD needs to be recognized by caregivers, professionals and health managers as a tool for the (re) construction of care.

Keywords: Caregivers.
Parkinson Disease. Elderly.
Quality of life.

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INTRODUCTION

Parkinson's disease (PD) is a complex neurological condition arising from the degeneration of the dopaminergic neurons of the substantia nigra, and most severely affects the ventrolateral layer^{1,2}. Motor disorders such as bradykinesia, tremors and stiffness are frequently observed¹. This results in not only physical but also psychological impairment, through the presence of non-motor symptoms, such as cognitive dysfunction and mood disorders, which can result in disability, social isolation and reduced quality of life^{2,3}.

Therefore, non-motor symptoms generally prevail at the onset of the pathological process of PD, beginning in the non-dopaminergic structures of the brain or the peripheral nervous system¹.

Day-to-day living with PD is usually a challenge, as postural instability, movement difficulties, and other signs and symptoms can compromise the functional capacity, independence and autonomy of sufferers, necessitating assistance in the performance of daily activities, such as dressing and feeding oneself, as well as in the instrumental activities of daily living, which are related to the administration of the environment⁴.

The need therefore arises for a caregiver to be present to assist in the carrying out of such activities, to preserve biopsychosocial well-being and consequently quality of life. In addition, the caregiver is responsible for encouraging self-care, which is performed by a third party only when the PD patient is truly incapable of carrying out such activities⁴.

It is worth noting that the construction of the care process extends throughout the life experience of the family caregiver and is guided by the reality of the family, as well as by the guidance provided by multi-professional medical team, support groups and associations⁵.

Therefore, the care provided guides relationships of care through interaction and transformation, resulting in relations of accountability and affective involvement with another individual⁶, in addition to being more effective when performed with a positive attitude⁷.

Sometimes, however, caring is marked by impersonality and distance, making it increasingly necessary to implement an expanded conception of healthcare for the elderly, whether through interdisciplinary care or in a family environment⁸.

Although studies with a quantitative approach contribute to the development of the theoretical and technical basis of care, the caregiver should be involved in such a research to a greater degree.

Therefore, the development of new research and techniques is fundamental, since publications on the subject have resulted in a number of gaps in knowledge due to the scarcity of productions related to the perception of this process through studies with a qualitative approach. Given this context, the objective of the present study was to analyze the scientific production regarding the process of caring for an individual with Parkinson's disease.

METHOD

A descriptive integrative review type study was performed, allowing completed studies to be analyzed and conclusions to be reached on the topic of interest by analyzing significant studies for Evidence-Based Practice, collaborating to deepen knowledge and applicability⁹.

In order to apply methodological rigor, six stages were adopted in the preparation process¹⁰.

1st Stage: Establishing of hypothesis or research question - considering the purpose of the study, the integrative review began with the choice and definition of the theme, which was the process of caring for a person with PD, a question which has relevance to clinical practice and the scientific area.

The keywords in the present study, "Parkinson's Disease", "Caregivers" and "Elderly", were used to survey the articles, and were cross-checked with the use of Boolean AND. All are included in the Health Sciences Descriptors (DeCS).

To guide the theme proposed in the article, the following question was elaborated: How does the caregiver perceive the process of caring for a person with Parkinson's?

2nd Stage: literature search – a bibliographic survey of the period between May and July 2015 was carried out, with the following inclusion criteria for the search and selection applied: a) articles dealing with the proposed theme; b) articles published between 2005-2015; c) articles in English and/or Spanish and/or Portuguese; d) articles classified as evidence level 5; e) articles that fulfilled the criteria proposed by the Critical Appraisal Skills Program (CASP) Checklist for Qualitative Research. Criteria d) and e) will be explored later in the present study. Articles repeated among the databases were excluded.

Through free electronic access provided by the Biblioteca Virtual de Saúde (the Virtual Health Library) (BVS), the following databases were surveyed: Literatura Latino-Americana e do Caribe em Ciências de Saúde (Latin American and Caribbean Health Sciences Literature) (LILACS), Base de Dados em Enfermagem (the Nursing Database) (BDENF) and the Medical Literature Analysis and Retrieval System Online (MEDLINE).

The articles were independently selected by three reviewers, in order to guarantee the reliability and validity of the study in question.

3rd Stage: Categorization of studies - the instrument chosen to gather, organize and synthesize information was a validated form, which allows the acquisition of data relating to the identification of the original article and authors, the methodological characteristics, the level of evidence, the interventions measured and the results obtained¹¹.

However, this instrument was adapted to the reality of the study by including the following topics: periodical, year of publication, database and CASP classification, which were systematized and resulted in the elaboration of a database completed after data collection (Figure 4).

4th Stage: evaluation of the studies included in the integrative review - the critical analysis of the data was performed after the numerical organization of the articles surveyed based on the order in which they were found. Based on the objective of the study, we chose to use articles with a qualitative

approach, so all were classified as having a level of evidence of five (100%), according to the selection criteria proposed in the study¹². A standardized evaluation tool, entitled CASP For Qualitative Research, was also applied, with the objective of critically analyzing the methodology of the studies, to guarantee the methodological rigor, relevance and credibility required for an integrative review of studies with a qualitative approach¹³. According to Volkmer et al.¹⁴ this contains the following ten systematic items:

- 1) a clear and justified aim.
- 2) a methodological design appropriate for the aim.
- 3) methodological procedures presented and discussed.
- 4) intentional sample selection.
- 5) data collection described, instruments and saturation process explained.
- 6) relationship between researcher and researcher.
- 7) ethical care.
- 8) dense and substantiated analysis.
- 9) results presented and discussed, pointing out the aspect of credibility and the use of triangulation.
- 10) description of the contributions and implications of the knowledge generated by the research, as well as its limitations.

Following this analysis, the articles were classified as either A, for studies which had a small risk of bias and fulfilled at least nine of the ten items, or B, for studies which had a moderate risk of bias and fulfilled five to ten items¹³. Based on the critical analysis of each selected study, all those in the sample were classified as A, which guarantees the methodological rigor of the study in question.

5th Stage: interpretation of results - in this stage the discussion of the main results found in literature relating to the process of caring for a person with PD was carried out, allowing existing gaps to be identified, as well as factors that affect the care of the PD sufferer and, as such, interfere with the caregiver's own life.

6th Stage: presentation of integrative review - the results and discussion were presented in a descriptive manner, through the use of the main table referred to above, which contained information referring to the sample of articles, and schematic drawings that represented subjects pertinent to the process of caring for a person with PD.

RESULTS

A total of 198 articles were identified, which were submitted to the following predetermined inclusion and exclusion criteria (Figure 1).

The final sample resulted in four articles published in the period between 2008 and 2012, which were presented through a systematized synthesis (Figure 2) and submitted to full analysis.

In addition, all the research designs of the studies in the sample adopted the qualitative approach, which was one of the inclusion criteria, based on the perception of people who experienced a certain phenomenon, and using techniques to describe, explore and interpret this studied phenomenon¹⁵.

In terms of the identification of the sources, the articles were localized through MEDLINE. It should be noted that this evidence was not defined as an inclusion criterion, but as a random finding.

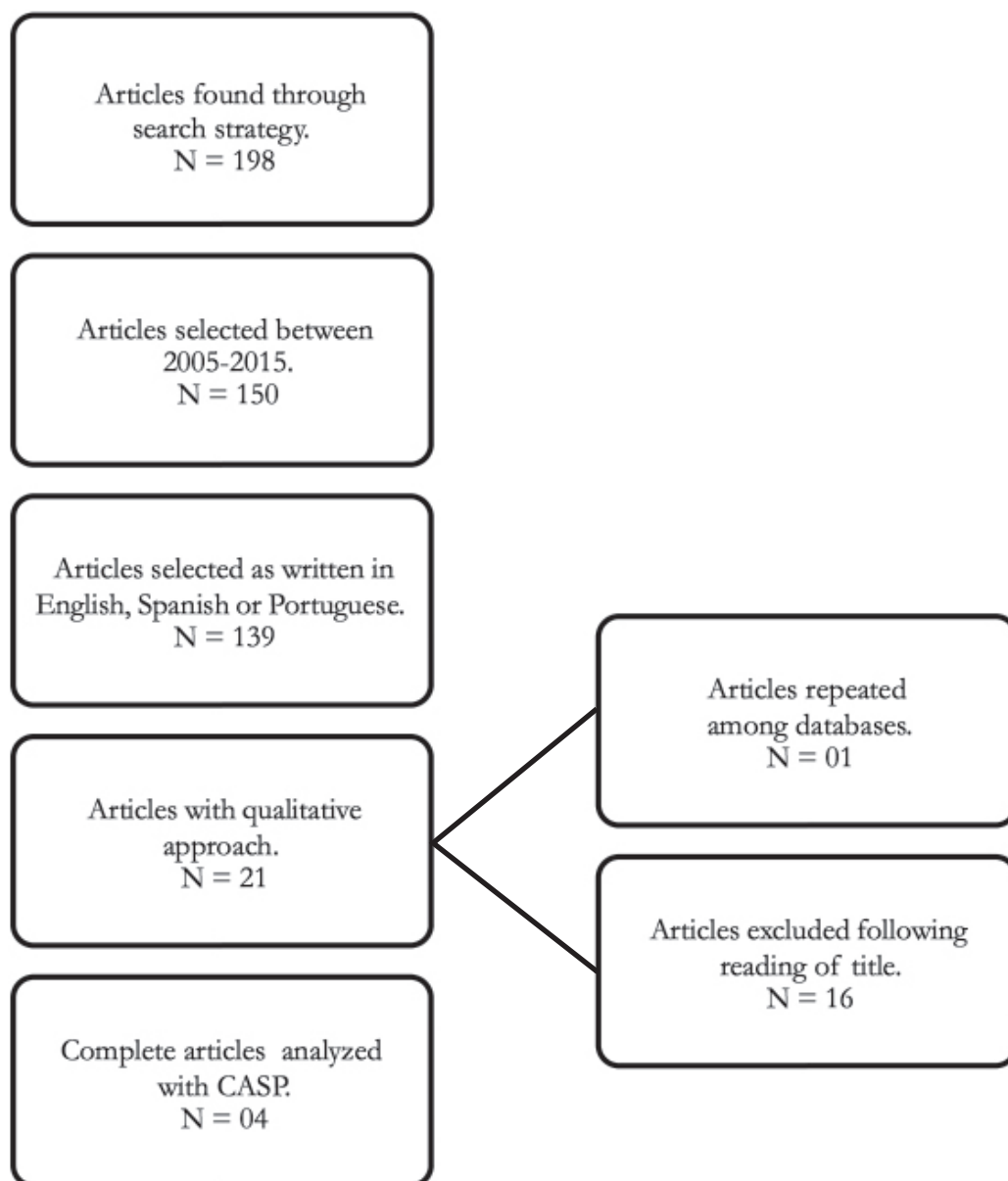


Figure 1. Schematic drawing of obstacles arising from the process of caring for persons affected by Parkinson's Disease. Recife, Pernambuco, 2015.

Figure 2. Synthesis of articles inserted in the integrative review according to year, periodical, title, authors, approach, level of evidence, type of analysis, database and results. Recife, Pernambuco, 2015.

Periodical	Title	Authors/ Year	Approach/ Level of evidence/ Type of analysis/ Database/ CASP Classification	Results*
Journal of Clinical Nursing	Experiences of caregivers of people with Parkinson's disease in Singapore: a qualitative analysis.	Tan SB, Williams AF, Morris ME. 2012 ¹⁷	Qualitative 5 MEDLINE Structural analysis of NVIVO 8 A	Following analysis of the discourse of 21 caregivers in Singapore, four themes emerged: a) Confrontation and adaptation; b) Challenges of caregivers; c) Effects of care on caregivers; d) The need for better support for caregivers.
Palliative Medicine	Living and coping with Parkinson's disease: perceptions of informal carers.	McLaughlin D, Hasson F, Kernohan WG, Waldron M, McLaughlin M, Cochrane B et al. 2011 ¹⁸	Qualitative 5 MEDLINE Analysis of content A	Following analysis of the discourse of 26 caregivers in Northern Ireland, four themes emerged: a) Medical support for people with Parkinson's Disease; b) Overload related to the care provided; c) Information needs; d) Economic implications of caring.
Movement Disorders	An exploration of the burden experienced by spousal caregivers of individuals with Parkinson's disease.	Roland KP, Jenkins ME, Johnson AM. 2010 ¹⁹	Qualitative 5 MEDLINE Personal construct technique and analysis of main components A	After analyzing the discourse of five caregivers in Canada, three themes emerged: a) the burden of social isolation; (b) the burden of safety concerns; d) the importance of adequate education and support.
Social Science & Medicine	Caregivers' experiences of caring for a husband with Parkinson's disease and psychotic symptoms.	Williamson C, Simpson J, Murray CD. 2008 ²⁰	Qualitative 5 MEDLINE Phenomenological analysis A	After analyzing the discourse of ten caregivers in England, four themes emerged: a) "Trying to find out for myself": uncertainty and the search for understanding; b) "Learning to live with it": adapting responses to symptoms over time; d) "He's not usually like this": the contribution of psychosis to the change of identity; D) "We aren't so bad, compared to them": the use of social comparison as a coping strategy

* Free translation

While the descriptor "elderly" was used during data collection, the age of the PD sufferers who received care was not defined in the studies. However, the age of the caregivers ranged from 31 to 79 years of age, with a prevalence of elderly persons. However, when the sample was analyzed, it was found that the most commonly used descriptors were "Parkinson's disease", which was present in four studies, followed by "quality of life" in two studies, while the other descriptors, such as

"caregivers" and "qualitative research" appeared in only one study.

The profile of the caregivers in the articles selected for this integrative review is summarized in Figure 3, and describes sample size, gender, age and the relationship between the caregiver and the individual with Parkinson's disease. Therefore, the fact that the caregivers of this study were classified as informal was a random finding.

The articles on the perceptions of the family caregivers about PD were from different journals: the Journal of Clinical Nursing, Palliative Medicine, Movement Disorders and Social Science & Medicine.

As for the country of origin of the articles, each came from a different location, two from Europe (England and Northern Ireland), one from North America (Canada) and one from Asia (Singapore). All the articles were published in the English language.

With regard to the objectives of each study, all the articles adequately met the requirements of this study and were presented clearly, in a way that facilitated the understanding of the reader. The description of the problems to be investigated was also noted, and there were no discrepancies between the type of objective and the method selected. The final considerations or conclusion were presented at the end, while one study presented a topic on relevance to clinical practice following the conclusion.

Figure 3. Synthesis of the sample data of articles inserted in the integrative review. Recife, Pernambuco, 2015.

Title of article	Sample	Gender	Age (years)	Relationship
Experiences of caregivers of people with Parkinson's disease in Singapore: a qualitative analysis ¹⁷ .	21	Female: 17 Male: 04	31-40: 03 41-50: 02 51-60: 08 61-70: 07 >71: 01	Husband/wife: 14 Son/daughter: 05 Friend: 02
Living and coping with Parkinson's disease: perceptions of informal carers ¹⁸ .	26	Female: 17 Male: 09	<55: 05 >55: 21	Husband/wife: 26
An exploration of the burden experienced by spousal caregivers of individuals with Parkinson's disease ¹⁹ .	05	Female: 05	49-71: 05	Wife: 05
Caregivers' experiences of caring for a husband with Parkinson's disease and psychotic symptoms ²⁰ .	10	Female: 10	63-79: 10	Wife: 05

Source: Authors' own work.

DISCUSSION

The process of care and the caregiver of an individual with PD are fundamental discussion points for global public health, considering that there has been a significant change in the epidemiological profile of the population, in which there is currently a prevalence of chronic non-communicable diseases, making the presence of caregivers increasingly evident and active in society¹⁶.

Following content analysis, three thematic categories emerged: a) the process of caring for a person with Parkinson's Disease; b) the positive and negative aspects associated with the process of caring for a person with Parkinson's Disease; c) support for caregivers of people with Parkinson's Disease: what can be done for them?

The process of caring for a person with Parkinson's Disease

According to the reports of the caregivers, the process of caring for an individual with PD can imply careful observation of aspects such as the impairment of body balance and a consequent increase in falls, which cause anxiety, worry and fear. From this perspective, one of the ways of dealing with this situation responsibly is by maintaining the safety of the individual with PD. Therefore, caregivers are in a challenging situation that encourages them to seek ways to adapt and cope¹⁷ with the difficulties of this new daily reality, as after receiving diagnosis, there remain several uncertainties about the life of those being cared for, as well as the caregiver's own life.

Corroborating the findings of the present study, it was observed in another survey that

most caregivers are women and the wives of the individual receiving care. These caregivers are usually aged over 50, which makes them perceive care as a physically and emotionally draining function, though they clearly state that their partners would do the same for them¹⁷. Nevertheless, dealing with caring is also about learning to relax, to minimize the stress of exercising such a role, as a person's life does not stop when they become a caregiver. Therefore, the caregiver should be aware of the need to set aside time for self-care, and to feel attractive and good about oneself, because as was expressed in one study, the caregiver's own health is a latent concern, mainly because their role is often solitary¹⁷.

When a person with PD envisages reducing the burden of care, they consider the possibility of being institutionalized, however, according to Tan et al.¹⁷, the caregiver and the PD sufferer together consider that this is not the best option, as being close to one another more than one hour a day is fundamental to both parties¹⁷.

Some caregivers believe that it is useful to adopt a holistic approach to care¹⁷, which envisions the individual as an integral being. The implementation of care is generally hampered, however, by the presence of a number of obstacles which are mentioned in Figure 4, such as the high level of dependence on the part of the caregiver, who cannot leave their relative alone for a long period of time, resulting in the emergence of feelings of frustration¹⁸.

It is important to note that the health care and social service professionals connected to the process of care provided by the caregiver are often not prepared to discuss the end of life, which is as important a stage as any other. According to a caregiver from the study by McLaughlin et al.¹⁸ it is important to discuss palliative care with individuals who are afflicted with chronic diseases, not only those who have a terminal illness. However, many health professionals do not believe that this is appropriate, as PD is not terminal, but neurodegenerative¹⁸.

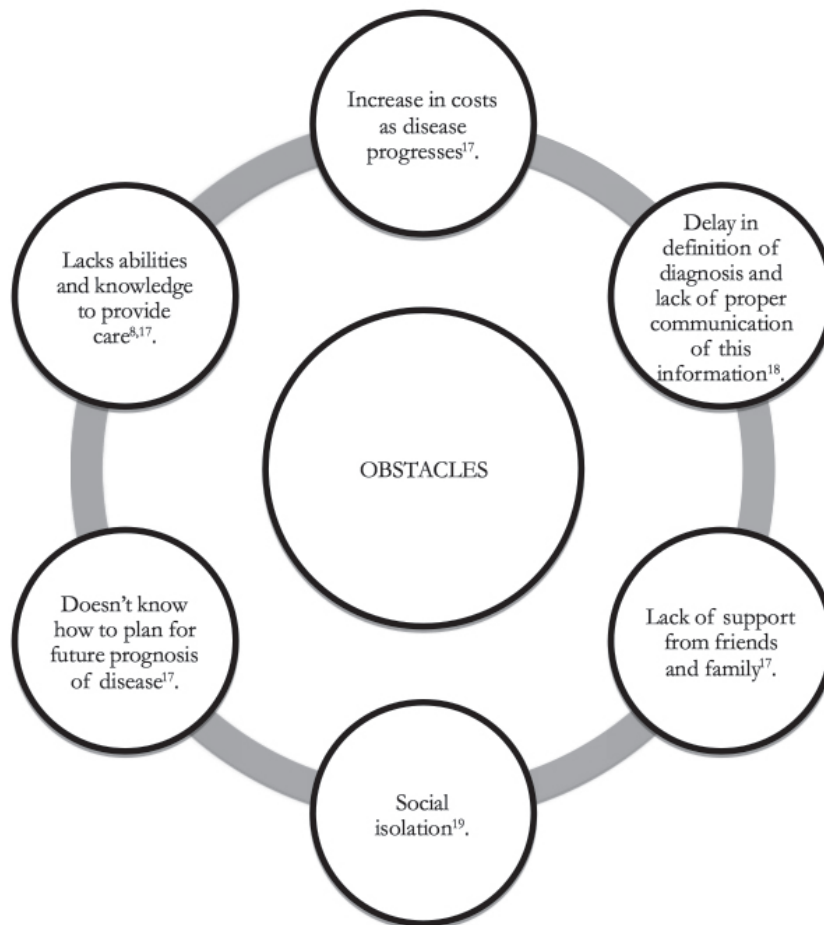


Figure 4. Flowchart of the number of articles found and selected after applying the inclusion and exclusion criteria. Recife, Pernambuco, 2015.

The positive and negative aspects associated with the process of caring for a person with Parkinson's Disease

It can be perceived from the reports of the caregivers that the caring process can be experienced positively through social situations and closer family ties, such as the strengthening of the marital relationship through the assuming of joint responsibility. This finding was perceived among couples who did not have a good relationship before becoming caregivers. Thus, care can lead to emotional benefits, and even a feeling of gratitude, which encourages improvements in the lives of both parties^{17,18}.

One negative aspect relates to the diagnosis of the disease, as according to one caregiver's report diagnostic confirmation can be delayed or inadequately communicated, resulting in shock and anger due to a lack of knowledge about PD, and fear¹⁸.

In addition, when there is a marital or family relationship between the caregiver and the individual with PD, both may experience minor social deaths, which can begin in the work environment, with colleagues and friends, and even reach the family context¹⁹.

As described by caregivers, there may be restrictions to their lifestyle, which can lead to physical and emotional overload, and may or may not be associated with the difficulty of accepting a reversal of roles, such as in the case of parents and children, and the responsibility of the role¹⁷. Over time, the prognosis of PD requires the caregiver to provide and receive more physical, emotional and social support than in the initial stage. With increased demand for care, there may be a financial impact on family income, because caregivers sometimes need to give up their jobs, causing a serious loss of direct income¹⁸.

The mentally that "no one who can care for them as well as me" and the need to be always present prevents many caregivers from entrusting care to another caregiver. Whenever they are forced to do so, or to leave the individual with PD alone, feelings of guilt, worry and insecurity emerge¹⁷. The caregiver therefore needs a break from caring to improve their own quality of life¹⁸.

The association between the process of caring for an individual with PD and its positive and negative aspects allows us to reflect on how complex the daily construction of care is, as it demands resilience both on the part of caregivers and individuals with PD. The main aspects are shown in

Figure 5. Positive and negative aspects for caregivers of people with Parkinson's Disease. Recife, Pernambuco, 2015.

Positive aspects	Negative aspects
Increased personal maturity	Physical, emotional and social exhaustion
Learn to act calmly	Reduction in freedom/independence to plan one's daily schedule
Seek out information about Parkinson's Disease and its prognosis	State of alert
Exercise more patience	Lack of integration in care network
Exercise positive thinking	Emotional impact
Improve family bonds/relationships	Undue concern with the opinion of others
Feelings of joy	Restrictions on lifestyle
Feeling of relief that is not malign tumor or dementia	Feelings of worry, frustration, sadness, shock, loss, anger and anxiety
Improve family bonds/relationships	Making decisions alone

Source: Authors' own work.z

Support for caregivers of people with Parkinson's Disease: what can be done for them?

The discussion of this theme reveals how important it is to improve the support provided to the caregiver, either through the greater availability of information about PD and the management of the disease or accessibility to quality content¹⁷. This information will enable the caregiver to understand and deal with PD²⁰.

Information related to the economic implications of the disease is as important as that related to caring, as there may be a financial burden related to the hiring of formal caregivers. According to the reports of the caregivers, this situation can be aggravated as a result of difficulties in accessibility to information about rights, benefits and social facilities¹⁸. It is important to emphasize that this information can facilitate the daily life of individuals with PD and their caregivers.

The caregivers described some factors related to the support they receive, such as: access to information; knowledge about PD and its prognosis; the creation of coping strategies; strength from spiritual beliefs; the development of a professional patient-caregiver relationship; volunteer groups to help people with PD and caregivers; maintaining social commitments; improvements in the health system and integrated care; family relationships; positive interpersonal relationships; and personal qualities desirable in a caregiver. The support network should be a part of the discussions of managers and health professionals in order to provide efficient and effective support to the caregiver. In this way, the anxiety, stress and helplessness reported by caregivers can be minimized¹⁸.

As explained by the caregivers, the health system needs to be improved through the adoption of an integrated approach to the provision of services for the care of PD by the multi-professional team, with the aim of seeking the best solutions¹⁷. Therefore, interdisciplinary actions across a network of services using referral and counter-referral as instruments to guide this reality can guarantee the biopsychosocial well-being of individuals with PD and their caregivers.

The lack of integrated and networked action means that health professionals do not focus on PD and are not aware of the services available for specialized care, and so can contribute to the occurrence of crises in these individuals¹⁸.

Therefore, the guarantee of a space where doubts about PD can be answered, mainly by the health professionals responsible for follow-up monitoring of a case, such as a neurologist, about the definition, progression, signs and symptoms, medication and its adverse effects, and advances in the treatment of PD is essential for quality health monitoring. This information should be made available based on the need/profile of each person affected by PD and their caregiver¹⁸.

Sometimes caregivers are not aware of the extent of the PD, and even health professionals are not usually the appropriate people to provide important details on such a subject, such as the presence of psychosis as an adverse effect of PD medication²⁰.

The support given to the caregiver by others is fundamental to ameliorate the challenges of the caring process. One strategy might be the insertion of the caregiver into mutual support groups that allow the exchange of experiences and feelings among people who experience similarly situations. Many caregivers have perceived that these groups are a valuable tool in the carrying out of their role from the onset of PD, as they can also reduce mental overload and anxiety^{9,17}. In addition, it is important to change the perception of caregivers that they have no support from anyone, while the individual being cared for receives all the support of third parties¹⁷.

There is also a need to create groups for those with DP themselves¹⁸, as these individuals must be stimulated to deal with their disease the best they can, either through therapeutic groups or through the accompaniment of dentists, nurses, physiotherapists, speech-language pathologists and others.

With a significant number of elderly people providing care, it is important to emphasize that these individuals either are going through or will go

through the process of human aging, which raises concerns regarding their own aging, during which they will probably also require care¹⁸.

The lack of research studies carried out in Brazil for the sample population is a limiting factor of the present work, and evidences the need to carry out studies that focus on the care of individuals affected by PD from the perspective of the family caregiver, so that this individual can be understood within the care process and in the context of their respective reality, considering the relevant cultural and social factors.

CONCLUSION

There is still a major shortage of publications about caregivers of people with Parkinson's disease. This failing is even more severe in Brazil, where a large majority of studies are directed at the individual affected by the disease itself.

Thus, caring for a person with Parkinson's disease is a challenge, considering that the caregiver's understanding of the health-disease process does not always occur in an adequate manner, which contributes to their physical and emotional exhaustion.

The positive and negative aspects of the caring process, such as the strengthening of family ties and the restricting of the disease, involve access to information related to the disease and its prognosis. It is therefore imperative that health and social service professionals and managers are prepared to facilitate universal access to quality information, and to respond to questions about the same.

It is necessary to take care of caregivers through integral care services for individuals affected by Parkinson's, in order to guarantee the improvement of their functioning and reduce physical, emotional and social overload, which will directly influence the health of both parties. In addition, it is necessary to make society aware of the issues related to Parkinson's Disease in order to demystify the paradigms involving this condition, so that the network of support for people with Parkinson's and their caregivers is broadened and strengthened.

Therefore, there is a need for new studies that contribute to the understanding of this process from the perspective of the caregiver, including those affected by Parkinson's disease, especially in Brazil, considering that in this study no publications were found that adopted this perspective, which can be used to guide the creation of public policies for caregivers.

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Thematic Section

Drug use and associated risks among the elderly



Factors associated with adherence to pharmacological treatment among elderly persons using antihypertensive drugs

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Abstract

Objective: analyze adherence to pharmacotherapy and associated factors among elderly patients using at least one antihypertensive medication. *Methods:* A cross-sectional, population-based study was performed of elderly patients resident in Juiz de Fora, Minas Gerais, Brazil. Adherence to medication was assessed with the Morisky-Green Test. Socio-demographic variables and variables related to health status, the health service and drug therapy were collected. The Poisson regression model was used to assess crude and adjusted (95% confidence interval) prevalence ratios (PR). The level of significance was tested using the Wald test. *Results:* The prevalence of adherence to pharmacological therapy was 47% (95% CI: 41%-53%). The sample consisted of 279 elderly persons, the majority of whom were women (69%), described themselves as white (45.5%), and had up to four years of schooling (76.48%). Regarding pharmacological therapy, the subjects took 5.19 (\pm 2.8) medications and 7.1 (\pm 4.4) tablets per day. *Conclusion:* a significant association was observed between adherence to pharmacological therapy and the variables positive perception of vision, positive perception of hearing and absence of frailty.

Keywords: Elderly.
Hypertension. Medication
Adherence.

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INTRODUCTION

As the population ages, there is an increase in the prevalence of chronic noncommunicable diseases, making the practice of polypharmacy more common. This imposes a need for actions to promote health, the prevention of diseases and specific treatment for this age group¹.

Systemic arterial hypertension (SAH) is characterized as a chronic multifactorial disease, which is highly prevalent, especially among the elderly. The effects of the disease have a major economic and social impact and it is responsible for 9.4 million deaths per year around the world. In some countries, the costs of SAH complications reach as much as 20% of total health expenditures².

Adherence to drug therapy can be understood as "the extent to which individual behavior – the use of medications, following a diet, and/or making lifestyle changes coincide with the recommendations of health professionals"³.

Low adherence has negative consequences for the inherent challenge of improving health among poor populations, as it results in the loss and underutilization of already scarce resources³. A systematic review has concluded that improved adherence to the treatment of coronary artery disease reduces the annual costs of the disease by between 10.1 and 17.8%⁴.

According to data from the National Household Sample Survey, 83% of Brazilians who self-report hypertension make continuous use of medication. The prevalence of hypertension and the number of medications used to treat this chronic disease increase with age⁵⁻⁷.

The positive clinical results of pharmacological therapy depend on it being used at the correct dosage and over the correct period. Adherence compromises the effectiveness of treatment, impacting on the quality of life of the patient and health expenditures, whether in the public or private health service³.

Results obtained from population-based studies on drug use are important tools for the planning of pharmaceutical care, health regulation (registration and inspection) policies, and to promote the rational use of medicines³. Several instruments are described in literature to measure adherence, but there is no consensus on a gold standard and there is no instrument that is suitable for all studies^{5,8}.

Therefore, the present study aims to analyze adherence to pharmacological treatment and associated factors among elderly persons who use at least one antihypertensive drug.

METHODS

A cross-sectional, population-based study was carried out, which was part of a research project entitled "the Health Survey of the Elderly Population of Juiz de Fora". The city is located in the Zona da Mata (Forest Region) area of the state of Minas Gerais, and has a population of 516,247 inhabitants, of which 13.6% (70,288 inhabitants) are elderly⁹. The northern part of the city has the greatest territorial area in the urban region and the second largest population contingent in the municipality. It is also home to the largest number of neighborhoods and the greatest concentration of informal settlements and social programs.

The study population consisted of individuals aged 60 years or more residing in the northern region of the city of Juiz de Fora, Minas Gerais. Data collection occurred between September 2014 and February 2015.

The inclusion criteria were: report the use of at least one antihypertensive medication and be approved in the "Mini Mental State Exam" (MMSE) or, in the case of cognitive decline, have a caregiver who is responsible for medications who can respond to the interview. When the caregiver was the respondent, questions about self-perceived health status were not answered.

The data collection instrument was previously tested and applied in a pilot study with 50 elderly individuals residing in a region other than the one

selected for sampling in this study. All researchers participated in theoretical and practical training.

The present study originates from the cross-sectional cut-off of the second phase of a cohort study initiated in 2011¹⁰ and which had its second stage in 2014/2015. In the first phase, the individuals were selected through cluster sampling, based on the type of health care coverage offered by the Sistema Único de Saúde (the Unified Health System) (SUS), subdivided into primary care (Family Health Strategy or traditional), Secondary Level Medical Specialty Clinics, or areas without coverage.

In the current phase of this study, the calculation of the sample size was estimated from the study carried out in 2011 and from the 2010 Census data. As there are multiple outcomes of interest to be investigated in the current stage, the sample size was calculated based on a prevalence of 50%, d_{eff} 1.5 (considering the stratification and cluster effect) and a level of significance of 95%.

All the elderly participants of the first phase were visited again (462), and 53.68% (248) participated in the new phase. To compensate for losses over the four years due to population changes, the oversample¹¹ method was used, respecting the cluster sampling. The second phase sample consisted of 423 individuals.

The MMSE was used to track cognitive impairment^{12,13}. The criterion for approval in the MMSE was divided by level of education, with elderly persons with more than four years of schooling required to reach at least 25 points, and those with less than four years, at least 18 points.

To measure adherence to pharmacological treatment, the Morisky- Green Test (MGT), translated into Brazilian Portuguese¹⁴, was used. This is a simple scale, consisting of four questions with dichotomous answers¹⁵. Its choice was justified by its simplicity of application, low cost and frequent use in studies with similar designs^{6,16,17}. The elderly were classified as adherent if their four responses were negative, and non-adherent if they gave at least one positive response, regardless of the drug referred to.

The Edmonton Scale was used to assess frailty. This is composed of nine domains: cognition, general health, functional independence, social support, medication use, nutrition, mood, continence, functional performance. The maximum score is 17 points, representing severe frailty. In the present study, the elderly were classified as non-frail when they reached up to four points, and suffering apparent to severe frailty when they scored between five and 17 points¹⁸.

The interview also included a semi-structured questionnaire prepared by the authors, consisting of 30 questions regarding the socioeconomic conditions, health status and medications currently in use of the elderly persons. The collection of data was carried out by home visits. Losses were considered individuals not found at home after the third visit, at different days and times.

The effect of the study design was considered in the analyses, using the complex analysis module. Initially, the data was submitted to univariate descriptive analysis to obtain absolute and relative frequency measurements for each variable. For the quantitative variables, measures of central tendency (mean, median and mode) and dispersion (standard deviation and variance) were calculated. The chi-squared test was used to compare proportions.

To estimate the crude and adjusted prevalence ratios (PR) and the 95% confidence interval, a Poisson regression model was adopted, with a robust estimate of variance. The Wald Test was used to test the significance of each variable of the model.

Multivariate analysis was based on the proposed hierarchical model (Figure 1) to control possible confounding factors. Variables that obtained $p \leq 0.20$ were included in the bivariate analysis. The initial adjustment was carried out within each block. The gradual withdrawal of the variables was performed, based on significance levels, with those that maintained a value of $p < 0.05$ remaining in the final model, controlled by the significant variables from the blocks immediately above.

The participating individuals signed a Free and Informed Consent Form. The study was approved by the ethics research committee of the Universidade Federal de Juiz de Fora (Juiz de Fora Federal University) (opinion n. 771.916).

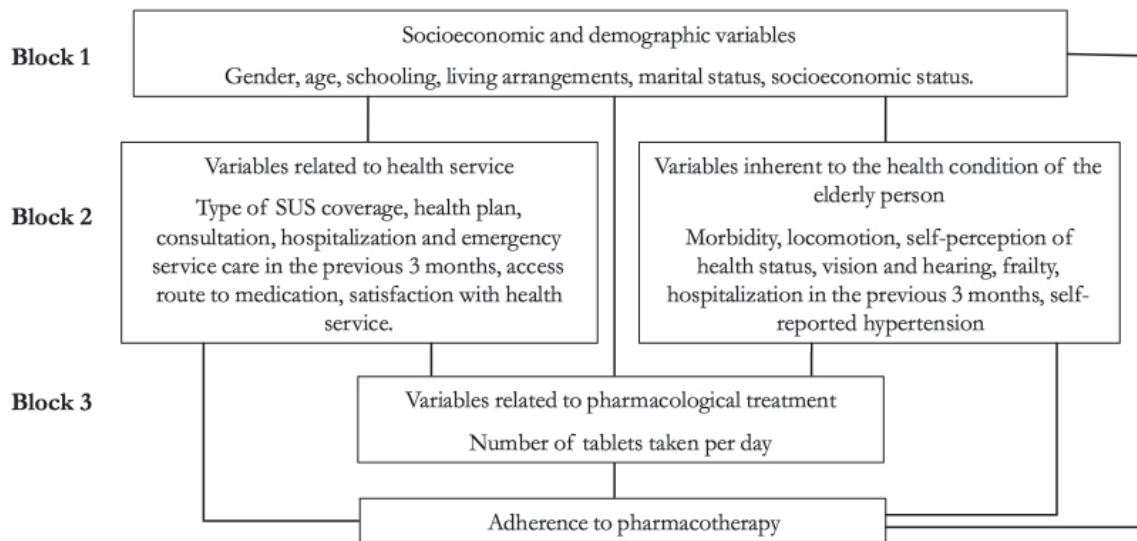


Figure 1. Organizational chart of the theoretic model of the investigation of the effects of the independent variables on level of adherence. Juiz de Fora, MG, 2015.

RESULTS

A total of 423 elderly persons were interviewed, while 23 (5.4%) individuals were excluded due to having a lower than recommended MMSE score based on schooling, and did not have a caregiver or family member who could provide the necessary information. Additionally, 97 (22.9%) persons were excluded as they did not use any antihypertensive medication.

Caregivers or family members responded to 56 (18.5%) interviews. Of these, 24 (8.3%) were not responsible for the medication of the elderly person and so did not respond to the MGT and were therefore also excluded. Only 11.4% (32) of the calculation of adherence was based on the response of another respondent. Of these, only one caregiver was hired and the rest were family members. There was no significant difference between the socioeconomic status of the elderly persons ($p=0.42$), those who had or did not have a caregiver, or adherence classification according to the respondent ($p=0.35$), and so all were included in the same analysis.

Considering the loss of 144 (34.1%) individuals, the final sample of the study included 279 elderly persons (65.9%). It was composed of mainly women (69%), who described themselves as white

(45.5%), had up to four years of schooling (76.48%) and belonged to socioeconomic class C¹⁹ (58.7%). The mean age was 73.9 (± 7.6) years. More than half of the sample (88.5%) lived with another person or persons, 58.17% (145) of whom described being married or living in a common-law marriage.

Only 6% of the sample lived in an area not covered by the Family Health Strategy (FHS) or traditional medical team, and more than half (169) had a health insurance plan. Morbidities relating to the circulatory (84%) and endocrine (31.7%) systems were the most frequent. The presence of at least one health problem was reported by 263 elderly persons, of whom 76.8% (202) reported suffering from SAH. The final sample consisted of 279 elderly persons, and included subjects who, although they did not report suffering from SAH, used antihypertensive medication.

In terms of pharmacological therapy, the use of 5.19 (± 2.8) medications and 7.1 (± 4.4) tablets per day was observed. According to the Anatomical Therapeutic Chemical Classification²⁰, the most consumed classes of medication were those for the cardiovascular system (50%), the alimentary tract (21.6%) and nervous system (13%). With respect to antihypertensive medication, an average of 2.2 (± 1.3) of these active ingredients was observed, with losartan (22.9%), hydrochlorothiazide (18.7%)

and atenolol (7.3%) the most commonly used. Regarding access to medications, 51.6% of the elderly persons received at least one antihypertensive drug from the SUS and 37.2% obtained at least one such drug from the Farmácia Popular or Popular Pharmacy program.

A total of 47% (95%CI: 41%-53%) of the elderly were classified as adherents to pharmacological treatment. Table 1 presents the general data of the sample according to the adherence criteria adopted.

Of the elderly interviewed, 40.5% described having forgotten to take their medication, and 28.6% answered yes to at least two MGT questions. Table 2 shows the answers obtained for each item.

The crude and adjusted prevalence ratios within each block are shown in Table 3. The variables that were most significantly associated with adherence were those related to health condition. Lower schooling was associated with non-adherence, while having had a medical consultation in the last three months, being satisfied with health services and taking up to three tablets per day were significantly associated with adherence.

After multiple regression analysis, the variables positive perception of vision, positive perception of hearing and absence of frailty remained statistically significant ($p < 0.05$) for adherence to treatment (Table 4).

Table 1. Level of adhesion as measured by the Morisky-Green Test according to characteristics of elderly persons using some type of anti-hypertensive medication. Juiz de Fora. Minas Gerais. 2015.

Variable	Adherent n (%)	Non-adherent n (%)
Block1: Relating to socioeconomic and demographic conditions		
Gender		
Female	90 (32.25)	103 (36.94)
Male	41 (14.69)	45 (36.94)
Age (years)		
60-69	46 (16.51)	44 (15.77)
70-79	58 (20.78)	63 (22.58)
80 or older	27 (9.67)	41 (14.69)
Skin color		
White	52 (18.63)	75 (26.88)
Non-white	79 (28.33)	73 (26.16)
Schooling (years)		
0	20 (7.29)	11 (3.94)
1 to 4	79 (28.83)	99 (36.42)
More than 4	30 (10.75)	35 (12.77)
Family arrangement		
Lives alone	16 (5.73)	15 (5.37)
Lives with others	115 (41.22)	133 (47.68)
Marital status		
Married/common law marriage	71 (25.44)	74 (26.53)
Single/widowed/separated/others	60 (21.50)	74 (26.53)
Socioeconomic level (Brazilian Association of Research Companies)		
A or B	34 (12.10)	46 (16.48)
C	78 (27.95)	86 (30.93)
D or E	19 (6.81)	16 (5.73)

to be continued

continued from table 1

Block 2: Health service		
Type of coverage in Unified Health System		
Traditional	9 (3.23)	14 (5.00)
Family Health Strategy	115 (41.30)	123 (44.20)
Medical Center	7 (2.51)	10 (3.59)
Health plan		
Yes	82 (29.30)	87 (31.10)
No	49 (17.56)	61 (21.86)
Medical consultation in previous 3 months		
Yes	96 (34.40)	125 (44.80)
No	35 (12.50)	23 (8.20)
Hospitalized in previous 3 months		
Yes	7 (2.48)	6 (2.12)
No	125 (44.30)	144 (51.06)
Received emergency care in previous 3 months		
Yes	13 (4.60)	20 (7.09)
No	119 (42.19)	130 (46.09)
Access route - Unified Health System Unit		
Yes	65 (23.30)	79 (30.00)
No	59 (23.00)	53 (20.70)
Access route - Farmácia popular (Popular pharmacy)		
Yes	49 (19.00)	55 (21.50)
No	75 (29.40)	76 (29.80)
Access route - Commercial pharmacy		
Yes	54 (21.10)	38 (14.90)
No	70 (27.40)	93 (36.40)
Satisfied with service		
Yes	110 (39.50)	116 (41.72)
No	20 (7.19)	32 (11.51)
Block 3: Health condition		
Self-reported health problem		
Yes	120 (43.00)	143 (51.20)
No	11 (3.90)	5 (1.70)
Self-reported Systemic Arterial Hypertension		
Yes	100 (38.02)	102 (38.78)
No	20 (7.60)	41 (15.58)
Help walking		
Yes	105 (37.60)	120 (43.00)
No	26 (9.30)	28 (10.00)
Self-perception of state of health		
Excellent/ very good/ good	67 (27.50)	59 (26.00)
Fair/poor	44 (18.10)	73 (30.00)
Self-perception of state of vision		
Excellent/ very good/ good	61 (25.10)	47 (19.30)
Fair/poor	50 (20.50)	85 (34.90)
Self-perception of state of hearing		
Excellent/ very good/ good	92 (37.70)	84 (34.40)
Fair/poor	20 (8.19)	48 (19.60)

to be continued

continued from table 1

Frailty		
Not frail	53 (23.10)	35 (15.20)
Apparent to severe frailty	54 (23.50)	87 (37.90)
Block 4: Pharmacological therapy		
N° of tablets taken/day		
1 to 3	49 (17.56)	42 (15.03)
4 or more	82 (29.39)	106 (37.99)
Access route - Commercial pharmacy		

Table 2. Frequency of responses to Morisky-Green Test among elderly persons using anti-hypertensive medicine. Juiz de Fora, Minas Gerais, 2015.

Questions	Yes n (%)	No n (%)
Do you ever forget to take your medications?	113 (40,5)	166 (59,5)
Are you careless at times about taking your medication?	70 (25,1)	209 (74,9)
When you feel better do you sometimes stop taking your medication?	22 (7,9)	257 (92,1)
Sometimes if you feel worse when you take your medications, do you stop taking them?	34 (12,2)	245 (87,8)

Table 3. Crude and adjusted prevalence ratios of elderly people classified as adherent according to the Morisky and Green scale, among the population using antihypertensive medication. Juiz de Fora, Minas Gerais, 2015.

Variables	Crude PR	CI-95%	<i>p</i>	Adjusted PR	CI-95%	<i>p</i>
Block1: Variables related to socioeconomic condition						
Age (years)			0.10			0.07
60-69	1.28	0.90	1.83	1.36	0.97	1.92
70-79	1.20	0.85	1.70	1.51	0.81	2.84
80 or older	1.00					
Skin color *			0.04			0.09
White	0.79	0.61	1.02	0.66	0.40	1.07
Non-white	1.00			1.00		
Schooling (years)**			0.07			0.79
0	0.65	0.38	1.11	0.57	0.27	1.23
1 to 4	1.03	0.80	1.34	1.09	0.50	1.69
Older than 4	1.00			1.00		
Socioeconomic level (Brazilian Association of Research Companies)**			0.16			0.55
A or B	1.14	0.77	1.69	1.16	0.72	1.85
C	1.03	0.80	1.34	1.26	0.54	1.38
D or E	1.00			1.00		
Block 2: Health services						
Medical consultation in previous 3 months *			0.02			0.02
Yes	1.42	1.01	1.99	2.04	1.08	3.79
No	1.00					

to be continued

continued from table 3

Access route- Unified Health System Unit*				0.14			0.90
Yes	0.85	0.66	1.10		0.97	0.55	1.69
No	1.00						
Access route- commercial pharmacy*				0.01			0.06
Yes	1.36	1.06	1.74		1.76	0.99	3.13
No	1.00				1.00		
Satisfaction with service*				0.11			0.41
Yes	1.27	0.88	1.83		1.30	0.70	2.42
No	1.00				1.00		
Block 3: Health condition							
Self-reported health problem*				0.06			0.33
Yes	0.66	0.46	0.94		0.49	0.11	2.09
No	1.00				1.00		
Self-reported Arterial Hypertension*				0.02			0.26
Yes	1.51	1.03	2.22		1.54	0.73	3.28
No	1.00				1.00		
Perception of health*				0.01			0.88
Excellent/ very good/ good	1.41	1.06	1.88		1.06	0.52	2.16
Fair/poor	1.00				1.00		
Perception of vision*				0.02			0.08
Excellent/ very good/ good	1.52	1.15	2.00		1.75	0.92	3.31
Fair/poor	1.00				1.00		
Perception of hearing*				0.01			0.01
Excellent/ very good/ good	1.78	1.20	2.64		2.69	1.28	5.62
Fair/poor	1.00				1.00		
Frailty*				<0.01			0.01
Not-frail	1.57	1.20	2.06		2.32	1.14	4.69
Apparent to severe frailty	1.00				1.00		
Block 4: Pharmacological therapy							
Nº of tablets taken/day *				0.07			0.07
1 to 3	1.23	0.96	1.59		1.51	0.91	2.49
4 or more	1.00				1.00		

*p-value for heterogeneity; ** p-value for linear tendency

Table 4. Final logistic regression model of adherence and independent variables according to the Morisky-Green scale, among a population of elderly persons using anti-hypertensive medication. Juiz de Fora, Minas Gerais, 2015.

Variables	Adjusted PR *	CI-95%	<i>p</i>
Perception of vision			0.02
Excellent/ very good/ good	2.14	1.08 4.27	
Fair/poor	1.00		

to be continued

continued from table 4

Perception of hearing				0.03
Excellent/ very good/ good	2.33	1.05	5.18	
Fair/poor	1.00			
Frailty				0.03
Not-frail	2.18	1.05	4.55	
Apparent to severe frailty	1.00			

DISCUSSION

Low adherence to pharmacological therapy is associated with an increased risk of cardiovascular complications and hospitalizations²¹. The prevalence of adherence of 47% in the present study is similar to that found in a number of other works^{21,22}.

Studies have observed a statistically significant association between socioeconomic conditions and adherence^{8,22}. In the present study, this association did not occur, probably due to a certain homogeneity among the population, of which 70% were from social classes C, D or E¹⁹, and 74.9% had up to four years of schooling.

The use of a greater number of medications is clearly associated with lower adherence in literature^{6,23}. In the present study, the variables "total tablets taken per day" ($p=0.07$) and "number of medications" ($p=0.08$) were significant in bivariate analysis. There was, however, an apparent overlap of the effects observed in the Poisson regression of block 3 (total tablets/day $p=0.61$ and number of medications $p=0.39$). Due to the importance assigned to these variables in literature, and considering that the number of daily doses best reflects the complexity of the therapeutic regimen^{8,19}, it was chosen to maintain this variable only in the model. It was observed in bivariate analysis that elderly persons who take up to three tablets per day, irrespective of the active ingredient, are more adherent to pharmacological treatment, but in the final analysis this variable was no longer statistically significant.

Access to medicines may be the first barrier to adherence. In Brazil, great efforts have been

made to expand access to the treatment of chronic diseases^{24,25}. According to data from the 2013 National Survey by Household Samples, 82.5% of the sample obtained access to all the drugs prescribed to them, while 33.2% of such individuals obtained at least one drug from SUS units, and 21.9% obtained at least one drug from the Farmácia Popular, or Popular Pharmacy, Program²⁶. This program has two modalities: a network of Popular Pharmacies and a partnership with pharmacies from the private network, named "popular pharmacy here"²⁵. In the present study, more than half of the sample obtained at least one of their antihypertensive drugs through these routes.

The antihypertensive drugs most commonly used by the elderly in this study (losartan, hydrochlorothiazide and atenolol) are provided free of charge by the Popular Pharmacy program, which should favor access and adherence to therapy²⁶.

The variables classification as non-frail and a positive self-report of hearing and vision remained statistically associated with adherence to pharmacological therapy in the final model.

Frailty among the elderly can be understood as a multidimensional and multidetermined event that results in functional impairments and their outcomes. This process is characterized by vulnerability to environmental stressors and alterations in the musculoskeletal system, in motor functioning and in body composition. Limitations in the performance of activities of daily living represent a consequence of frailty which have a major impact on the life of the elderly and their relatives²⁷.

The Edmonton Frail Scale assesses physical and psychosocial factors, and when answered by elderly persons themselves reflects their perception of their limitations¹⁸. Therefore, the questions about the self-reporting of conditions of vision and hearing represent an extension of an individual's own perception of their difficulties. In the study by Borinet al.²⁸, it was observed that a poor self-assessment of health status by the elderly was associated with a greater report of functional limitations arising from self-reported morbidities. The greater the self-reported limitations, the greater the need for assistance and guidance for the control of chronic diseases²⁷, which explains the greater adherence in non-frail individuals with positive self-reports of vision and hearing.

A population-based study found an association between low adherence and incapacity in instrumental activities of daily living, a variable that represents one of the items evaluated in the frailty scale^{18,22}. Regarding physiological condition, the elderly individual is more exposed to adverse events due to the changes in pharmacodynamics and pharmacokinetics inherent to aging. Elderly persons identified as frail are even more vulnerable to adverse drug events and hospitalizations²⁹.

Knowledge about disease and medications used favors adherence³⁰. The pharmacist is the health professional with the most knowledge about medicines, and is therefore the recommended individual for orienting the patient about the proposed therapeutic regimen⁴. However, the importance of the interdisciplinary action of the health team in this process of orientation and optimization of the adherence to pharmacological treatment cannot be overlooked.

More than 80% of interviewees described living with another person or persons and more than half had a caregiver, which demonstrates the importance of pharmaceutical care to guide and accompany not only elderly persons, but also caregivers and family members, making them active subjects in the care process according to the needs of each elderly person.

One of the limitations of the present study is that it was part of a larger research with different objectives. Additionally, most of the information obtained was self-reported, which may be affected by memory bias. The method used to measure adherence can be direct (such as dosage of the principle ingredient) or indirect (tablet counting or user reporting through a questionnaire). This diversity of methods and criteria may limit the comparison of the results found⁸. In the present study, an indirect method was applied, which has greater applicability in public health, but tends to overestimate adherence³⁰. Also, the questionnaire was not validated for the Portuguese language, which implies limitations in its internal validity. Despite these factors, it was possible to calculate adherence and associated factors in a sample of the elderly through a household survey, generating information that may contribute to the elaboration of interventions among this group.

CONCLUSION

In the present study, a significant association was observed between adherence to pharmacological therapy and the elements positive perception of vision, positive perception of hearing and absence of frailty.

It is interesting to note that only variables related to condition of health remained associated. Adherence management should be considered an inherent factor in the control of hypertension, culminating with efforts to ensure greater adherence to medications of continuous use, through multidisciplinary interventions according to the needs of each individual. Medicine is an essential technological component of the health system, and represents a tool for health workers, so it is unacceptable that it should be dissociated from the medical service⁴.

It is hoped that the present study may support other studies into the health condition of the elderly population, and that the results presented may guide the elaboration of health programs and policies in the municipality of Juiz de Fora.

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Applicability of Anticholinergic Risk Scale in hospitalized elderly persons

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Abstract

Objective: to define the applicability of the Anticholinergic Risk Scale (ARS) as a risk indicator of delirium in hospitalized elderly persons. *Method:* the medical records of elderly patients hospitalized in the medical wards of a teaching hospital were analyzed with the ARS, translated and adapted for medicines used in Brazil. The version of the Confusion Assessment Method (CAM) for the clinical diagnosis of delirium translated and validated by Fabbri et al. was used. Individuals aged ≥ 60 years were included in the evaluation of drug use. The sample was divided by gender and age to analyze the effect of these variables on the use of anticholinergic drugs based on the ARS, and association with delirium. *Results:* 123 elderly persons, 47 men and 76 women, with a mean age of $72.7(\pm 9.2)$ years were included. The average consumption of drugs not listed in the ARS (some with anticholinergic action as Ipratropium and Scopolamine) was $6.1(\pm 3.0)$ and the average number of drugs used listed in the ARS (Metoclopramide, Ranitidine, Atropine, Haloperidol and Risperidone) was 0.9 ± 0.6 . Four elderly persons had a score ≥ 3 (3.3% of total cases). Delirium was observed in 27 patients (21.9% of the total), none of whom scored more than two ARS points. There was no statistical significance regarding gender, age and delirium. *Conclusion:* the average score of the ARS was low among this population, and did not correlate with delirium. The ARS does not cover all anticholinergics, meaning this study should be repeated in a geriatric ward for comparison.

Keywords: Elderly.
Cholinergic Antagonists.
Pharmaceutical Preparations.
Iatrogenic Disease.

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INTRODUCTION

Anticholinergic drugs often have adverse effects on elderly persons¹⁻⁴. However, they are part of the drug treatment of several situations and diseases, such as urinary incontinence and Parkinson's disease, which are common among this age group³. How should these drugs be prescribed to ensure a lower iatrogenic risk among the elderly?

Rudolph et al.⁵ developed the Anticholinergic Risk Scale (ARS), which is based on publications about drugs and pharmacology during aging, with the aim of creating a simple tool to estimate the risk of the adverse effects of anticholinergics. The ARS is divided into four groups of drugs with scores of 0 to 3 (no or limited effect, moderate effect, strong effect, or very strong effect, respectively), with the risk being proportional to the sum of the points of the drugs used by the patient. A final sum greater or equal to 3 is considered a serious risk.

The ARS⁵ methodology involved three independent reviews (one by a geriatrician and two by pharmacologists) of the 500 medications most prescribed by the Veterans Affairs Boston Health Care System, with the aim of identifying drugs with the known potential to produce adverse anticholinergic effects. Topical, ophthalmological, otological and breathing effects were excluded from the analysis. The inclusion of medications in the ARS and their anticholinergic risk score was based on three reviews: a) the KiBank data base 18 of the National Institute of Mental Health psychoactive drug search program: to determine the dissociation constant (pKi) for the cholinergic receptor; b) Microdex: evidence-based review of drugs registered with the Food and Drug Administration (FDA) to define rates of adverse anticholinergic events compared with a placebo; c) Medline: active search for literature related to adverse anticholinergic effects. The classification of the anticholinergic effect of drugs on a scale of 0 to 3 was based on the inclusion of the drug in the three analyzes and agreement between the researchers regarding the anticholinergic potential of each individual drug.

Therefore, the present study presents the question of whether the ARS is of practical use

for the evaluation of elderly patients hospitalized in a medical ward in terms of the risk of drug iatrogenesis through anticholinergic agents and/or the association of this drug group with the clinical diagnosis of delirium, given the frequent association between this state of acute mental confusion and anticholinergic drugs.

The objective of this study was to evaluate the applicability of ARS, based on degree of anticholinergic risk, as an indicator of the risk of delirium among elderly persons hospitalized in the medical ward of a teaching hospital.

METHOD

The medical records of elderly patients hospitalized in the medical ward of a teaching hospital at the end of hospitalization were analyzed by the ARS⁵ adapted for the Brazilian pharmacopoeia (Figure 1). The ARS was translated into Portuguese and adapted for medicines used in Brazil for the present study, the primary objective of which was to verify its practicality for use in Brazil. The drugs were grouped based on scores of 1 to 3 (moderate, strong and very strong, respectively). A final points total greater than or equal to 3 was considered a serious risk (Figure 1).

Patients who had used medication since the start of their hospitalization and who were 60 or older were included in the study. The clinical diagnosis of delirium was established using the Portuguese version of the Confusion Assessment Method (CAM) translated and validated by Fabbri et al.¹² and routinely used in Brazilian clinical practice since its publication in 2001. Positive cases were classified by motor subtypes of delirium¹³: a) hyperactive delirium: evidence in 24 hours prior to diagnosis of at least two of the following symptoms: quantitatively increased motor activity, loss of activity control, restlessness, perambulation; b) Hypoactive delirium: evidence in 24 hours prior to diagnosis of at least two of the following symptoms: significantly reduced activity, decreased movement speed, poor attention to surrounding environment, significantly reduced speech, decreased speech rate, indifference, reduced agility; c) Mixed delirium: evidence of two previous

Figure 1. Medications commercially available in Brazil and included in the Anticholinergic Risk Scale (Rudolph et al.5). São Paulo, 2012.

Medications with anticholinergic effect		
Very strong 3 points per drug	Strong 2 points per drug	Moderate 1 point per drug
Amitriptyline	Amantadine	Carbidopa-Levodopa
Atropine	Baclofen	Entacapone
Benztropine	Cetirizine	Haloperidol
Carisoprodol	Cimetidine	Metocarbamol
Ciproheptadine	Clozapine	Metoclopramide
Chlorpheniramine	Cyclobenzaprine	Mirtazapine
Chlorpromazine	Desipramine	Paroxetine
Dicyclomine	Loperamide	Pramipexole
Diphenhydramine	Nortriptyline	Quetiapine
Fluphenazine	Olanzapine	Ranitidine
Hydroxyzine	Prochlorperazine	Risperidone
Hyoscyamine	Pseudoephedrine	Selegiline
Imipramine	Tolterodine	Trazodone
Meclizine		Ziprasidone
Oxybutynin		
Perphenazine		
Promethazine		
Thioridazine		
Thiothixene		
Tizanidine		
Trifluoperazine		

Serious risk: final points total ≥ 3 .

subtypes (hyper and hypoactive) in previous 24 hours; d) non-motor delirium: absence in the previous 24 hours of the symptoms listed in a and b to define the hyperactive and hypoactive subtypes.

As delirium is a syndrome of organic and multifactorial cause and not necessarily easy to etiologically determine, patients were not characterized in terms of severity, exacerbation or previous cognitive dysfunction. It was thus possible to use the syndromic diagnosis of delirium in a generic manner, to remain faithful to the basic proposal of this study, which is to determine the impact of the use of drugs with anticholinergic potential on patients with delirium diagnosed by the CAM¹².

The medical records and the patients in the present study (elderly patients hospitalized in the medical ward of a teaching hospital) were jointly analyzed by

the two authors of this study (geriatricians) based on hospitalizations during the year 2011.

As the hospitalized elderly population is the group with the highest risk of drug iatrogenesis, the present study adopted a convenience sample. This decision was also based on greater accessibility to this group of patients, operational ease and low cost. As the present study is considered a pilot study in this line of research, risk was based on the lowest potential generalization of results based on this method of research, considering its practical utility in the institution where the study was carried out.

Statistical analysis was based on the Chi-squared Test (Corrected Yates Test or Fisher's exact test), dividing the study between men and women and age (< and 80 years) to allow analysis by gender and age in terms of the use of anticholinergic drugs

described by ARS and association with delirium. Considering the prescriptions of 120 elderly persons and ARS values 3 in between 5.0 and 2.5% of the studied population, it was estimated that a sample of between 105 and 109 inpatients would represent a significant value.

The present study was part of project n 418/08 approved by the Ethics Committee for Human Research of the Irmandade da Santa Casa de Misericórdia de São Paulo, the institution where the study was carried out.

RESULTS

The medical records of 123 elderly persons (47 men and 76 women), with a mean age of 72.7 (± 9.2) years, were analyzed. A mean consumption of 6.1 (± 3.0) drugs not listed in ARS⁵ (some with an anticholinergic action, such as Ipratropium and Scopolamine)^{14,15} and 0.9 (± 0.6) drugs listed in ARS were identified: 1) Metoclopramide: in 80 medical records, used symptomatically; 2) Ranitidine: in 21 records; 3) Atropine: in three records; 4) Haloperidol: in three records; 5) Risperidone: in one medical record.

Symptomatic drugs were taken at least once to be included in this list. The prescription of the two psychotropic drugs mentioned (Haloperidol and Risperidone) occurred after the clinical diagnosis of delirium.

A total of 31 patients had an ARS score of zero (25.2% of the total number of cases), 75 had a score of one (60.9%), 12 had a score of two (9.8%) and five elderly persons had a score 3 (4.1% of the total analyzed).

Delirium was observed in 27 patients (16 with hypoactive delirium, five with mixed delirium and six with hyperactive delirium), which represented 21.9% of the total sample. None of these individuals scored more than two ARS points. There was no statistical significance when ARS was individually related to age, gender or delirium.

DISCUSSION

Anticholinergic drugs have the potential to trigger serious adverse effects, particularly among the elderly, such

as falls, cognitive dysfunction and delirium^{1-11,14}. They also contribute to increased mortality in this age group^{13,6,9}.

Drugs with anticholinergic properties are cited in several lists and criteria of potentially inappropriate medications (PIM) for the elderly published between 2003 and 2012¹⁵⁻¹⁹. A PIM is defined as a drug that risks causing adverse effects that are greater than the benefits for the elderly.

These lists and criteria are useful in clinical practice, but merely cite and explain the reasons for the inclusion of the PIM, and do not quantify the degree of risk of adverse effects of each drug. Several anticholinergic drugs are cited, such as first-generation antihistamines^{15,16,18,19}, systemic^{15,19} or urinary¹⁶⁻¹⁹ antispasmodics, disopyramide^{15,19}, tricyclic antidepressants^{15,16,18,19}, first-generation antipsychotics^{15,16,18}, muscle relaxants^{15,19}, dimenhydrin¹⁶, doxylamine^{16,18} and diphenhydramine¹⁶. Some of these anticholinergic drugs are found in the ARS⁵ adapted for the Brazilian pharmacopoeia, yet represent only approximately 40.0% of all drugs listed (19 out of 48). Such drugs are mainly in the list of drugs with three anticholinergic risk points (15 of the 21 drugs listed), or in other words, among those most likely to produce adverse effects.

The ARS fills a gap in the lists and criteria of PIM for the elderly, as it provides a more refined analysis of anticholinergic risk, detecting drugs with weaker anticholinergic action and allowing the risk of the total medication prescribed to be calculated. Some published studies⁶⁻¹¹ include findings that suggest limitations in the application of the scale in clinical practice.

Evaluations of samples from hospitals^{6,9} have associated high ARS scores with a higher mortality risk among the elderly, a fact not observed in asylum institutions¹¹. This discrepancy can be attributed to the low number of studies and the different dynamics of care and populations in hospitals and asylum institutions.

As was the case with the present study, Gouraud-Tanguy et al.⁷ did not detect a greater number of central adverse effects, such as delirium, among hospitalized elderly persons. Both studies were

based on wards in teaching hospitals, with a care structure that allowed the early diagnosis of delirium and the non-prescription of anticholinergic drugs, facts that may explain this negative result.

Interestingly, while the present study and that of Vanier et al.⁸ detected similar percentages of elderly individuals with scores ≥ 3 , the findings for the number of individuals scoring one or two points differed, with approximately three times as many such individuals in the present study. However, it should be considered that the prescriptions of the present study presented a high percentage of symptomatic drugs, such as Metoclopramide and Ranitidine, a possible explanation for this discrepancy. The results of the present study were similar, in terms of ARS scores of two or three points, to a population of patients receiving outpatient care¹¹. The prescription pattern of the medical records analyzed is closer to the American¹¹ than the French⁸ model.

As a final observation, the ARS⁵ adapted for the Brazilian pharmacopoeia does not include all the drugs with anticholinergic properties used in patients hospitalized in medical wards. Previously described examples such as Ipratropium¹⁴ and Scopolamine¹⁵

justify the extension of the present study by adding new drugs to the original ARS. In addition, repeating the study in a geriatric ward to compare cases of elderly people with different diagnostic and treatment dynamics would be worthwhile.

The present study should be refined by adding other variables, such as separating groups with or without previous cognitive dysfunction and/or based on the severity of the diseases that led to the hospitalization of the patients. This is a limiting factor for potential generalizations about the results of the present study. Considering the multifactorial etiology of delirium, it is also possible to further define ARS analysis based on the medication being used upon admission to the Emergency Department and the drugs prescribed in the medical ward.

CONCLUSION

The mean number of drugs in the Anticholinergic Risk Scale was low in the study population, and there was no correlation with cases of delirium. It was noted that the Anticholinergic Risk Scale does not include all anticholinergics, and so this study should be repeated in a geriatric ward for comparison.

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Suicidally motivated intoxication by psychoactive drugs: characterization among the elderly

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Abstract

Objective: to characterize suicidally motivated intoxication by psychoactive drugs among elderly people. *Method:* a retrospective and documentary study with a quantitative approach was carried out, based on the notification forms of 692 cases of suicidally motivated intoxications by psychoactive drugs, registered by the Centro de Assistência Toxicológica (the Toxicological Care Center) in Fortaleza, Ceará, Brazil from 2010 to 2014. The absolute and relative frequencies of social conditions, intoxication episodes and clinical conducts were obtained, and the Chi-squared Test was applied with a significance of $p \leq 0.05$. *Results:* elderly people aged between 60 and 69 years (65.9%), who were female and retired predominated. The most frequently used psychoactive drugs were antidepressants (48.3%) and anxiolytics/hypnotics (29.0%). The most frequent clinical conducts were the use of activated charcoal and gastric lavage. Moderate poisoning was the most frequent, and the main outcome was discharge arising from cure. There was a significant relationship between the elderly persons and gender, occupation, occurrence of intoxication at home, clinical manifestation and hospital admission. *Conclusion:* suicidally motivated poisoning by psychoactive drugs in elderly persons suggests the need to promote active aging, as well as the access to and rational use of these drugs, thereby reducing harm and preserving the lives of elderly persons.

Keywords: Suicide
Attempted. Psychotropic
Drugs. Comprehensive
Health Care for the Elderly.

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INTRODUCTION

Senility brings many diseases that require treatment based on the use of psychoactive drugs, medications that affect mental and emotional functioning¹. The use of psychoactive drugs can lead to intoxication, which is understood as a set of signs and symptoms that cause an organic imbalance, resulting in damage or death².

There are few studies that address the characteristics of suicidally motivated intoxication by psychoactive drugs among the elderly, despite the understanding that an association exists between such factors^{3,4}. Yet suicidal motivation is considered a predictor of suicide, which is a global public health problem⁵.

According to the World Health Organization (WHO), suicide is responsible for the deaths of around one million people around the world every year. China has the highest suicide rate among elderly persons (100 deaths per 100,000 inhabitants), while in South Korea the risk of suicide and suicide attempts among the elderly was 70.7 and 13.1/100,000 inhabitants, respectively. In the USA, the risk is 10.8/100,000 inhabitants^{6,7}.

In Brazil, the rates of suicide are low compared with the majority of countries, oscillating between 3.50 and 5.80/100,000 inhabitants. However, the rates for the elderly, considered to be individuals aged 60 years or over, are twice those of the general population^{1,2,8,9}.

A study about the suicide of the elderly, using the psychological autopsy technique in which post mortem information about the circumstances and situations of the suicide is gathered together, reported that between 71 and 95% of elderly people who committed suicide were diagnosed with a mental disorder at the time of death, while from 71 to 90% suffered from some degree of depression^{3,8}.

In this context, the holistic conception is often neglected in favor of the indiscriminate use of psychoactive drugs, based on the medicalization of the elderly, which is strongly influenced by the biomedical model¹⁰⁻¹². Supporting this theory, it

was observed that there are no programs, actions or strategies directed at the safe use of psychoactive drugs by the elderly in the Unified Health System.

The characteristics of suicidally motivated intoxication by psychoactive drugs among the elderly represent a health problem. At the same time, they stimulate reflections on the use of psychoactive drugs by the elderly and on health actions directed at the prevention of these episodes and their recurrence^{13,14}.

The present study on suicidally motivated intoxication by psychoactive drugs can contribute to a number of health services, establishing individual and collective strategies to promote the safe and rational use of medications¹³, and forming part of the agenda of actions directed at the integral care of the health of the elderly person. Therefore, the present study aimed to characterize suicidally motivated intoxications by psychoactive drugs among the elderly.

METHOD

A retrospective documentary study with a quantitative approach was carried out, based on the Notification Forms of registered intoxications by psychoactive drugs from 2010 to 2014, recorded at the Centro de Assistência Toxicológica (the Toxicological Care Center) (CEATOX) of the Instituto Dr. José Frota (IJF) in Fortaleza, Ceará, a referral center for the care of victims of intoxication.

There were 1,362 reports of drug intoxication in the five-year period studied, of which 692 were caused by psychoactive drugs and were motivated by suicide. Of this total, 25 intoxications involved the elderly, equivalent to 3.6% of the cases in the studied period.

All the treatment records of elderly persons who fit the following inclusion criteria were analyzed: aged at least 60 years at the time of being treated at CEATOX, registration of medication as cause of intoxication, and diagnostic classification in accordance with the International Code of Diseases (CID-10).

Data collection took place in June and August 2015, with a semi-structured form based on the Notification Form, containing information relating to patient data, intoxication characteristics and clinical conduct adopted.

The social characteristics of the patients included the following variables: gender; current age in complete years; and occupation. The intoxication characteristics included the variables: location where intoxication occurred, which can be in the patient's residence or in an external environment; type of intoxication, being classified as single acute or repeated acute; route of administration; form of medication, which could be solid or not informed; quantity of agents used in intoxication; combined use of other substances; time elapsed from exposure to psychoactive drug until arrival at hospital.

The characteristics of clinical conduct included: presence of clinical manifestation; need for hospitalization; length of hospital stay shorter or longer than 24 hours; conduct adopted for treatment of intoxication by psychoactive drugs, which could be gastric lavage/activated charcoal/hydration/clinical observation; assessment of mild/moderate/severe poisoning; classification of outcome, which was either hospital discharge, discharge on request, discharge against medical advice, transferred, or not found.

The analysis of the data involved obtaining the frequency measures of the central tendencies of the variables related to socioeconomic profile, episodes of intoxication and clinical conduct, allowing descriptive statistics to be performed.

The absolute and relative frequencies of variables relating to social profile, episodes of intoxication and the clinical conduct of elderly persons who suffered suicidally motivated intoxication by psychoactive drugs were obtained and compared with those of other patients.

The relationship between social characteristics, episodes of intoxication and clinical conduct and suicidally motivated psychoactive drug intoxication among elderly persons, which was a dependent variable, was also analyzed, using the Chi-squared test ($p < 0.05$).

The study was approved by the Research Ethics Committee of the Instituto Dr. José Frota, under protocol number n° 1.060.172 (CAAE: 43543215.4.0000.5047).

RESULTS

The majority of elderly persons were aged between 60 and 69 years (20; 80.0%), female (19; 76.0%) and retired (12; 48.0%). The majority of non-retired patients performed some kind of work activity (274; 41.0%). Characteristics of intoxication showed that the most common location was in the patient's residence, through a single acute intoxication, via the oral route and with a pharmaceutical in solid form. It was also observed that there was a significant association between age, occupation and place of residence and elderly persons who suffered suicidally motivated intoxication by psychoactive drugs (Table 1).

A proportion of the elderly persons took a quantity of one, two or three drugs, while the taking of a single agent was most frequent among the other patients. The combined use of other substances was frequent among all patients who suffered suicidally motivated intoxication by psychoactive drugs (Table 1).

In terms of the distribution by pharmacological classes of the psychoactive drugs used in suicidally motivated intoxication by the elderly persons, there was a predominance of antidepressants (12; 48.3%) and anxiolytic/hypnotic drugs (7; 29.0%) (Figure 1).

The characteristics of the episodes of suicidally motivated intoxication by psychoactive drugs among elderly persons showed a period of treatment of over eight hours (9; 36.0%), while other patients were treated for between one and eight hours (383; 57.3%). The majority of the elderly persons exhibited manifestations and the need for hospitalization for a period of up to 24 hours, representing a significant relationship (Table 2).

Moderate poisoning was the most frequent, and the use of activated charcoal and gastric lavage were the predominant treatment conducts adopted. Hospital discharge was the most frequent outcome, and was statistically significant. Most of the characteristics of the intoxication episodes and the clinical conducts of other patients were similar to those of the elderly patients (Table 2).

Table 01. Social characteristics of elderly persons and of episodes of suicidally motivated intoxication by psychoactive drugs. Fortaleza. Ceará. 2010-2014.

Variable (n= 692)	Elderly persons (n=25) n (%)	Other Patients (n=667) n (%)	<i>p</i> *
Age (years)			0.00
60 – 69	20 (80.0)		
70 – 79	03 (12.0)		
80 – 89	02 (8.0)		
Gender			0.97
Male	06 (24.0)	213 (32.0)	
Female	19 (76.0)	454 (68.0)	
Occupation			0.00
Retired	12 (48.0)	15 (2.5)	
Performed work activity	10 (40.0)	274 (41.0)	
Unemployed	01 (1.5)	66 (9.8)	
Student	-	139 (20.8)	
Information not provided	03 (12.0)	173 (25.9)	
Location of Intoxication			0.03
Residence	23 (92.0)	650 (97.4)	
External Location	02 (8.0)	17 (2.6)	
Type of Intoxication			0.55
Acute single	25 (100.0)	637 (95.5)	
Acute repeated	-	30 (4.5)	
Administration Route			-
Oral	25 (100.0)	667 (100.0)	
Form			0.85
Solid	17 (68.0)	470 (70.4)	
Information not provided	08 (32.0)	182 (29.6)	
Quantity of toxic agents			0.58
01	09 (36.0)	350 (52.4)	
02	08 (32.0)	172 (25.7)	
03	08 (32.0)	88 (13.1)	
Over 3	-	57 (8.8)	
Combined with other substances			0.11
Yes	16 (64.0)	320 (47.9)	
No	09 (36.0)	347 (52.1)	

**p* refers to Chi-squared test with a level of significance of ≤ 0.05

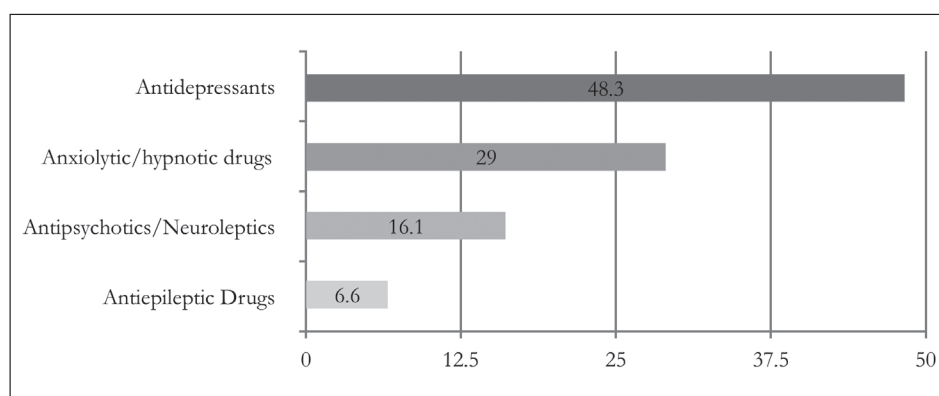
**Figure 1.** Distribution by pharmacological class of medications used in the suicidally motivated intoxication of elderly persons by psychoactive drugs. Fortaleza, Ceará, 2010-2014.

Table 02. Characteristics of episodes of suicidally motivated intoxications by psychoactive drugs of elderly persons and clinical conduct. Fortaleza, Ceará, 2010-2014.

Variable (n= 692)	Elderly persons (n=25) n (%)	Other Patients (n=667) n (%)	<i>p</i> *
Duration of Treatment (hours)			0.65
01 – 04	08 (32.0)	264 (39.5)	
04 – 08	05 (20.0)	119 (17.8)	
More than 08	09 (36.0)	180 (26.9)	
Information not provided	03 (12.0)	104 (15.8)	
Clinical Manifestations			0.00
Yes	21 (84.0)	654 (98.0)	
No	04 (16.0)	13 (2.0)	
Hospitalization Required			0.03
Yes	21 (84.0)	431 (64.6)	
No	04 (16.0)	236 (35.4)	
Duration of Hospitalization (hours)			0.46
Up to 24	19 (76.0)	459 (68.8)	
Over 24	06 (24.0)	208 (31.2)	
Clinical behavior**			-
Gastric lavage	11 (44.0)	336 (50.3)	
Activated charcoal	17 (68.0)	445 (66.7)	
Hydration	05 (20.0)	242 (36.2)	
Clinical observation	02 (8.0)	35 (5.2)	
Type of poisoning			0.33
Mild	06 (24.0)	197 (29.5)	
Moderate	11 (44.0)	330 (49.4)	
Severe	06 (24.0)	123 (18.4)	
Not excluded	02 (8.0)	17 (2.7)	
Outcome			0.07
Hospital discharge	09 (36.0)	395 (59.2)	
Discharge on request	03 (12.0)	42 (6.3)	
Discharge against medical advice	01 (4.0)	18 (2.7)	
Transferred	03 (12.0)	25 (3.7)	
Death	01 (4.3)	06 (1.0)	
Not found	08 (4.0)	181(27.1)	

**p* refers to the Chi-squared test with a level of significance of ≤ 0.05 ; **In the conduct variable the participants may have received more than one treatment resource

DISCUSSION

There was a low incidence of suicidally motivated intoxication by psychoactive drugs among the elderly, although the possibility of underreporting should be considered

The higher frequency of intoxication by psychoactive drugs among younger elderly persons (60 to 69 years old) ratifies data regarding the higher rate

of suicide attempts among this age group. The group aged 70 or above, meanwhile, exhibited a high suicide rate and a low rate of intoxication as a suicide attempt^{3,4}.

A study carried out in China identified an incidence of elderly persons who had experienced self-mutilation, suicidal ideation and attempted suicide of 23.3%. The frequency found by this study for younger elderly persons was 81%, while for elderly persons aged 70 or older it was

68%¹⁵. The study also demonstrated a significant association between age and the intoxicated elderly persons, which suggests that greater attention should be paid to the conditions that characterize the vulnerability of the elderly person.

Women suffered most frequently from suicidally motivated psychoactive drug intoxications. While this higher frequency may be associated with a greater consumption of psychoactive drugs and more frequent suicidal ideation among women, men arrive at the final act of suicide more often, most probably by using other methods^{1,9,16}.

It is known that while men and women face the same degree of risk when suffering from a mental disorder linked to the ideation of suicide, the triggering factors are different, with the impossibility of performing work activities most affecting men, and family and conjugal conflicts most affecting women^{1,3}.

The most frequent occupations reported by the elderly are retirement or the performance of work activities, while in the other patients the most frequent occupations were work and study activities. This finding reveals the influence of retirement on changing family and social roles¹⁷. The performance of work activities, in accordance with the individual's physical capabilities, makes elderly persons less vulnerable to suicide attempts, as it stimulates healthy aging by promoting social integration, autonomy and a sense of usefulness^{13,18}.

The most frequent location of suicidally motivated intoxication by psychoactive drugs was in the home, a statistic which was significantly associated with elderly persons who suffered suicidally motivated intoxication by psychoactive drugs. The choice of the location to attempt suicide is probably based on the fact that the elderly person lives alone, despite suicide attempts through drug poisoning/intoxication presenting low lethality¹⁹.

The intoxications of the elderly persons were all classified as acute, single occurrences, characterized by short-term exposure and the rapid absorption of the toxic agent²⁰. The first episode

of intoxication should be dealt with urgently, but represents a challenge for a psychology outpatient clinic, as overcoming suicidally motivated intoxication without subsequent follow-up by a health professional can result in suicide in later years through accentuated social isolation and associated pathologies^{3,4}.

Oral intoxication and the predominantly solid form of the psychoactive drugs are related to access, which in turn is based on medical prescription and the availability of the drugs in public pharmacies. In this sense, it is necessary to recognize the failings of public actions to prevent intoxication by psychoactive drugs among the elderly²¹.

There was an equitable distribution of the quantities of medications among the elderly, whereas among the other patients, the use of a single agent was more prevalent. In most cases, the drug was used in combination with other substances. These findings differ from a study on the use of psychoactive drugs among the elderly, which found the most frequent quantities to be one or two agents, with prevalences of 26% and 16.4%, respectively¹⁴.

The vulnerability of the elderly to problems arising from the use of drugs is high, due to the complexity of clinical problems, the need for multiple therapeutic agents, and the pharmacokinetic and pharmacodynamic changes inherent in aging. Polypharmacy among the elderly reduces adherence to drug therapy and increases the frequency and severity of adverse reactions and drug interactions, adding to the risk of using potentially inappropriate drugs and, consequently, morbidity and mortality^{22,23}.

The drugs most often used in the present study were the antidepressant and anxiolytic/hypnotic pharmaceutical classes. This finding is explained by the strong association between the diagnosis of depression and the use of psychoactive drugs^{24,25}. The use of antidepressants can result in vulnerability associated with the impairment of metabolism among elderly users²⁶.

The treatment of depression requires the prolonged use of psychoactive drugs, but the

absence of psychotherapy and the fact that the elderly persons live alone make such use unsafe, increasing the risk of socially motivated intoxication^{13,14,27-29}.

The most frequent treatment period for intoxication among the elderly persons was over eight hours, while the other patients were treated for between one and four hours. It is known that elderly persons who attempt to take their own lives are more likely to neither be found nor helped in a timely manner, as many of those who make up this age group live alone¹⁹.

Among the elderly persons, there was a predominance of clinical manifestations, with somnolence and sensory alteration the most frequent. This finding was statistically significant. The ingestion of a toxic quantity of antidepressants and anxiolytics/hypnotics potentiates a sedative effect, with the use of other toxic substances being a potential determinant²⁹.

The need for hospitalization of the elderly for a period of up to 24 hours represented a statistically significant relationship. The short period of hospitalization may be related to the fact that specialized care at a referral center in toxicology was provided, resulting in a positive prognosis.

The most frequently used clinical conducts were the use of activated charcoal, gastric lavage, hydration and observation, respectively. These conducts constitute general treatment which, in turn, is much more effective than the search for a specific antidote²⁰.

Activated charcoal is used in the majority of intoxications due to its absorbing action and, consequently, its reduction of toxic effects. Gastric lavage permits gastric emptying, immediate recovery of the gastric contents and access for the installation of activated carbon. Hydration decreases the concentration of the toxic agent. Both gastric lavage and hydration can eliminate the toxic agent from the body. Clinical observation is indicated for recording the evolution of the patient, the stability of vital signs and overcoming clinical manifestations²⁰.

Intoxication by psychoactive drugs in the elderly in this study produced moderate poisoning and the most frequent outcome was discharge from hospital. Most people are discharged following a cure, when they are attended quickly and effectively by the emergency unit of any hospital where the health professional actions the CEATOX²⁰.

The hospital discharge of elderly persons who suffered suicidally motivated intoxication by a psychoactive drug should not represent the termination of health care, but should involve the continued care of the elderly to observe their overall health condition. There is evidence that depression reappears among elderly persons within a period of two to three years in 50% to 90% of cases, making preventing the recurrence of suicidally motivated intoxication an objective following hospital discharge¹³.

The elderly should be included in risk detection and psychotherapeutic treatment programs to reduce the mortality rate by suicide by 60%^{13,27}. In this context, psychotherapy is understood as a planned and structured intervention that influences behavior, mood and emotional patterns, assuming a transforming role in the lives of the elderly, as it redefines aging and prevents suicidally motivated intoxication^{11,14,29}.

The recognition of protective factors is fundamental for the prevention of suicide attempts among the elderly. These include the support of family and friends and involving oneself in affective links, social protection and social and leisure meetings based on social integration and autonomy^{8,30}. Family and social relationships, including the cultivation of friendships, are important protective factors against depression and suicidal ideation and should be considered a priority^{13,31}.

It is important to recognize and understand the experiences and desires of elderly persons when considering the different ways of integrating such individuals socially. Engagement in social activities and in collective and creative projects should be considered as a suicide prevention strategy, as it promotes their well-being and quality of life, even when dependent^{18,32}.

Elderly persons must be respected as citizens and should be recognized as active, singular individuals, capable of producing subjective meanings and valuing their critical/reflexive capacity for life in a process of personal reconstruction and resignification, promoting active and healthy aging^{11,17,18}.

The present study has some limitations, such as the assumption that suicidally motivated intoxication by psychoactive drugs is associated with depression. This information cannot be confirmed from the notification form, although such association is demonstrated by evidence-based health. The findings of the study refer to the suicidally motivated intoxication by psychoactive drugs, but due to the lack of research on this subject, these results were compared with actual suicide data.

CONCLUSION

Suicidally motivated intoxication by psychoactive drugs among the elderly was characterized by the age group 60 to 69 years, the female gender, and being retired. The most commonly used psychoactive drugs were

antidepressants and anxiolytics/hypnotics, with the most frequent poisoning type being moderate and the main outcome being cured.

The characterization of suicidally motivated intoxication by psychoactive drugs among elderly persons suggests the need to promote active aging, developed by a multi-professional health team working in basic care. Access to and the rational use of psychoactive drugs, especially in the treatment of mental disorders, as well as psychotherapy, should be investigated as strategies to reduce intoxication by psychoactive drugs among the elderly.

It is fundamental to continue research into the multiple dimensions involved in these intoxications. Such research can support strategies that stimulate access to and the rational use of psychoactive drugs, preventing intoxication and preserving the lives of the elderly.

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Prevalence of and factors associated with polypharmacy among elderly persons resident in the community

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Abstract

Objective: to verify the prevalence of and factors associated with polypharmacy among elderly residents of the city of Cuiabá, in the state of Mato Grosso. *Method:* a cross-sectional study of 573 people aged 60 and over was performed. Polypharmacy was defined as the use of five or more medications. To investigate the association between polypharmacy and sociodemographic variables, health and access to medication, the Mantel Haenszel chi square test was used in bivariate analysis and Poisson regression was used in multivariate analysis. The significance level adopted was 5%. *Result:* the prevalence of polypharmacy was 10.30%. Statistically significant associations were found between polypharmacy and living with others, describing suffering from circulatory, endocrine, nutritional and digestive tract diseases, and referring to financial difficulties for the purchase of medicines. *Conclusion:* some social and health condition factors play an important role in the use of multiple medications among the elderly.

Keywords: Health of the Elderly. Polypharmacy. Drug Combinations. Cross-Sectional Studies.

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INTRODUCTION

The population of Brazil has undergone a rapid aging process, creating challenges for health services in terms of the provision of care and the maintenance of quality of life. Aging also brings an exponential increase in the prevalence of chronic diseases and medication use¹, often with negative consequences for health.

The increased use of medications by the elderly leads to polypharmacy, defined as the regular use of five or more drugs². Concomitant use of multiple medications can lead to undesirable health outcomes such as an increase in adverse reactions and drug interactions, lower adherence to drug therapy, decreased functional capacity, and cognitive decline.

In addition to these effects, polypharmacy can result in a greater demand for care, an increase in the number of hospital admissions, and higher costs for the health system³. It can also affect the quality of a prescribed drug treatment when it is combined with self-medication, which is common among the elderly⁴.

Some studies have evaluated the use of medications and the presence of polypharmacy among the elderly. In developed countries, polypharmacy among the elderly varied between 39%⁵ and 45% of the population⁶. In Brazil, a study with elderly people living in the metropolitan area of the city of São Paulo found a prevalence of polypharmacy of 36.0%².

A number of factors have been associated with polypharmacy among the elderly, such as the female gender, having a poor self-perception of health, belonging to a more advanced age group, having a low level of schooling and the presence of chronic diseases^{2,7-9}. Added to this is the ease of obtaining medicines in pharmacies without prescriptions, which increases the exposure of the elderly to excessive drug use and unnecessary financial expense¹⁰.

In addition to these factors, the presence of cognitive deficits, chronic disease and low schooling, which are common among the elderly,

are considered to compromise their ability to perform activities of self-care¹¹.

Considering the complexity of the relationship between aging and medication use, there is a need to gather new scientific evidence on this phenomenon in developing countries such as Brazil, so that health managers and professionals can better understand these exposure factors and act to prevent polypharmacy. Thus, the objective of the present study was to verify the prevalence of and factors associated with polypharmacy among elderly persons resident in the community.

METHOD

A cross-sectional population-based study was performed. The data analyzed was taken from a study carried out by Cardoso et al.¹² which evaluated the self-reported health conditions of elderly persons living in the city of Cuiabá, in the state of Mato Grosso. For the present study, individuals aged 60 years or older living in the urban area of the city of Cuiabá in 2012 were selected. Institutionalized elderly individuals with evidence of cognitive deficit or with a condition that prevented them from answering the questions were excluded, as were those living in rural areas.

The procedures proposed by Luiz and Magnanini¹³ for finite populations were used to determine the sample size. Based on a total number of elderly people aged 60 years or over of 45,649¹⁴, and adopting a significance level of 5% (corresponding to a 95% confidence interval, $z [\alpha]/2=1.96$), with a sampling error tolerance of 5%, an estimated maximum prevalence of polypharmacy among the elderly of 50% and a design effect of 1.3, a required sample of 495 participants was identified. This number was increased by 10% to explore associations between the independent variables and polypharmacy. It was then increased by a further 10% to compensate for any losses and refusals. A total of 26 elderly people refused to participate, resulting in a final sample of 573 interviewees. The data collection instrument used was the Brazil Old Age Schedule (BOAS) for the multidimensional evaluation of the elderly, which was validated by Veras and Dutra¹⁵.

Data collection was performed as follows: from the starting point of the census sector, a clockwise route was followed from house to house until the end of the sector. Researchers asked if anyone aged 60 years or older lived at each house. If the answer was yes, the interviewer identified themselves and explained the research objectives, and the elderly persons were invited to participate in the study. The interviews took place either at the time or were scheduled for a later date. All elderly people living in the household (men and women) were interviewed. The interviews were carried out in the home of the elderly person, in a comfortable, well-lit environment that was free from interference. Several strategies were adopted to guarantee the quality of the data, from the preparation of a data collection manual, the standardization of the data collection form, the selection and training of the interviewers and the direct accompanying of the researchers in the field. In addition, data collection was assessed on a weekly basis and all the questionnaires were checked to identify failures in the completion of the answers, provide complementary information and complete the database.

The dependent variable in the present study was the presence of polypharmacy – defined as the regular use of five or more medications² and evaluated by asking about the use of medication during the application of the questionnaire.

The following independent variables were evaluated: a) sociodemographic characteristics: gender (male/female), age group (classified as 60 to 69 years, 70 to 79 years and 80 years and over), marital status (classified as married and single/other), schooling (classified as illiterate, up to 4 years of schooling or more than 4 years of schooling), monthly income of elderly person (classified as having no income or an income), occupational status (classified as active, when the individual declared that they performed some kind of labor activity, irrespective of remuneration, or inactive); b) health conditions: use of medical services (classified as public institution or others), self-medication (yes, when any medication, prescribed by a doctor or otherwise, was used), self-reported health (classified as poor or very poor, good, good or very good), presence and type of self-reported disease (classified as presence of self-reported disease and reclassified as circulatory disease (yes/

no), endocrine disease, nutritional and metabolic disease (yes/no), musculoskeletal and connective tissue disease (yes/no), diseases of the digestive tract (yes/no), diseases of the ear and the mastoid process (yes/no) and other diseases (yes/no); c) variables related to access to medication: financial difficulties in the acquisition of medication (yes/no), difficulty finding the medication in the pharmacy (yes/no), difficulty in obtaining a prescription for controlled medication (yes/no).

The active principles of each drug were described in accordance with the Anatomical Therapeutic and Chemical classification (ATC), level 5 (chemical substance)¹⁶.

In bivariate analysis, the crude associations between the outcome variable (polypharmacy) and the other exposure variables were identified. The chi-square test ($p < 0.05$), using the Mantel Haenszel method (95% CI), or Fischer's exact test were applied as indicated.

Multiple analysis was performed using the Poisson Regression model, including all variables that presented an association with p -value < 0.20 in the crude analysis, adopting the insertion of variables by block technique (sociodemographic first, followed by health conditions and then acquisition of medication). All variables that retained an association were included in the final model, using the progressive withdrawal of variables method (Stepwise backward). Variables with a statistically significant association p -value < 0.05 were considered in the final model.

The project was approved by the HUIJM Research Ethics Committee (CEP/HUIJM), under record number 132/CEP-HUIJM/2011, and all the participants signed a Free and Informed Consent Form (FICF).

RESULTS

Of the 573 elderly persons surveyed, the majority were female (55.67%), aged from 60 to 69 years (46.07%), and illiterate or with up to 4 years of schooling (83.06%). In terms of polypharmacy, 59 (10.30%) individuals reported the regular use of five or more medications (Table 1).

Table 1. Distribution of elderly persons according to gender, age group, marital status and level of schooling (n=573). Cuiabá, Mato Grosso, 2012.

Variables	n (%)
Gender	
Female	319 (55.67)
Male	254 (44.33)
Age range (years)	
Over 80	105 (18.32)
70-79	204 (35.60)
60-69	264 (46.07)
Marital Status	
Married	307 (53.58)
Single/other	266 (46.43)
Schooling (years of study)	
More than four	144 (25.06)
Up to four	332 (58.00)
Illiterate	97 (16.95)
Polypharmacy	
Five or more medications	59 (10.30)
Up to four medications	514 (89.70)

Table created by study authors.

In total, 350 medications were used by the elderly persons, according to ATC classification. Among the 20 most frequently used medications were those that acted on the cardiovascular system (55.0%), the alimentary tract and metabolism (25.0%), the nervous system (10.0%), and systemic hormonal preparations (5.0%). The active principles most commonly used by the elderly persons were hydrochlorothiazide (6.6%), acetylsalicylic acid (6.3%), metformin (6.0%), captopril (4.9%), nifedipine (3.7%), simvastatin (3.7%) and omeprazole (3.7%) (Table 2).

In terms of health conditions, elderly individuals who used public health services (PR=5.03, CI=1.59-15.93) and who described their health as poor or very poor (PR=5.03; CI=1.59-15.93) were associated

with the use of polypharmacy. The presence of polypharmacy was more frequent among those who reported diseases of the circulatory system (PR=4.88, CI=2.14-11.16), endocrine, nutritional and metabolic diseases (PR=3.78, CI=2.37-6.05) and diseases of the digestive tract (PR=3.17, 1.68-6.00) (Table 4).

In terms of variables relating to access to medicines, elderly persons who had financial difficulties in purchasing medicines (PR=3.63, CI=2.26-5.84), difficulties finding the drug in the pharmacy (PR=3.15, CI=1.88-5.28) and difficulties obtaining a prescription for controlled drugs (PR=3.15, CI=1.61-5.80) reported a greater presence of polypharmacy (Table 4).

Table 2. Distribution of 20 medications most frequently used by elderly persons practicing polypharmacy, Cuiabá, MT, 2012.

Medications (5th level, ATC WHO chemical substance)	Frequency (%)
Hydrochlorothiazide (C03AA03)	6.6
Acetylsalicylic acid (B01AC06)	6.3
Metformin (A10BA02)	6.0
Captopril (C09AA01)	4.9

to be continued

continued from table 2

Medications (5th level, ATC WHO chemical substance)	Frequency (%)
Nifedipine (C08CA05)	3.7
Simvastatin (C10AA01)	3.7
Omeprazole (A02BC01)	3.7
Enalapril (C09AA02)	3.1
Glibenclamide (A10BB01)	2.9
Propranolol (C07AA05)	2.6
Insulin (human) (A10AB01)	2.3
Levothyroxine Sodium (H03AA01)	2.3
Carvedilol (C07AG02)	2.0
Furosemide (C03CA01)	2.0
Losartan (C09CA01)	2.0
Atenolol (C07AB03)	1.7
Multivitamins and Calcium (A11AA02)	1.4
Amitriptyline (N06AA09)	1.4
Cinnarizine. combinations (N07CA52)	1.4

Table created by study authors.

Table 3. Bivariate analysis of polypharmacy and sociodemographic variables (n=573). Cuiabá, Mato Grosso, 2012.

Variables	%	PR	CI 95%	<i>p</i> -value
Gender				
Female	11.29	1.25	0.76-2.05	0.383
Male	9.06	1.00		
Age range (years)				
Over 80	10.48	1.13	0.59-2.16	0.713
70-79	8.37	0.80	0.39-1.64	0.544
60-69	11.83	1.00		
Marital Status				
Married	12.70	1.69	1.01-2.82	0.042
Single/other	7.52	1.00		
Schooling (years of study)				
More than 4	3.81	0.45	1.13-1.54	0.193
Up to 4	14.81	1.75	0.77-3.99	0.166
Illiterate	8.45	1.00		
Living arrangements				
With other person/people	11.13	3.40	0.85-13.56	0.057
Alone	3.28	1.00		
Monthly income				
No income	26.92	2.74	1.38-5.44	0.006
Income	9.82	1.00		
Occupational status				
Active	11.68	1.18	0.69-2.03	0.542
Inactive	9.86			

Table created by authors.

Table 4. Bivariate analysis of polypharmacy, health conditions and access to medication of elderly persons (n=573). Cuiabá, Mato Grosso, 2012.

Variables	%	PR	CI 95%	<i>p</i> -value
Health conditions				
Health services				
Public institution	11.24	6.41	1.17-289.89	0.020
Others	1.75	1.00		
Self-medicating				
Yes	15.91	1.61	0.78-3.35	0.203
No	9.83	1.00		
Self-reported health				
Poor/Very poor	18.64	5.03	1.59-15.93	<0.001
Good	7.05	1.90	0.58-6.20	0.272
Very good	3.70	1.00		
Self-reported circulatory system disease				
Yes	14.36	4.88	2.14-11.16	<0.001
No	2.94	1.00		
Self-reported endocrine, nutritional and metabolic disease				
Yes	24.39	3.78	2.37-6.05	<0.001
No	6.44	1.00		
Self-reported musculoskeletal and connective tissue disease				
Yes	12.17	1.30	0.79-2.13	0.301
No	9.38	1.00		
Self-reported digestive tract disease				
Yes	29.63	3.17	1.68-6.00	<0.001
No	9.34	1.00		
Self-reported ear and mastoid apophysis				
Yes	15.00	1.51	0.70-3.30	0.311
No	9.94	1.00		
Other self-reported diseases				
Yes	14.56	1.56	0.90-2.68	0.116
No	9.36	1.00		
Access to medications				
Financial difficulties in acquiring medications				
Yes	22.70	3.63	2.26-5.84	<0.001
No	6.25	1.00		
Difficulty finding medications in pharmacy				
Yes	26.79	3.15	1.88-5.28	<0.001
No	8.51	1.00		
Difficulty obtaining prescription for controlled medications				
Yes	28.57	3.05	1.61-5.80	<0.001
No	9.36	1.00		

Table created by study authors.

Table 5. Poisson Multiple Regression Model and variables associated with polypharmacy among elderly persons. Cuiabá, MT, 2012.

Variables	Crude PR	Adjusted PR	CI 95%
Lives			
With other person/people	3.40	1.04	1.00-1.08
Alone	1.00	1.00	
Self-reported circulatory system disease			
Yes	4.88	1.04	1.02-1.07
No	1.00	1.00	
Self-reported endocrine, nutritional and metabolic disease			
Yes	3.78	1.07	1.01-1.12
No	1.00	1.00	
Self-reported digestive tract disease			
Yes	3.17	1.13	1.01-1.26
No	1.00	1.00	
Financial difficulties in purchasing medications			
Yes	3.63	1.07	1.02-1.12
No	1.00	1.00	

Table created by study authors.

In Poisson Multiple Regression, the variables that remained significantly associated with polypharmacy were: living with another person or other people ($p=0.012$, $PR=1.04$), self-reported circulatory system disease ($p=0.002$, $PR=1.04$); self-reported endocrine, nutritional and metabolic disease ($p=0.011$, $RP=1.07$); ($p=0.038$, $RP=1.13$) and described financial difficulties in purchasing medicines ($p=0.008$, $RP=1.07$) (Table 5).

DISCUSSION

The prevalence of polypharmacy identified in this study was similar to that observed in Belgrade, Serbia, in a survey of 480 elderly people receiving care at a Health Care Center¹⁷, and a study of 400 individuals aged 60 and over residing in an area covered by the Family Health Strategy in Recife¹⁸. However, other studies found prevalences ranging from 13.9% to 57.0%^{2,19,20}.

The most frequently used medications were those aimed at cardiovascular performance, the alimentary/metabolic tract and the nervous system,

a result that collaborates with other studies^{2,4}. These findings are consistent with the morbidity profile of those practicing polypharmacy in the present study. It should be noted that omeprazole was the sixth most frequently used medication among the elderly. This medication has a high potential for drug interactions with medications commonly used by the elderly, such as acetylsalicylic acid, glibenclamide and nifedipine^{21,22}, making its consumption even more of a concern among elderly users of a number of medications.

In the present study, the fact that an elderly person lived with another person or people was associated with the use of polypharmacy. Cintra et al.²³ stated that elderly people with such living conditions adhere more to the treatments recommended by the health service. Among the probable explanations for this are the fact that, under these conditions, the family member or caregiver, who has a more accurate perception of the health conditions of the elderly individual, encourages him or her to more frequently seek medical care, which can also lead to the increased prescription and consumption of medicines for such elderly people.

Paradoxically and unexpectedly, elderly persons who reported financial difficulties in purchasing medications were associated with a greater use of polypharmacy. This finding was further corroborated, in bivariate analysis, by the fact that elderly persons who practiced polypharmacy had greater difficulty finding the drug in the pharmacy or even obtaining a prescription for controlled medications.

In this context, the National Medication Policy of the Sistema Único de Saúde (SUS) (the Unified Health System) has among its objectives the guaranteed access of the population to what are considered essential drugs, and to make medicines for the treatment of chronic diseases available free or at a lower cost²⁴. However, there is a lack of medicines in primary care, forcing the elderly person to seek the unavailable drugs in local commercial pharmacies and drugstores. In these establishments, staff are financially compensated for increased sales of medications, including those not included in pharmacological prescriptions²⁵. The necessity to spend more when purchasing these drugs may conversely contribute to the underutilization of such medications²⁶ and subsequently greater financial difficulties in their acquisition²⁷. There is a fine line between risk and the benefit of the practice of polypharmacy by the elderly. Elevated use of medications can adversely affect the quality of life of the elderly due to the greater occurrence of adverse effects and drug interactions. In contrast, these same medications help to prolong life, for the most part. In this way, it is not necessarily polypharmacy that exposes the elderly to the potential risk of adverse events, but rather the irrational nature of their use²⁸.

The rational use of medicines is defined as use appropriate for the clinical conditions in question, in doses appropriate to the needs of the individual, for a suitable period and at the lowest cost to the individual and the community. Among other criteria, such rational use recommends that when it is necessary, its efficacy and safety should be prioritized and the prescribed therapeutic regimen be fulfilled in the most suitable way²⁹. However, complex drug prescriptions, combined with the reduced dexterity and auditory and visual acuity of elderly persons, as well as the high illiteracy rate present in most

Brazilian elderly individuals, can compromise the understanding of a medical prescription, leading to incorrect use of the medication³⁰.

It is important to consider that elderly persons have a range of comorbidities, meaning that prescriptions for medications are constantly reviewed in terms of pharmaceutical form, packaging and labels, and other factors. Additionally, the improper prescription of medications is often attributed to a lack of training among doctors who prescribe medicine to geriatrics, as well as a deficiency in pharmaceutical training when attending the elderly³¹. Thus, the presence of the pharmacist in the process of pharmaceutical care for the elderly is important to ensure the rational use of medications and the reduction of prescribing or dosing errors, as well as preventing the misuse of drugs and limiting the occurrence of adverse reactions. However, pharmaceutical care remains incipient in primary care, which is the priority locus of health care for the elderly.

The association between the various comorbidities evaluated and polypharmacy found in this study is consistent with other studies of the elderly^{17,32}. A study conducted in Japan found that polypharmacy was more common in the treatment of hypertension, hyperlipidemia, gastric ulcers and diabetes³³. Similarly, Carvalho et al.² in a study carried out in the metropolitan region of São Paulo found that elderly persons with hypertension and diabetes were also more likely to practice polypharmacy. These diseases are the main causes of mortality among the global elderly population^{33,34}. The high prevalence of diseases of the digestive system can often lead to the unnecessary intake of other drugs, thus explaining the use of polypharmacy in this population³². This condition can lead to a cascade of negative effects on the health of the elderly and on the health system.

This study was cross-sectional in nature, and its strengths include the use of measures of association of prevalence in both bivariate analysis and in the multiple final model³⁵. However, care is suggested when interpreting the associations between the explanatory factors and the use of polypharmacy among community dwelling elderly

persons. As both sets of information were obtained simultaneously, the possibility of reverse causality, where the explanatory variables may not have occurred before the response variable, cannot be excluded. The occurrence of memory bias can also not be excluded as the study was based on the evaluation of recall, in which the capacity to remember the past may be more closely related to the use of polypharmacy.

CONCLUSION

The prevalence of polypharmacy found in the present study was similar to that found in communities in other regions. Elderly persons who lived with others, described having financial difficulties in acquiring medications, and who suffered from a comorbidity or comorbidities were associated with polypharmacy, demonstrating that a number of aspects of social and health

conditions play an important role in the use of multiple medications among the elderly.

The present study allows a greater understanding of the use of multiple medications by elderly persons living in the community and the main factors associated with this practice. Closer monitoring by health professionals, including questions regarding the acquisition of medications during screening tests for the multidimensional evaluation of the elderly, may result in more suitable treatment of the comorbidities that are common among individuals of this age group.

It is important to include the pharmacist in basic health care. The efficient use of medications requires the interrelated work of a team of professionals who directly assist the health care user. The pharmacist is responsible for the monitoring of therapeutic results and adverse effects, and is of great importance for the care of elderly people practicing polypharmacy.

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