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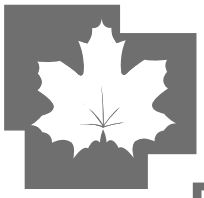

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Research in older adult health: investments in the last ten years

Over the last ten years Brazil has maintained its level of investment in research and development (R&D) at approximately 1% of its gross domestic product (GDP). With the 2016-2022 Action Plan for Science, Technology and Innovation (or Pacti), total investment increased to 1.23% of GDP, an increase which is still far from the average percentage (2.3%) invested by Organization for Cooperation and Economic Development (OECD) countries[1]. In order to achieve this target, increased investments will be required in the coming years, so that the expenditure on R&D, as well as on the human resources involved, remains relevant.

In Brazil, historically, the most significant funding source for R&D has been the government. The Ministry of Health (MH) became an important financial backer, inducer and user of health research[2] when it assumed the responsibility of leading the management of science, technology and innovation in health – a role delegated to the National Health System (or SUS) in article 200, item V, of the Federal Constitution of 1988 (CF/88)[3].

In this context, in 2004, two important institutional frameworks for scientific and technological development in health in Brazil were launched - the National Policy on Science, Technology and Innovation in Health (or PNCTIS)[2] and the National Agenda for Health Research Priorities (or ANPPS)[4], considered to be guiding tools for the fostering of actions promoted by the MH.

Resources for funding most health research come from the bilateral cooperation fund of the Ministry of Science, Technology and Innovation (MSTI) and the MH[5]. National research is financed with technical and administrative support from the National Council for Scientific and Technological Development (or CNPq), the Funding of Studies and Projects body (or Finep) or the SUS Shared Health Management Research Program (or PPSUS).

When analyzing the sub-agenda for the health of older adults, in the period from 2010 to 2019, investment was approximately R$100 million, which supported 6,822 scientific, technological and innovation research projects in the area of older adult health. Of these, 6,760 projects were contracted via CNPq Public Notices and Calls, allocating a total of R$79.8 million, while in the MH the investment was R$19.6 million distributed in the following modalities: a) National Fostering, with the amount of R$0.78 million allocated for four research projects; b) PPSUS, which allocated R$4.8 million among 55 surveys, and c) direct contracting, with a total of R$14.1 million for the contracting of three surveys.

The distribution of research by period revealed that while productivity increased over the entire period, in 2017, there was a significant contribution of resources for research, around R$20.2 million.

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Two regions exhibited the greatest productivity: the southeast with 3,673 studies and an investment of R$52 million and the south with 1,537 studies and an investment of R$14.2 million, with emphasis on São Paulo and Rio Grande do Sul, the states with the greater number of research groups in the area of aging[6].

The major areas of knowledge with the greatest concentration of resources and research were the biological sciences (R$53 million and 3,013 studies) and health sciences (R$26.9 million and 3,681 studies). This may be the result of the predominance of research focusing on the aging process of the Brazilian population carried out in the area of health sciences, with the significant participation of biological sciences[6].

Currently, several initiatives in favor of healthy, active aging with a good quality of life are being prioritized through the implementation of public policies in line with Sustainable Development Goals (SDGs)[7], associated with the financing of scientific and technological research.

While advances have been observed through the results of studies and research, there are still gaps that require new scientific, technological and innovation knowledge, that will provide further scientific evidence and contribute to the improvement of public policies, programs, services and technologies focused on the health of older adults in Brazil.

Brazil possesses a significant critical mass and capacity of expertise in the area of research in older adult health. However, greater investment in this area is required, generating knowledge that brings answers and solutions to the priority health problems of the older population.

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Multimorbidity due to chronic noncommunicable diseases in older adults: a population-based study

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Matheus Figueiredo Nogueira[1]

Abstract

Objective: To estimate the prevalence of multimorbidity arising from chronic noncommunicable diseases among older residents of the northeast of Brazil and to analyze its association with sociodemographic, behavioral and anthropometric factors. *Method:* A cross-sectional study was carried out with 3,141 older participants of the National Health Survey (2013). The dependent variable was multimorbidity, and the independent variables were sociodemographic, behavioral and anthropometric indicators. Descriptive, bivariate analyzes and logistic regression models were applied. *Results:* The prevalence of multimorbidity was 23.7%, with the state of Alagoas having the highest prevalence (27.2%). The occurrence of multimorbidity was associated with the female sex (OR=1.33; p=0.002), age over 80 years (OR=1.35; p=0.019) and being overweight (OR =1.37 p= 0.001). The protective factors were brown skin color (OR=0.79; p=0.013) and low weight (OR =0.71; p=0.017). *Conclusion:* The prevalence of multimorbidity in community-dwelling older adults in the northeast of Brazil was almost one quarter of the study population, with the state of Alagoas having the highest prevalence. Sex, age, skin color and being overweight were associated with the outcome. Knowledge of these factors can guide health care in the prevention, control and reduction of complications of these diseases, and support the strengthening of health education strategies and policies.

Keywords: Aging. Chronic Disease. Multimorbidity.

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INTRODUCTION

While aging is not synonymous with illness, among older adults there is an increase in clinical-functional vulnerability and a predisposition to chronic non-communicable diseases (CNCDs), which are associated with disabilities which in turn can increase socioeconomic burdens and elevate costs and the use of health services[1,2].

CNCDs are the main global cause of morbidity and mortality[2]. Among them, four groups stand out: cardiovascular diseases, responsible for 29.7% of mortalities in Brazil; neoplasms, responsible for 16.8%; chronic respiratory diseases, representing 5.9%; and diabetes, the prevalence of deaths of which is 5.1%[3].

Around 80% of the cases of these pathologies could be avoided with changes in behavioral factors. Thus, investment in strategies for reversing the alarming profile of mortality and disability due to these conditions is essential, and studies of the factors associated with the occurrence of these outcomes are essential[4,5].

Older adults often have two or more diseases occurring simultaneously, an occurrence known as "multimorbidity", which is the main cause of death and disability in this population[6]. Most previous studies with this group, however, have aimed to evaluate the factors associated with each chronic disease in isolation[7,8].

In addition, there are few studies with samples distributed across all the states of the Brazilian northeast and, among existing surveys, the majority demonstrated little external validation, being concentrated in only a single state or municipality[9,10]. While most of the research carried out with older adults is concentrated in the south and southeast of Brazil[9,10], the social inequalities that exist between the regions of the country can result in differences between unfavorable health outcomes, including multimorbidity[11].

From this perspective, studies of the occurrence of multimorbidity due to CNCD and its associated factors in a sample of older adults distributed in all the states of the Brazilian northeast are required, in order to provide knowledge about the distribution of such illnesses in the region, as well as the modifiable factors that can be targeted by interventions by professionals, health managers and public policies. Thus, the aim of this study was to estimate the prevalence of multimorbidity due to CNCDs in older adults living in the northeast of Brazil and to analyze its association with sociodemographic, behavioral and anthropometric factors.

METHOD

A cross-sectional study was performed, which used secondary data from the National Health Survey (or PNS), carried out between 2013 and 2014, the data of which are available for public and free access on the website of the Brazilian Institute of Geography and Statistics (or IBGE): http://www.ibge.gov.br. The PNS consists of a home-based epidemiological survey, the general objective of which was to obtain information on the health conditions and lifestyle of the Brazilian population[12].

The population that participated in the PNS survey was composed of residents of permanent private households across the country, which was divided into census tracts. Areas such as: indigenous villages, barracks, military bases, settlements, camps, boats, penitentiaries, penal colonies, prisons, jails, asylums, orphanages, convents and hospitals were excluded[13,14].

The sampling by clusters occurred in three stages: the census sectors were established as Primary Analysis Units (PAU); households as Secondary Analysis Units (SAU) and residents aged 18 years or older as Tertiary Analysis Units (TAU)[12].

In the first stage, the census sectors that formed the PAUs were obtained by means of a Master Sample, which is used to meet the needs of several surveys that make up the IBGE Integrated Home Research System[14]. A total of 6,069 UPAs were randomly selected throughout Brazil[13].

In the second stage, a fixed number of households in each PAU was selected by Simple Random Sampling. The selection of households was made based on the National Address Register for statistical purposes, in the latest version available in 2013, before the completion of this stage of the sample plan, with 64,348 households visited throughout Brazil[13]. Finally, in the third stage, only the selected resident could participate in the individual interview, and other members of the household were not permitted to answer the questions[14].

A total of 60,202 individual interviews were carried out with the selected residents in their homes, of which 11,177 were with older adults. The sample used in this investigation was 3,394 older adults living in the states of the northeast of Brazil, namely: Alagoas, Pernambuco, Paraíba, Rio Grande do Norte, Sergipe, Bahia, Piauí, Maranhão and Ceará. Due to the presence of missing values in the variables that made up the outcome, the final sample was 3,141. Interviews in which the head of household or resident who responded to the second stage of selection, rather than the older adult, were not included.

The questionnaire was applied by IBGE collection agents, with the help of handheld microcomputers[14]. In the present study, data from the following modules were used: general characteristics of residents (module C), educational characteristics of people aged 5 or over (module D), lifestyle (module P) and chronic diseases (module Q).

The outcome variable was 'multimorbidity', defined as the simultaneous occurrence of two or more CNCDs[6,15], which included the self-reported diagnosis of the following conditions: diabetes, heart disease (infarction, angina and congestive heart failure), systemic arterial hypertension, strokes, cancer, chronic obstructive pulmonary disease, chronic kidney disease and asthma. Multimorbidity was identified through the creation of a variable sum of these eight chronic diseases and was then dichotomously categorized as: 0 = none or one chronic diseases and 1 = two or more chronic diseases.

The following sociodemographic exposure variables were used: gender (0 - male; 1 - female); age group: (0 - 60 to 69; 1 - 70 to 79; 2 - 80 or more); level of education in years of schooling (0 - 12 or more; 1 - 9 to 11 years and, 2 - 0 to 8 years of study); receives pension (0 - yes; 1 - no); self-reported skin color (0 - white; 1 – brown (mixed ethnicity); 2 – black (Afro-Brazilian); 3 - other [yellow (Asian-Brazilian) and indigenous]); marital status: (0 - has partner; 1 - no partner).

Regarding lifestyle, the following variables were analyzed: regular consumption of fruits, salads and cooked vegetables (0 - consumes 5 or more times a week; 1 - consumes less than 5 times a week); practice of physical activity today (0 - yes; 1 - no); current smoking (0 - no; 1 - yes); current alcohol consumption (0 - no; 1 - yes)[16].

Anthropometry was assessed by BMI, which was calculated as weight in Kg, divided by the height measured in centimeters, squared[17]. For the BMI, the cutoff points established by Lipschitz[18] were used, which take into account the physiological changes resulting from senescence. Older adults with a BMI between 22 and 27Kg / m^2were considered normal weight, those whose BMI was less than or equal to 22Kg/m^2 were considered underweight and those with a BMI greater than 27kg/m^2were overweight[18].

For data analysis, a descriptive and exploratory stage of the exposure and outcome variables was performed. Simple and percentage frequency measures were used with their respective 95% confidence intervals. Subsequently, bivariate analysis was performed. The associations of the independent variables with the outcome were verified using Pearson's chi-squared test, and the measure of association using non-adjusted odds ratios (OR). In Pearson's chi-squared test, variables with a p-value<0.20, were selected for multiple analysis.

The multiple analysis was performed by means of multiple logistic regression. For this purpose, the forward criterion was used in which all the variables selected in the bivariate step were inserted one by one in the model. The introduction of the variables began with the outcome and then the exposures of interest. The variables that remained significant, with p<0.05, according to the Wald test, made up the final (adjusted) model. The magnitude of association was measured by the odds ratio adjusted for confounding factors.

This research used secondary PNS data, which are available in the public domain. As the confidentiality and anonymity of participants were maintained, they could not be identified through data manipulation. Thus, the present study meets the requirements of Resolution 466/12 of the National Health Council. The PNS received approval from the Research Ethics Committee, under opinion number 328.159.

RESULTS

Table 1 shows that there was a predominance of older women (60.7%), aged 60 to 69 years (54.7%), with brown skin color/mixed ethnicity (55%), who had 0 to 8 years of schooling (80.5%) and retired (79.5%).

Figure 1 shows that the prevalence of multimorbidity in older adults in the northeast was 23.7% and that the state of Alagoas had the highest proportion of this outcome (27.2%), followed by the states of Pernambuco and Rio Grande do North, both with a prevalence of 25.8% (Figure 1).

According to Table 2, the highest prevalence of multimorbidity was observed in women (26.7%), in those aged 80 and over (28.0%), with low levels of education (24.4%) and who were overweight (28.1%). On the other hand, a higher prevalence of the outcome was found in older adults who did not consume tobacco (24.8%) or alcohol (25.6%). In the bivariate analysis, sex, age group, receiving a pension, marital status, self-reported skin color, body mass index, smoking and drinking were associated with the occurrence of multimorbidity due to chronic diseases in older adults (Table 2).

Table 3 shows that in the adjusted model, the factors associated with multimorbidity in the older adults were: sex, age group, skin color, BMI and alcoholism. Women were 33% more likely to suffer multimorbidity than men (adjusted OR=1.33; p=0.002), regardless of age, skin color, BMI and alcohol consumption.

Longer-lived older adults, aged 80 or over, had a 35% greater chance of presenting the outcome (adjusted OR=1.35; p=0.019), than older adults aged 60 to 69 (Table 3). In addition, having brown skin/being of mixed ethnicity was a protective factor for multimorbidity, when compared to being white (adjusted OR=0.79; p= 0.013). Being overweight increased the chance of suffering multimorbidity by 37% (adjusted OR=1.37; p=0.001). In contrast, being underweight (adjusted OR=0.71; p= 0.017), and current alcohol intake (OR=0.60; p<0.001), were considered protective factors for multimorbidity (Table 3).

Table 1. Sociodemographic characterization of older participants (n = 3,394). States of the northeast region of Brazil, 2013.

Sociodemographic Characteristics	n (%)	95% confidence interval
Sex		
Male	1,335 (39.3)	37.7 - 41.0
Female	2,059 (60.7)	59.0 - 62.3
Age group (years)		
60-69	1,858 (54.7)	53.0 - 56.4
70-79	1,075 (31.7)	30.1 - 33.2
80 or more	461 (13.6)	12.5 - 14.8
Retirement		
Yes	2,699 (79.5)	78.1 - 80.8
No	695 (20.5)	19.1 - 21.9
Marital status		
Partner	1,464 (43.2)	42.3 - 44.0
No partner	1,930 (56.8)	55.9 - 57.7
Self-reported skin color		
White	1,118 (32.9)	31.4 - 34.5
Mixed ethnicity	1,866 (55.0)	53.3 - 56.6
Black	375 (11.0)	10.0 - 12.0
Other	35 (1.1)	0.07- 0.14
Schooling (years)		
12 or more	297 (9.0)	8.0 - 10.0
9 to 11	366 (10.8)	10.0 - 11.9
0 to 8	2,731 (80.5)	79.1 - 81.8

Source: National Health Survey (or PNS), 2013.

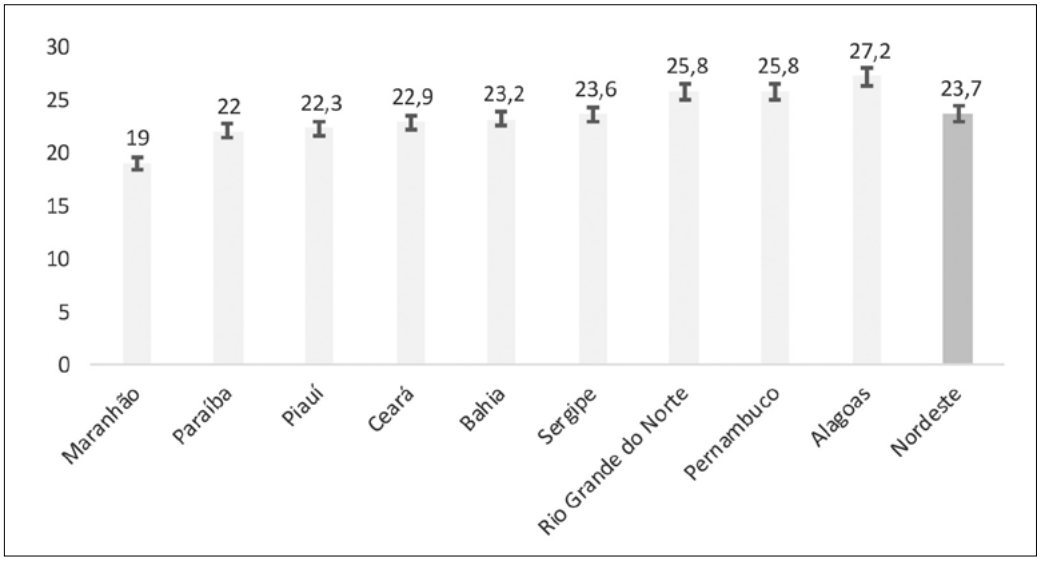

Figure 1. Prevalence of multimorbidity in older adults (n=3,141), States of the northeast region of Brazil, 2013.

Source: National Health Survey (or PNS), 2013.

Table 2. Association of sociodemographic, anthropometric and lifestyle factors and multimorbidity in older adults (n=3,141). States of the northeast region of Brazil, 2013.

Characteristics	Multimorbidity		
	No	Yes	
	n (%)	n (%)	p-value
Sex			
Male	953 (81.2)	220 (18.8)	<0.001
Female	1443 (73.3)	525 (26.7)	
Age group (years)			
60 to 69	1344 (78.4)	371 (21.6)	0.006
70 to 79	744 (74.5)	254 (25.4)	
80 or over	308 (72.0)	120 (28.0)	
Retired			
Yes	1883 (75.4)	615 (24.6)	0.019
No	513 (79.8)	130 (20.2)	
Marital status			
Partner	1056 (78.3)	292 (21.7)	0.019
No partner	1340 (74.7)	433 (25.3)	
Skin color			
White	780 (73.6)	280 (26.4)	0.006
Brown/mixed ethnicity	1336 (78.7)	362 (21.3)	
Black/Afro-Brazilian	257 (73.6)	92 (26.4)	
Other	23 (67.6)	11 (32.3)	
Schooling (years)			
12 or more	235 (79.4)	61 (20.6)	0.180
9 to 11	284 (78.7)	77 (21.3)	
0 to 8	1877 (75.6)	607 (24.4)	
BMI			
Normal weight	1024 (78.1)	287 (21.9)	<0.001
Underweight	419 (83.1)	85 (16.9)	
Overweight	953 (71.9)	373 (28.1)	
Smoking			
No	2058 (75.2)	679 (24.8)	<0.001
Yes	338 (83.7)	66 (16.3)	
Alcoholism			
No	1907 (74.4)	657 (25.6)	<0.001
Yes	489 (84.7)	88 (15.2)	
Physical activity			
Yes	492 (77.5)	143 (22.5)	0.427
No	1904 (76.0)	602 (24.0)	
Regular consumption (salad, fruits and vegetables)			
Regular	2112 (76.2)	660 (23.8)	0.743
Irregular	284 (77.0)	85 (23.0)	

Source: National Health Survey (or PNS), 2013.

Table 3. Non-adjusted and adjusted odds ratios (OR) for the occurrence of multimorbidity according to sociodemographic characteristics, anthropometry and lifestyle in older adults (n=3,141). States of the northeast region of Brazil, 2013.

Characteristics	Multimorbidity			
	Non-adjusted Odds Ratio (95% CI)	*p*-value	Odds Ratio Adjusted (95% CI)	*p*-value
Sex				
Male	Ref.***		Ref	
Female	1.57 (1.31-1.88)	<0.001	1.33 (1.10-1.61)	0.002
Age group				
60 to 69	Ref.		Ref.	
70 to 79	1.23 (1.02- 1.48)	0.023	1.17 (0.97-1.42)	0.083
80 or more	1.41 (1.11- 1.79)	0.005	1.35 (1.05- 1.73)	0.019
Retired				
Yes	Ref.		Ref.	
No	0.77 (0.62- 0.95)	0.019	-	-
Marital status				
Partner	Ref.		Ref.	
No partner	1.22 (1.03- 1.44)	0.019	-	-
Skin color				
White	Ref.		Ref.	
Brown/mixed ethnicity	0.75 (0.63-0.90)	0.002	0.79 (0.66- 0.95)	0.013
Black/Afro-Brazilian	0.99 (0.75- 1.31)	0.984	1.05 (0.80-1.40)	0.685
Other	1.33 (0.64- 2.76)	0.442	1.31 (0.62-2.75)	0.469
Schooling (years)				
12 or more	Ref.		Ref.	
9 to 11	1.04 (0.71- 1.52)	0.821	-	-
0 to 8	1.24 (0.92-1.67)	0.146	-	-
BMI				
Normal weight	Ref.		Ref.	
Underweight	0.72 (0.55- 0.94)	0.018	0.71 (0.54- 0.94)	0.017
Overweight	1.39 (1.16- 1.66)	<0.001	1.37 (1.15- 1.65)	0.001
Smoking				
No	Ref.		Ref.	
Yes	0.59 (0.44- 0.78)	<0.001	-	-
Alcoholism				
No	Ref.		Ref.	
Yes	0.52 (0.40- 0.66)	<0.001	0.60 (0.43- 0.78)	<0.001

Source: National Health Survey (or PNS), 2013.

* Odds ratios of multimorbidity according to the individual explanatory variable with respective 95% Confidence Interval; **Odds ratios of multimorbidity adjusted for all explanatory variables, with respective 95% Confidence Interval; ***Reference category for comparisons.

DISCUSSION

In the present study the prevalence of two or more chronic diseases among older adults in the northeast region of Brazil was 23.7%. In other Brazilian surveys, a range of prevalence of between 30.7% and 98% was found. This variation in the prevalence of multimorbidity may be due to the definition adopted for this outcome. For example, some studies define multimorbidity as the occurrence of three or more diseases. In addition, there are large variations in the samples used and contexts investigated[6,19,20].

The state in the northeast with the highest prevalence of multimorbidity in older adults was Alagoas (27.22%), a finding which may be related to socioeconomic issues, as this state has the worst Human Development Index in Brazil, and the second lowest household income *per capita*. In addition, 96.1% of the municipalities are classified as having high or very high social vulnerability[21].

Significant differences in the prevalence of multimorbidity were also observed according to sex, age group, pension, marital status, skin color, BMI, smoking and alcoholism, corroborating previous studies[22,23]. In contrast, in the multiple model, only sex, age group, skin color, BMI and alcoholism remained associated with multimorbidity.

Women were more likely to develop multimorbidity than men. This finding was also observed in previous studies carried out with different populations and regions[22,23]. Several factors can justify this fact. Firstly, biological aspects, related to the reduction of estrogen after menopause, a period in which women become more vulnerable to CNCDs, such as colon and breast cancer, strokes, thromboembolisms and type II diabetes *mellitus*[24]. Secondly, gender aspects, as the growing presence of women in the labor market, when combined with chores assigned in the home, can generate a workload three times greater than that of men. This reality can contribute to a greater burden of these diseases in women[25]. In addition, women access health services more frequently. Thus, there may be greater notification of cases of NCDs, while for men there may be an underreporting, as they access health services less frequently, due to cultural and gender influences[22,26].

There was also an association between age group and the occurrence of multimorbidity. Long-lived older adults were more likely to suffer multimorbidity than older adults aged 60 to 69 years. Previous studies have shown that long-lived older adults may suffer more impacts from the physiological, morphological, biochemical and psychological changes that occur with aging, which can linearly predispose them to functional decline and greater susceptibility to diseases[6,13,27].

In the present study, it was found that having brown skin/being of multiethnicity can reduce the chance of multimorbidity, in contrast to being white. Previous studies show that white individuals have a higher prevalence of abdominal adiposity and a greater abdominal perimeter, especially men[6,28]. In addition, previous research has shown that in the white-skinned population there is a higher consumption of tobacco products, associated with a lower consumption of fruits, vegetables, and lower caloric expenditure in labor functions, when compared to brown and black individuals[6,28].

Another important result of this study was that overweight older adults have a 37% greater chance of multimorbidity than eutrophic individuals. Obesity and overweight are predisposing conditions for CNCDs, such as: type II diabetes *mellitus*, arterial hypertension, cardiovascular diseases and cancer[4,5,29]. Lifestyle is one factor related to these conditions[5,29].

An irregular diet in addition to physical inactivity can increase the chronic concentration of visceral adipose tissue, which together with the molecular changes associated with obesity are factors that trigger metabolic syndrome and compromise the homeostasis of several systems. In addition, when associated with aging, these factors may predispose the individual to the onset of disabilities and reduce quality of life[4,5,29].

This study also found protective factors for the outcome, such as being underweight and current alcohol consumption. Low weight may be related to other conditions, including functional dependence

and disability[28]. On the other hand, being overweight and obesity are strongly associated with CNCDs such as systemic arterial hypertension, diabetes mellitus and heart diseases[11,22].

Alcohol consumption, investigated in this study, was related to consumption at the time of the survey and not in the past. The frequency and amount ingested by the older adults were also not considered, which may have influenced the association found. However, previous studies show that alcohol consumption in low doses and at low frequencies can be a protective factor for cardiovascular diseases[28,29]. In contrast, the reduction in the chance of multimorbidity with alcohol consumption evidenced in this study, may be due to a phenomenon that is influenced by the time frame, as cross-sectional studies have the limitation of obtaining information that refers to a single moment. It is known that the emergence of diseases can influence the reduction or cessation of alcohol consumption. On the other hand, the older adults may have consumed alcohol in the past, and therefore suffered exposure then[22,30].

The consumption of alcohol in harmful doses is a recognized risk factor for multimorbidity[7]. Therefore, the goal in Brazil is to reduce its prevalence from 18% to 12% by the year 2022[5]. Alcohol consumption is related to the occurrence of various CNCDs, such as neoplasms, liver diseases, chronic kidney disease and cardiovascular diseases[4,7].

The results of this study have certain limitations. First, a self-reported multimorbidity metric was used, which can underestimate or overestimate prevalences. On the other hand, this form of measurement has been used by Brazilian and international surveys, allowing comparisons[6,7]. Furthermore, the cross-sectional structure makes it impossible to establish cause-effect relationships.

CONCLUSION

The prevalence of multimorbidity in older adults living in the community in the northeast region of Brazil, was almost a quarter of the population participating in this study, and Alagoas was the state with the highest proportion of older adults with two or more chronic diseases. The factors associated with the occurrence of multimorbidity were sex, age group and being overweight.

The identification of these factors is important for strengthening and expanding health promotion, prevention and surveillance strategies, as well as public policies, in order to provide a perspective focused on priority groups (women, octogenarians and overweight people) and on the states of the northeast region with the highest prevalence of multimorbidity, such as Alagoas.

It is vital to expand health care for older adults in a transversal manner in order to meet the needs of younger age groups, who will be the older adults of future generations. Finally, it is suggested that subsequent studies adopt longitudinal methodologies which reduce the effects of reverse causality and, thus, can ratify and expand the scope of knowledge about risk factors for multimorbidity in older adults.

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The effect of inspiratory muscle training on the quality of life, immune response, inspiratory and lower limb muscle strength of older adults: a randomized controlled trial

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Abstract

Objective: To evaluate the impact of inspiratory muscle training (IMT) on the quality of life, immune response, inspiratory and lower limb muscle strength of older adults. *Method:* A randomized clinical trial was conducted with 30 institutionalized older adults. They were allocated into two groups: the IMT group (n=15), which underwent IMT with PowerBreathe Classic, using a load of 60% of maximal inspiratory pressure (MIP). This was performed using a 30 repetition protocol, three times a week, for six weeks. The second group was the control group (n=15) which did not perform any type of therapeutic intervention. In both groups, MIP, lower limb strength by sit-up test, quality of life by the SF-36 questionnaire and C-reactive protein (CRP) were evaluated. *Results:* The results demonstrated the homogeneity between the groups regarding the demographic and clinical variables. The IMT group showed an increase in the variation of MIP (9.20±7.36 cmH2O) compared to the control (0.93±8.79 cmH2O). Improvement was also observed in the sitting and standing test ($p<0.05$) (Tukey Test) in the difference between the values before and after the IMT. In terms of quality of life, two of the eight SF-36 domains were influenced by the IMT, namely: functional capacity and limitations due to physical factors. There were no changes in CRP in either group. *Conclusion:* IMT improved the inspiratory muscle strength, lower limb strength and quality of life of institutionalized older adults. These findings reinforce the contribution of this therapy to reducing the deleterious effects of aging.

Keywords: Aging. Respiratory Muscle Training. Immune Response.

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INTRODUCTION

Aging is a natural process and brings with it a series of adaptations and changes to various bodily systems. The alterations to the immune system that arise from aging are known as immunosenescence and cause physiological changes, resulting in an increased incidence of infectious diseases, morbidity and mortality in older adults[1,2].

One of the main consequences of the aging process is the decline in overall muscle strength, which has a direct impact on functional capacity and the performance of activities of daily living among this population group. The reduction in muscle mass and strength does not depend on the presence of diseases, but is accentuated in older adults affected by diseases that limit their mobility[3]. Respiratory muscle weakness alone is a major limiting factor for the deterioration of physical fitness, as it triggers changes in lung function, reduced muscle strength and dyspnoea[4].

It has previously been reported that physical exercise in the older population generates a series of benefits, such as increased functional capacity, the reduced incidence of infections, improved cardiovascular conditioning, and enhanced muscle fiber and quality of life[2]. In general, regular physical exercise induces a local and systemic anti-inflammatory state in the body, enabling adaptations and protection against chronic inflammatory pathologies[5]

Aerobic physical activity generates systemic benefits, including gains in respiratory muscle strength. Inspiratory muscle training (IMT) has been shown to have a direct relationship with the functional autonomy of older adults[3,6]. The gain in respiratory muscle strength improves the physical performance of such individuals, increasing maximum oxygen consumption during effort and reducing muscle fatigue. This results in an improvement in muscle quality and a reduction in the deleterious effects on the respiratory muscles caused by sarcopenia. The functional capacity of older adults is therefore enhanced, resulting in greater independence in activities of daily living with an improvement in quality of life[7,8].

Physical activity, through aerobic training, is established as the main non-medication based treatment for curbing the effects of the inflammatory processes common to aging. A new trend for treating this specific population is using devices capable of generating inspiratory load, bringing benefits to the pulmonary system. IMT can be performed with several types of devices, where the individual in training performs forced inspirations against an imposed load, aiming at improving lung function, inspiratory muscle strength and thoracoabdominal mobility, and is considered an efficient and safe physiotherapeutic resource[6,9,10].

With global population aging, the number of active older adults in society has progressively increased, making the physiological alterations of this population of particular interest[11,12]. It is believed that IMT contributes to minimizing the damage caused by aging, reducing inflammatory markers and increasing respiratory muscle strength, functionality and quality of life. The present study therefore aimed to assess the impact of IMT on respiratory strength, lower limb strength, immune response and quality of life in older adults.

METHOD

A controlled and randomized clinical trial was performed involving participants living in four Long-Term Care Facilities (LTCFs) in the city of Recife, Pernambuco, Brazil, who previously signed Informed Consent Forms (ICF) to confirm their participation in the study. The study protocol was published in the Brazilian Registry of Clinical Trials (or ReBEC), under number RBR-7g4dhr and met the CONSORT guidelines for clinical trials. This study was approved by the Ethics and Research Committee of the Health Sciences Center of the Universidade Federal de Pernambuco (the Federal University of Pernambuco) under decision number 2.264.422 and complied with Resolution nº 466/2012 and nº 510/2016.

The sample calculation was performed using the WinPepi program (PEPI-for-Windows) based on the following criteria: 95% confidence interval and a sampling error of five percentage points. Based on

the total number of 40 older adults who underwent IMT in a study by Iranzo et al.[13], a standard deviation of seven percentage points and a sample loss of 30% in the same study, a minimum sample of 13 older adults was calculated.

As inclusion criteria, adults over the age of 65, of both sexes, residents of the LTCFs, who were healthy and agreed to participate in the research were included in the study. Older adults were excluded from the study if they did not understand any of the steps of the proposed protocols, had a body mass index above 35 mL/kg² or had some degree of orthopedic or neurological limitation that made it impossible to perform the tests. Even after randomization and the start of the research protocol, some participants were excluded from the study if they had any of the following criteria: changes in LTCF, missing two consecutive sessions or five sessions in total over the six weeks, suffered from a disease that prevented the training from being carried out or expressed a willingness to discontinue the study.

C-reactive protein (CRP) was assessed through the collection of peripheral blood by a qualified nursing professional. Patients eligible for the study underwent venous blood collection before the start of the protocol and after six weeks. The blood collected was distributed in vacuum tubes, identified and taken for CRP analysis in a specialized laboratory.

Inspiratory muscle strength was assessed through maximum inspiratory pressure by the MVD300 digital manometer (GlobalMed), in the sitting position, with a 90° angle between the torso and the thighs. Participants were instructed on how to perform the maneuver, which was demonstrated in a practical manner by the evaluator. All measurements started from the residual volume to the maximum inspiration of the participant, in a rapid, forced manner, inhaling through a mouthpiece while using a nose clip. In the system applied, a small hole was used to attenuate the interference of the glottis in the measurement. Up to five consecutive maneuvers were performed, three of which were required to be considered acceptable, without leaks and lasting more than two seconds. Of the acceptable maneuvers, at least two were to be reproducible, with values that did not vary from the highest value by more than 10%. The highest value was used for evaluation criteria. The exact value of the register was measured at the peak pressure of the maneuver. The values were subsequently analyzed and compared with specific reference values for age and sex[14].

To assess the strength of the lower limbs, the Sit to Stand Test (SST) was performed. Each participant was positioned in the center of a chair, with their spines erect, feet fully supported on the floor and arms crossed against the chest; they were instructed to perform sitting and standing repetitions, alternating between fully standing and sitting, without the support of their hands. Participants were encouraged to perform as many repetitions as possible over a 30-second period. The final result was determined by counting the number of times the participant performed the movement of sitting and standing correctly. The number of repetitions, age and sex were considered when predicting a satisfactory test result[15].

To evaluate quality of life, the Medical Outcomes Study 36-item short-form health survey (SF-36) questionnaire was used. This was applied in the form of an interview, always by the same evaluator, with all participants evaluated in isolation, guaranteeing the confidentiality of their answers. The questions were read by the evaluator as many times as requested and the participant was instructed to select only one of the alternatives presented to them. After the questionnaire was applied, the scores were calculated, where the values of the questions were transformed into scores for eight domains, ranging from 0 to 100, where 0 = the worst and 100 = the best possible status for each domain[16]. As with the other stages of the evaluations, the quality of life questionnaire was carried out before and after the six-week protocol period.

Randomization for participation in the groups was carried out using the web site http://www.randomization.com. Participants were randomized into two groups: the IMT Group, where the six-week IMT protocol was applied, and the control group where only the initial and final evaluations were performed, without any type of physical therapy intervention, over the same time period as the intervention group.

Participants in the IMT group underwent inspiratory muscle training, using an inspiratory

pressure resistor from the PowerBreathe Classic® series. Participants were instructed to perform forced and rapid inspirations through their mouths and were encouraged to reach their maximum inspiratory capacities[17]. The load used for the IMT was equivalent to 60% of the maximum inspiratory pressure (MIP), with an adaptation period, where the initial load was 20% of MIP on the first day, 40% on the second day and 60% on the third day until the end of the protocol. Each session consisted of 30 repetitions of consecutive forced inspirations through a mouthpiece connected to the device. Participants used a nose clip while performing the training to avoid any leakage of air that would decrease the effort expended. Initially, the participants were instructed to remain seated in the chair, at a 90° angle, in an upright and comfortable position. They were advised to perform the 30 maximum inspiration repetitions in a row, although they were allowed to stop to rest, for as brief a time as possible, if necessary. Each inspiratory effort was initiated from the residual volume and the participant was instructed to maximize the inspiratory volume with each repetition. The total training time was six weeks, with three sessions of 30 repetitions performed on alternate days each week: Mondays, Wednesdays and Fridays[18].

Descriptive analysis of the data obtained was performed, showing the mean and standard deviation for each analyzed variable. The T test was used to compare the mean and standard deviation of the two groups studied and analysis of variance (ANOVA) was used for the comparative analysis of the parametric data obtained in the evaluation of the treatment effect, with the Tukey test applied for the comparison of the means of the delta values (Δ) (after confirming the normal distribution of the sample with the Shapiro-Wilk test). For delta calculation, the values obtained in the post-training moment were subtracted from the data obtained in the pre-training moment. (Δ= Final – Initial). The level of significance adopted was 5% (p<0.05). To compare the before and after results each group, the Wilcoxon nonparametric test was used. All conclusions were taken at the 5% significance level.

RESULTS

While a total of 54 potential older adult participants met the inclusion criteria, 22 exhibited some of the exclusion criteria and so only 32 individuals were included in the research. However, two participants were unable to complete the training protocol due to presenting a criteria for discontinuing the research. Therefore, only 30 older adults completed the analysis, being distributed as follows: control group (n=15), where the participants did not undergo any type of therapy during the six week protocol; and the IMT group (n=15), where a protocol for strengthening the inspiratory muscles was performed using the PowerBreathe Classic for six weeks. The order of entry into the groups was made randomly.

Figure 1 shows a flowchart for the selection and allocation of participants in the study.

Table 1 shows the demographic variables of the patients in each of the groups evaluated, control and IMT, shown in mean and standard deviations.

Figure 2 describes the initial and final values of inspiratory muscle strength based on MIP values, as well as the variation between the two after the six weeks of the study protocol. A difference (p<0.05) was observed between the before and after variation values of the IMT group and those of the control group. There was no difference in the MIP values expected for age and sex.

In relation to the SST, there was a difference (p<0.05) in the variation values before and after the IMT. The group that received the training recorded a greater variation in the number of times they sat and stood in 30 seconds than the group without training. Figure 3 shows the behavior and variation in the SST before and after the protocol period.

Figure 4 shows the behavior of the variation in the CRP serum concentration between the groups before and after six weeks. The training protocol did not alter the variation in CRP.

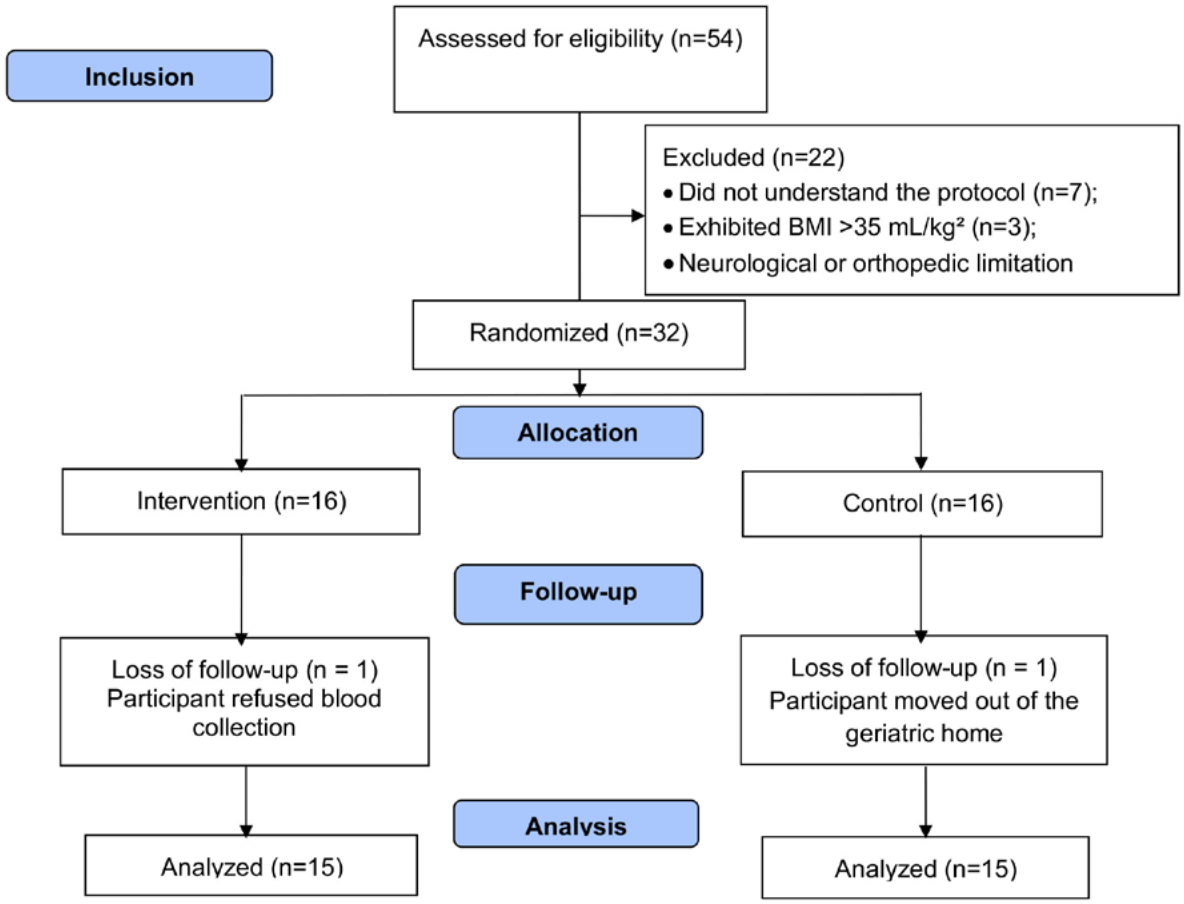
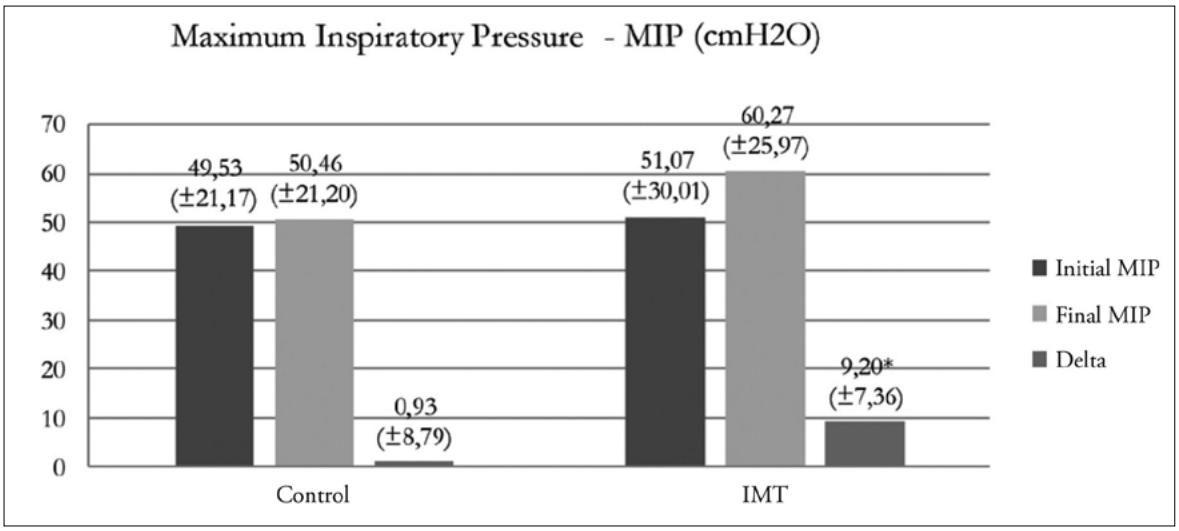


Figure 1. Flowchart of allocation of participants. Pernambuco, Brazil.

Table 1. Mean and standard deviation of age and sex of patients in the studied groups.

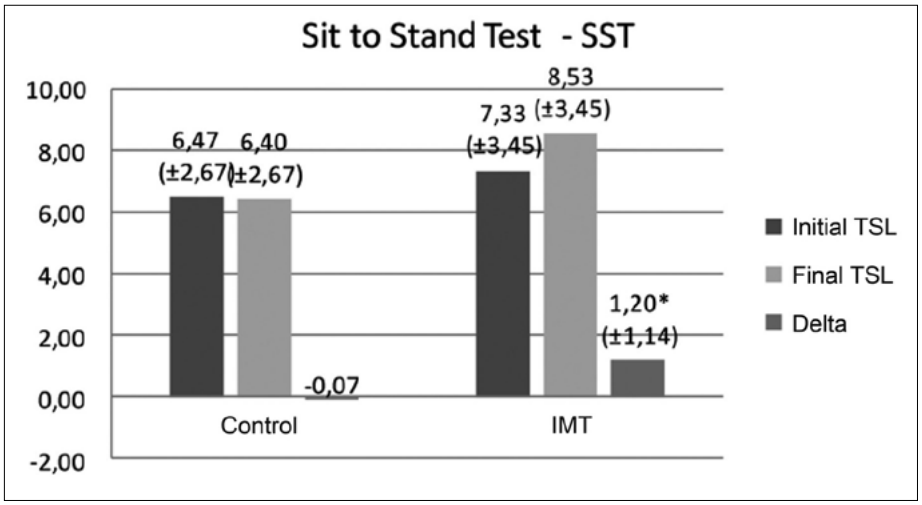
Variables	Control (n %)	IMT (n %)	*p*
Sex			
Male	13 (86.6%)	11 (73.3%)	0.37
Female	2 (13.3%)	4 (26.6%)	
Age (mean ± sd)	76.33 ± 9.79	80.33 ± 7.71	0.42

Data expressed as mean ± standard deviation; Comparison between the two groups, T test.



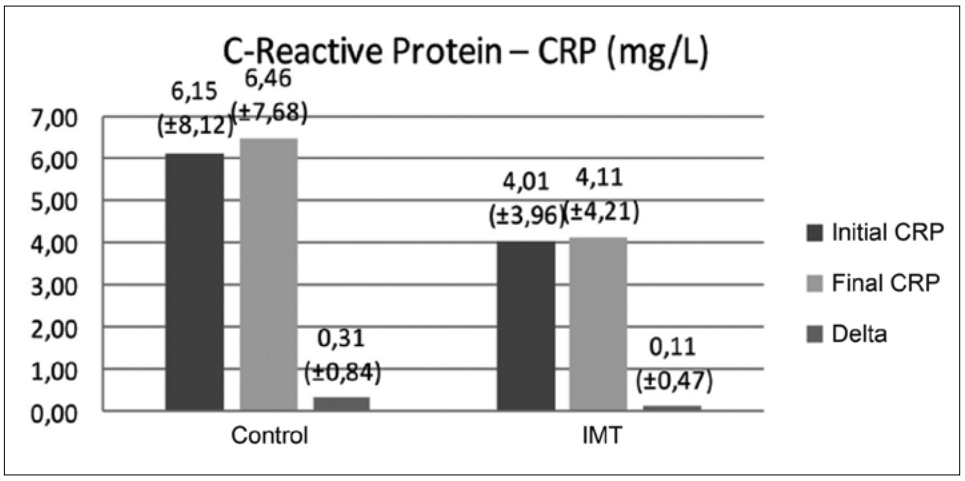
Data expressed as mean ± standard deviation; Comparison before and after for each group - Tukey test.

Figure 2. Mean and standard deviations of PiMax (cmH2O) obtained during the initial and final evaluation of the control (CON) and inspiratory muscle training (IMT) groups. Pernambuco, Brazil.



Data expressed as mean ± standard deviation; Comparison before and after for each group - Tukey test.

Figure 3. SST means obtained during the initial and final evaluation of the control (CON) and inspiratory muscle training (IMT) groups. Pernambuco, Brazil.



Data expressed as mean ± standard deviation; Comparison before and after for each group - Tukey test.

Figure 4. CRP measurements obtained during the initial and final evaluation of the Control (CON) and inspiratory muscle training (IMT) groups. Pernambuco, Brazil.

In terms of quality of life, two of the eight domains of the SF-36 were influenced by the training, namely: functional capacity, before (56.33±17.78) and after (62.33±19.54) the IMT (p=0.0009), and limitations due to physical aspects, before (66.00±31.36) and after (71.00±29.71) the IMT (p=0.0384).

DISCUSSION

The present study showed that the six-week IMT protocol increased inspiratory muscle strength, an effect noted following the improvement in MIP observed in the trained group in comparison with the control group. The improvement in MIP is in line with most studies that evaluate the effects of IMT in healthy older adults, and is based on the increased motor unit recruitment during the period of muscle training[8,13,16,18].

In a study carried out by Feriani et al.[19], gains in respiratory muscle strength were observed in just seven sessions of IMT with a spring resistor device in a group of 16 older women with metabolic syndrome. This study used a load of 30% of MIP, and each session consisted of 45 minutes of training. In the present study a relatively high load was used, but only 30 repetitions were applied, and in general the participants succeeded in carrying out the training. There is no consensus in literature regarding the load and the number of repetitions used in IMT. It is assumed that low loads for longer periods of time, or a greater number of repetitions, are suitable for improving muscle endurance, while higher loads with fewer repetitions are suitable for increasing muscle strength[16,18].

A gain in respiratory muscle strength was also observed in the study by Pascotini et al.[20], this time with a daily protocol over 12 consecutive days. Flow and volume incentive spirometry devices were used, and both were able to improve the strength outcome. On average, three sets of 12 repetitions per day were performed. This protocol can be used mainly by individuals with good cognitive ability who can train without supervision.

It is possible that the specific exercise of the inspiratory musculature leads to changes in the structure of these muscles, with an increase in the synthesis of the contractile proteins actin and myosin, generating a greater capacity to generate strength. In addition, conditioning and resistance result in increased levels of oxidative enzymes, lipid reserve, glycogen and number of capillaries. Through the load imposed on these muscles, changes in cellular architecture occur in direct proportion to the stimulus generated, a key factor in curbing the effects of sarcopenia in older adults[19,21,22].

An increase in SST performance was observed in the IMT group after six weeks of training. It is known that exercise improves physical fitness in older adults, which is reflected in improved performance in tests of peripheral muscle strength and functionality[23]. The improvement in the final test result when compared to the control group corroborates the work carried out by Fonseca et al.[6], where institutionalized older adults presented an increase in functional capacity assessed by the 6-minute walk test (6MWT), after undergoing IMT with the use of the volume incentive spirometer for ten weeks. Although this device is not a widely used IMT resource, it can provide a non-linear pressure load that favors the increased recruitment of motor units resulting, in improved inspiratory muscle strength[24].

In another study evaluating the effects of IMT in patients undergoing dialysis, Silva et al.[25] found that eight weeks of training with a load of 40% of IMP were sufficient to improve the distance covered in the 6MWT. Plentz et al.[26], also observed improvement in the 6MWT and in MIP after 12 weeks of IMT in cardiac patients. Although most studies use the 6MWT to assess functional capacity in older adults, Silva et al.[25] observed that the SST showed a positive correlation with the 6MWT, proving to be a safe and easy tool for older adults, in addition to being comparable to the 6MWT in predicting functional condition in this population.

The explanation found for the improvement of peripheral muscle strength parameters, even when only the inspiratory muscles are trained, is based on the attenuation of the phenomenon known as metaboreflex. Inspiratory muscle metaboreflex is a response mediated by the sympathetic nervous system, where there is vasoconstriction in the skeletal muscles during exercise, limiting physical performance by reducing blood flow to the active muscles[26]. When the respiratory muscle is conditioned through IMT, there is an increase in oxygen supply to the peripheral muscles during exercise, improving performance and tolerance[27-29].

In the present study, the CRP levels remained constant after the six-week period, both in the IMT group and the control group. In literature, no studies were found that associated breathing exercises with serum protein concentration. In a study carried out by Agostinis-Sobrinho et al.[30], the association between physical activity and CRP was evaluated in 386 adolescents, and no correlation between the variables was observed, with the age group studied and the absence of reference values in this population possible justifications. In a study conducted with adults aged between 40 and 70 years of age with metabolic syndrome, it was observed that the practice of weight training and walking for one hour and thirty minutes, three times a week, for 12 weeks, was sufficient to reduce CRP levels compared to baseline[31].

Mills et al.[18], meanwhile, submitted 17 individuals to an IMT program for eight weeks and, although MIP values increased at the end of the training period, no changes in the concentration of inflammatory cytokines in the blood were recorded. This result can be justified by the fact that the respiratory muscle mass represents only approximately 3% of total body weight, and the increase in its workload is not sufficient to alter the systemic concentration of cytokines and, consequently, of CRP. It is important to note that although CRP is the main inflammatory marker used today, conditions such as bacterial or viral infections can increase protein synthesis, in an acute manner, changing its serum value in blood analysis[32].

The improvement in quality of life with the practice of physical activity is clearly established in the literature. Scherer et al.[33], observed an improvement in quality of life, assessed through the SF-12 questionnaire, after an IMT protocol of eight weeks, with training five times a week, in patients with COPD. On the other hand, Gomes et al.[34], in a study that evaluated respiratory muscle strength, quality of life, degree of dependence and functional capacity in institutionalized older adults, found no correlations between these variables. The justification for these results was attributed to the transversal character of the study.

In isolation, IMT did not result in an improvement in the majority of the domains of the SF-36 quality of life questionnaire in the present study. However, the two domains that exhibited improvement in the group that received the IMT were related to functionality: functional capacity and physical limitations. The older adults reported through the

questionnaire that they had improved in these aspects over the six weeks of training, that is, they were able to perform more activities of daily living. It is likely that the improvement in respiratory muscle conditioning reduced the negative effect of the metaboreflex in these individuals, causing them to have fewer episodes of physical limitation[6,16,27].

It should be noted that the profile of the studied population refers only to institutionalized older adults, which may be directly related to the findings of the study. Although LTCFs are appropriate care environments for this population, it is possible that progressive muscle loss occurs in comparison to the population of the same age group that maintains more active lifestyle habits. Often the environment of these facilities does not offer sufficient incentives to avoid a sedentary lifestyle, accentuating sarcopenia[35].

From the results obtained, it is clear that for healthy older adults IMT, if performed regularly, can contribute not only to improving the strength of the inspiratory muscles, but is related to peripheral muscle strength and, consequently, to improvements in the quality of life of this population, representing a safe and effective practice. As limitations of the study, the fact that all participants are institutionalized older adults, as well as the small sample size, may have interfered with the final results. Another important negative factor was the use of C-reactive protein as a marker in the evaluation of immune response, since other factors may be determinants for changes in the serum level of this protein.

CONCLUSION

In view of the results presented, we can conclude that six weeks of inspiratory muscle training was able to improve inspiratory muscle strength, increase the strength of the lower limb muscles through the Sit to Stand Test and improve the functional capacity and limitations by physical factors domains of the SF-36 quality of life questionnaire. These findings reinforce the contribution of this therapy in reducing the harmful effects of aging.

No significant changes in C-reactive protein were found. Although there was no protective effect against inflammation as expected, it can be said that inspiratory muscle training did not generate any new or harmful inflammatory processes in this population, and can be considered a safe procedure. It is suggested that new studies are carried out with different training protocols and a larger population, thus contributing to a better understanding of the real needs of this group.

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Financial abuse: circumstances of occurrences against older adults

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Abstract

Objective: To analyze the occurrences of financial abuse against older adults. *Methods:* a descriptive and retrospective cross-sectional study with a qualitative and quantitative approach was conducted through the analysis of 209 Police Reports (PR) of financial abuse against older adults, dated between October 2016 and March 2017. Data analysis was performed by content analysis in the thematic modality. *Results*: The profile of the victims was characterized as follows: male (50.72%), aged from 60 to 69 years old (56.6%) and living with a partner (48.33%). Financial abuse against older adults is mainly committed by strangers, in 85.6% of cases, and in 6.7% of cases by family members. The sociodemographic characteristics of most offenders were unknown. Three cores of meaning relating to the types of financial abuse were identified: appropriation and damage; exposure to fraud/extortion and theft/robbery. Conclusion: There is a need for actions aimed at preventing and protecting against the financial abuse of older adults, in order to avoid suffering and emotional, physical and social harm. In addition, further studies are needed to more effectively highlight the association of alterations during the aging process and financial violence.

Keywords: Violence. Aging. Health Services for the Aged.

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INTRODUCTION

The increasing growth of the older population and its consequences has resulted in a number of reflections and concerns[1]. Aging is part of human development and occurs in a heterogeneous manner, being influenced by the social, economic and political context and by genetic determinants[2]. The process leads to biopsychosocial losses and increased exposure to chronic-degenerative diseases. Thus, older adults may have greater social, physical and emotional vulnerabilities, including different forms of dependence, which predisposes them to situations of abuse[3].

Violence against an older adult is defined as an act or omission which results in damage or distress, causing suffering, injury, pain, loss and a reduction in quality of life, compromising human rights[1]. For the World Health Organization (WHO), ill-treatment can be due to physical, psychological, sexual and financial abuse, abandonment, neglect and self-neglect, often caused by family members and caregivers at home and in long-term care facilities[4].

The severity of abuse against older adults is related to their vulnerability, and is more prevalent in older people with dementia, depression and rheumatological problems[5]. It also contributes to the development of psychosomatic illnesses, alterations in sleep and diet, dehydration, agitation, loss of identity and suicide attempts[6].

Despite its impact on public health, caused by the negative influence on the lives of older adults and family relationships, the issue of abuse is not specific to the area of health, requiring multiprofessional and intersectoral attention[7,8]. Violence against older adults has always been present within the social reality, however, only in recent times has it been discussed in literature and in policies with the necessary focus[9].

Another problem associated with the phenomenon of abuse is the lack of preparation within society to deal with these situations, which, combined with the victim's fear of and/or resistance to reporting aggressors, often hinders their identification and, consequently, the adoption of measures of protection[3].

In this context, financial abuse is worthy of attention due to its frequent occurrence. It is characterized by the theft of property and real estate, withdrawals of money through the provision of a password or code number, or depriving older adults of their own belongings, or misusing such belongings[10]. Financial abuse occurs when family members or persons responsible for the older adults misappropriate their resources, whether taking money without authorization or even taking out a loan on their behalf, impacting their monthly income, without their authorization, manipulating and/or threatening them as a form of coercion[11-12].

This abuse occurs more frequently among older adults with cognitive impairment or functional dependence, which results in difficulties in taking care of their own finances, resulting in the management of such resources being delegated to third parties. In other situations the older adults are prohibited from managing their own finances, with the financial dependence of the aggressor in relation to these adults also representing a risk factor for abuse them[6].

Considering the context and significance of financial abuse in the lives of older adults, the present study aimed to analyze the occurrences of financial abuse against older adults, based on police records registered in a police station in a medium-sized city in the interior of São Paulo, from October 2016 to March 2017.

METHOD

A cross-sectional, descriptive and retrospective study, with a qualitative and quantitative approach, was performed based on the documentary analysis of police reports (PR) of financial abuse against older adults, from October 2016 to March 2017. This article was derived from a larger project entitled *The older victim of abuse: the interface of health, legal and social care for creating interventions*. Data were collected at the Police Station for Women of the Judicial Police Center of the São Paulo State Civil Police, in a medium-sized city in the state of São Paulo, Brazil, in two phases.

The police reports included older adults over 60 years old, who suffered financial abuse from October 2016 to March 2017 and who lived in the city where the data was collected. Reports that did not contain sufficient data for the desired analysis and those of older adults who did not live in the studied city were excluded.

Data collection was carried out by three researchers between March and July 2018. For the collection of the quantitative data, a script was prepared containing the variables that defined the older adults (sex, skin color/ethnicity, marital status and education), the aggressor (sex, degree of kinship with the victim, professional status, marital status and reported skin color) and the abuse (form of complaint, place of occurrence, type of financial abuse and recurrence of abuse in the last six months).

In relation to the events characterized as financial abuse, the following were considered: a) misappropriation: usurpation of the property of others, occurring without the consent of the owner; b) appropriating the assets of an older adult: appropriating or diverting benefits such as pensions or other income from retirement or other financial assets of an older adult for applications other than their purpose[13], c) property damage: loss or conveyance, total or partial, of the assets of the owner of the object or property; concrete injury to the property of the victim; d) embezzlement: benefiting illegally from others, leading to another's loss, inducing or maintaining a third party in error through fraud or any other means; e) extortion: coercion, through threats or violence, of another to alter their behavior, with the intention of obtaining an advantage, gaining a reward or achieving a profit; f) theft: removal of another's property, in a non-apparent way, for oneself or others in a definitive manner, without violence or serious threat; g) theft: removal of another's property, in a non-apparent way, for oneself or others in a definitive manner, with serious threat and/or violence, reducing the possibility of resistance depending on the approach used[14].

The qualitative data were obtained from the descriptions contained in the police reports. Data analysis was performed through content analysis, applying the thematic modality[15].

The analysis therefore involved the following steps: a) Pre-analysis: organization of the collected material through an exhaustive reading of the police report histories, which constituted the corpus of analysis. From this the indices were referenced and the indicators and the material for the next steps were prepared; b) Exploration of material: extracts were taken of the identification records and the topics studied. These were classified to identify the cores of meaning of the police reports, through the distribution of the fragments, the identification of the cores of meaning and the construction of a framework of initial categories. The different cores of meaning were analyzed to identify the broader themes (secondary categories) and the fragments were regrouped for the construction of the final categories and the writing of the article by thematic category; and c) Treatment of the results and interpretation: preparing of the interpretative synthesis to promote the dialogue of the cores of meaning and the objectives and assumptions, correlating these to a scientific reading for the explanation and understanding of such phenomena[15]. In order to present the results, the police reports were coded as PR, inserting an increasing numerical sequence (PR1...PR209).

The project from which this study arose was approved by the Research Ethics Committee of the Faculdade de Medicina de Marília (the Marília Medical School), under decision nº 2.253.887, complying with Resolution 510/2016, and was also approved by the board of the Judicial Police Center of the São Paulo State Civil Police, which issued a letter of consent, waiving the requirement for an Informed Consent Form.

RESULTS

From October 2016 to March 2017, 346 cases of abuse against older adults were registered in the police station for women of the city under study, of which 209 (60.4%) involved financial abuse either alone or in conjunction with other types of violence or abuse.

Table 1 shows the profile of the older victims of financial abuse according to the sociodemographic variables of sex, age, education, reported skin color/ethnicity and marital status.

It was observed that, in the study population, both older men and women were victims of financial abuse, the victims were mostly in the age group from 60 to 69 years old, and there was a predominance of victims who lived with a partner and had finished primary school. In terms of reported skin color, there was a predominance of white victims.

Table 2 shows the sociodemographic variables of the aggressors of older victims of financial abuse, the victim's relationship with the aggressor, the aggressor's professional situation, marital status and reported skin color.

The majority of the aggressors were not known to the older adults. The sociodemographic characteristics of most aggressors were also unknown.

Table 3 shows that cases of abuse that occurred in the presence of the victim predominated. The rate of recurrence was 3.3% of cases over a six month period. Theft was the most common type of charge arising, followed by fraud and robbery, other types of financial abuse, including embezzlement, violence against the property of the older adults, damage and extortion, occurred less frequently. As for the location of the occurrence, the predominance of cases occurred at home, followed by commercial establishments and services.

The qualitative analysis of the police reports allowed the identification of three cores of meaning, which are related to the types of abuse, as shown in Figure 1.

Table 1. Absolute and percentage distribution of the sociodemographic variables of older victims of financial abuse registered at the police station of a city in the state of São Paulo (N=209), October 2016 to March 2017.

Variables	n (%)
Sex	
Female	103 (49.3)
Male	106 (50.7)
Ages	
60-64	59 (28.2)
65-69	59 (28.2)
70-74	43 (20.6)
75-79	18 (8.6)
≥80	30 (14.4)
Schooling	
Complete higher education	39 (18.7)
Complete high school	37 (17.7)
Incomplete high school	2 (1.0)
Complete primary school	65 (31.1)
Incomplete primary school	2 (1.0)
Illiterate	2 (1.0)
Not reported	62 (29.7)
Reported skin color	
Yellow (Asian-Brazilian)	8 (3.8)
White	176 (84.2)
Black/brown (mixed race)	20 (9.5)
Not reported	5 (2.4)

to be continued

Continuation of Table 1

Variables	n (%)
Marital status	
Partner	101 (48.3)
No partner	80 (38.3)
Not reported	28 (13.4)

Source: Author, based on the data obtained in the study, 2019

Table 2. Absolute and percentage distribution of sociodemographic variables of aggressors and relationship with victims of financial abuse registered at the police station of a city in the state of São Paulo (N = 209), October 2016 to March 2017.

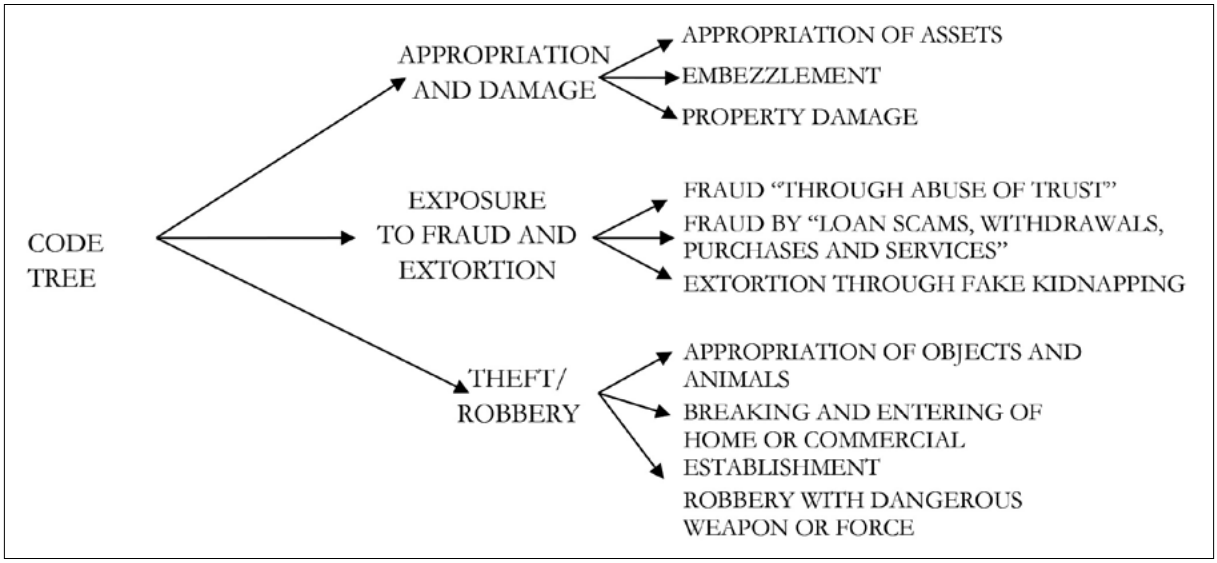
Variables	n (%)
Sex	
Female	16 (7.7)
Male	37 (17.7)
Not reported	156 (74.6)
Relationship with the victim	
Unknown	179 (85.6)
Relative	14 (6.7)
Non-family relationship	15 (7.2)
Professional	1 (0.5)
Professional status	
Unemployed	2 (0.95)
Employed	16 (7.6)
Not reported	191 (91.4)
Marital status	
Partner	2 (0.95)
No partner	8 (3.8)
Not reported	199 (95.2)
Reported skin color	
White	26 (12.4)
Black	1 (0.47)
Brown (mixed race)	15 (7.17)
Not reported	167 (79.9)

Source: Author, based on the data obtained in the study, 2019

Table 3. Absolute and percentage distribution of the variables, type of charge, place of occurrence, type of financial abuse and recurrence in the last 6 months. registered at a police station of a city in the state of São Paulo (N=209). October 2016 to March 2017.

Variable	n (%)
Type of reporting	
In person	202 (97.0)
Not in person	7 (3.0)
Location of occurrence	
Commercial establishment and services	36 (17.2)
Residence	123 (58.9)
Bank	8 (8.6)
Public place	21 (10.0)
Rural location	11 (5.3)
Type of financial abuse	
Theft	109 (52.2)
Fraud	53 (25.4)
Robbery	29 (13.9)
Others	18 (8.6)
Recurrence of abuse in the last six months	
Yes	7 (3.3)
No	202 (96.7)

Source: Author, based on the data obtained in the research, 2019



Source: *Software* WEBQDA version 3.0

Figure 1. Flowchart of construction of categories based on data from police reports from a police station in the state of São Paulo, 2018.

Appropriation and damage

Among the occurrences that the older adults suffered in this category were the crime of embezzlement, appropriation of and damage to property, often when the older adults were in a condition of frailty, such as in the process of becoming ill. The following statements referred to the appropriation of the property of the older adults:

> "The victim and her caregiver accuse the daughter of a former companion of the victim of taking advantage of her state of health, of appropriating a bank card, and claimed that while the victim was hospitalized she went to the central post office and withdrew a certain amount from the account of the victim" (PR 126).

> "The victim reports that she is a pensioner and receives a certain monthly amount and, on this date, when she went to the bank to withdraw this benefit, she was informed by the manager that, at the beginning of the month, the amount had already been withdrawn. She clarified that she was hospitalized and did not withdraw the money" (PR 33).

The embezzlement was carried out by a trusted family member, who appropriated property that belonged to the older adult. Below are some reports:

> "Victim reports that he suffered health problems and during this period his wife managed his checking account, using the card and the password. The victim confirms that he authorized her to only pay the expenses of the house, however, without his authorization the wife took out loans and made withdrawals" (PR 110).

> "The victim claims that at the beginning of 2015 he won a lawsuit and received compensation, he paid the lawyer and the rest of the money was misappropriated by his son, who opened an account and deposited the money" (PR 201).

In relation to property damage, there was material damage that affected the interest related to the property, as shown in the extracts from the descriptions contained in the charges:

> "The police were informed by the victim that the alleged aggressor went to the residence, broke the main gate and took the vehicle in front of the house and set it on fire." (PR 1).

> "Due to a disagreement between his son and the neighboring victims over loud music, they damaged the gate, broke the water trestle and threw stones at the entire residence." (PR 3).

Exposure to fraud and extortion

Three distinct conditions were observed in relation to fraud and extortion: fraud "through abuse of trust", fraud by "loan scams, withdrawals, purchases and services" and extortion through "fake kidnapping".

The police reports referring to fraud "through abuse of trust" occurred when the aggressors are people close to the victims and exploit them in an immoral and criminal manner, as shown in the following extracts from the records of the victims:

> "The victim reports that their neighbor said they were to receive compensation from a company in the city, but needed an account number to deposit the money, the victim offered his account. Withdrawals were made by the neighbor accompanied by the victim" (PR 1).

> "Victim reports that she had a romantic relationship of approximately two years with the author of the crime and that he asked for six cheques. Victim says that after lending the cheques the victim made several unsuccessful attempts to get them back" (PR 2).

The police reports included financial abuse characterized by fraud, "Loan scams, withdrawals, purchases and services for the older adults." The following records demonstrated these complaints:

> "Victim states that two people came to his home, identifying themselves as representatives of a company, offering massage mattresses, and the purchase was made by credit card in 12 installments. The product was defective" (PR 30).

> "Victim reports that he was approached on the street by a stranger who said his name and claimed he knew he was sick, asked for a cash value and supermarket card with the password" (PR 41).

Extortion by means of "fake kidnapping" is characterized by fraudulent maneuvers, in order to gain an advantage through harm to another, as seen below.

> "Victim says that he received a call from São Paulo claiming they had kidnapped his daughter and to release her they demanded a sum and an amount in other accounts" (PR 1).

> "He received a call from an unknown person, demanding a ransom, as he had his daughter in his possession. As the voice was similar to the daughter's, the victim made the deposits" (PR 15).

Theft/Robbery

The police reports in this category included the appropriation of objects and animals, without the consent of the owner, and without the use of violence. The following are descriptions that exemplify this type of abuse.

> "The victim reports that he has an acquaintance who helps him with chores at home and who got hold of his pension card and then went to the bank and withdrew a sum of money" (PR 5).

> "Victim informs that he was walking down the street when an unknown individual took his bag by pulling it from his left hand and escaping on foot" (PR 21).

Among the charges registered in the police reports, the most significant are home break-ins. The following is an excerpt from the PR describing such cases:

> "The victim said that he found the door broken open, and a safe was taken from the property containing several jewels, dollars, euros and *reais*" (PR 13).

Robbery with weapons or force were identified in the following PRs:

> "The victim was approached by two individuals on a black motorcycle without a license plate, who grabbed the victim from behind and announced the robbery. Victim says that one of the authors had a machete" (PR19).

> "She came across an individual in her room, who grabbed her and tried to have sex by force by violently attacking her, she managed to escape the rape, but the author escaped by stealing an amount of money" (PR 14).

DISCUSSION

A high prevalence of financial abuse was noted, with 60.4% of older adults who were victims of abuse in the studied period suffering financial abuse, whether in isolation or in combination with other forms of abuse. Albeit to a lesser extent, the occurrence of financial abuse is also high in European countries, such as Portugal (47.5%) and in other Brazilian states, as Piauí (47%)[16,17].

Older men were more frequently involved in financial abuse, due to resistance to sharing and/or accepting help with the management of assets[18].

The age group with the highest number of occurrences of financial abuse was 60 to 69 years old, which may be related to the fact that these older adults are in better health and have a greater degree of independence, which facilitates the registering of cases at the police station[16]. Furthermore, in this phase of life it is common for older adults to seek out new contacts and social relationships, since with retirement there is a loss of social position, friends and, often, cases of family neglect, exposing them to different types of financial abuse[19].

A study that analyzed social skills in older adults found that some do not consider starting conversations with strangers to be problematic. It is therefore important to remember that although social relationships are important for older adults, at times they can represent a risk to their property[20].

Regarding the education of victims, 32.1% reported not having completed primary school. In the northeast of Brazil, there was a predominance of financial abuse among older people with an incomplete primary education, 63.1%[21]. This difference may be related to the educational levels of the older adults in the two regions, since, between 2016 and 2018, the northeast and the north of Brazil had the highest illiteracy rate and fewer average years of schooling than in the mid-west or south of the country[22].

It was observed in one study, however, that higher levels of education tend to contribute to the autonomy of the older adults to carry out activities of daily living and their ability to make decisions. Thus, they are less vulnerable to situations of abuse[23].

In relation to skin color, the highest proportion of victims of financial abuse in the study was white, with this characteristic linked to the profile of the population living in the studied city, where 71.9% of older adults declare themselves to be white, 4.7% black, 4.0% yellow-skinned or Asian Brazilian, 19.2% brown-skinned or mixed race and less than 0.1% indigenous[24].-

Violence against older adults occurs mainly due to the countless changes that arise from the process of senescence, carried out by people either known or not known to the older adults who take advantage of the reduced capacity they often have to process information and make decisions[25].

In this way, among the analyzed occurrences, the considerable number of cases that occur in public places, banks, commercial establishments and post offices is notable, mainly by fraudulent perpetrators who abuse the vulnerability of the victims. Most of these crimes are carried out by men[21].

In this study, theft was the most reported type of financial abuse. When it comes to older adults, this occurrence can also be attributed to their frailty and the trust they place in people close to them[26].

While they are independent in basic and instrumental activities of daily living, older adults experience changes during the aging process that generate the need for a new way of living. From this perspective, when analyzing the descriptions of the police reports, it was often observed that a family member or neighbor appropriated the assets of the older adult, when for some reason, especially illness, they entrust said assets to them. It is therefore accepted that financial abuse may occur due to the dependence of the older adult on their family, which becomes the administrator of their monetary assets[27,28].

Thus, determining the limits between the autonomy of older adults and the need for greater interference and assistance from third parties was found to be an action fraught with difficulties, both for the older adult, their family, and the health and legal professionals involved in caring for these people[29].

Considering that older adults suffer chronic diseases and reduced functional/cognitive abilities[18], protective measures have been instituted, such as Law no. 12,461/2011, which makes the reporting of cases of abuse mandatory, aiming to meet the needs of the individual and improve quality of life[30].

There is therefore a need to raise awareness in society in general, so that the risks and situations of abuse against older adults are recognized and guidance for victims is provided, so that they are fully understood, as this is a complex situation involving the family and the community, as well as intersectoral actions[18].

Finally, the importance of identifying the characteristics of the context of the aggression is emphasized if new occurrences are to be prevented. In cases where the perpetrator of the aggression is identified, it is necessary to recognize their needs, as their behavior may be related to exposure to hostile environments in childhood[31].

The limitations of the present investigation mainly relate to the use of data from a single city and the carrying out of the research based on a time frame, which makes it difficult to generalize the data. Furthermore, not all police reports were completed, which made a more comprehensive analysis difficult.

CONCLUSION

The study showed that in the research population, both older men and women were victims of financial abuse. Most of the occurrences (56.4%) referred to younger older people (60-69), who declared themselves to be white (84.2%). They lived with a partner (48.3%) and had attended primary school (38.28%). It is also noteworthy that the majority of cases of abuse were carried out by people unknown to the victim.

In the qualitative analysis, three cores of meaning related to the types of financial abuse suffered by the older adults were identified: Appropriation and damage; Exposure to fraud/extortion, and Theft/Robbery. These are the forms of abuse that most affect older adults, as aging causes limitations in victims, making them more functionally disabled and leaving them in situations of frailty.

There is a need to develop actions aimed at the protection of older adults and the prevention of financial abuse against this group, with a view to avoiding physical, emotional and social suffering and exhaustion. In addition, more in-depth studies are needed in order to more effectively show the association of changes in the aging process with financial abuse.

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Complexity of care of hospitalized older adults and its relationship with sociodemographic characteristics and functional independence

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Abstract

Objectives: To investigate the relationship between the complexity of care of hospitalized older adults and sociodemographic and functional independence characteristics. *Method:* A quantitative cross-sectional and descriptive study was carried out in the medical and surgical clinics of the University Hospital of the Universidade de São Paulo, in the state of São Paulo SP, Brazil. A total of 382 older adults were assessed through a sociodemographic inventory, the Mini Mental State Exam, the Katz Index of Independence in Activities of Daily Living and the Interdisciplinary Medicine Instrument Method. *Results:* The complexity of care of participants was associated with the female sex (p=0.003), not having a partner (p=0.003), having a lower income (p=0.022), cognitive decline (p<0.001) and dependence in basic activities of daily living (BADL) (p<0.001). In the multiple logistic regression model, variables such as the female sex (OR=1.76; p=0.018), dependence in one or more activities of daily living (OR=1.26; p<0.001) and cognitive decline (OR=3.31; p<0.001) remained associated with complexity of care. *Conclusion:* The complexity of care of hospitalized older adults, as it is associated with limitations in BADL and cognitive decline, requires actions by the interprofessional team to ensure the rehabilitation, integration of long-term care and planning of care resources for older patients. Thus, it is necessary to adopt integrated services that include home care and care networks for the elderly, in order to provide qualified post-hospital discharge care and promote the health of the hospitalized older population.

Keywords: Needs Assessment. Comprehensive Health Care. Hospital Care. Health of the Elderly.

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INTRODUCTION

Population aging challenges health service professionals and managers to create actions that can respond to the physical, social, emotional and health demands of the final stage of the life cycle, old age[1]. In literature, the group of older people most susceptible to adverse health outcomes are the longest-lived individuals, with uncontrolled chronic diseases, difficulties in self-care, frailty, sarcopenia and dependence in basic activities of daily living (BADL)[2-6]. These factors predispose such people to difficulties in accessing services, adhering to health guidelines and acute exacerbations of their health conditions[2-6].

Thus, properly conducted functional assessment can provide important information, as the prevalence of functional disability in older Brazilians is high, especially among women, and is the main health indicator for older adults[7].

The assessment of functional status is therefore considered an important measure for hospital prognosis[8]. Disabilities seem to influence the effects of multimorbidity, which may be associated with an increased risk of death[9].

A study using data from the Hospital Information System/Ministry of Health on the characteristics of hospitalizations of Brazilian older adults in the SUS between 1998 and 2013, observed that such hospitalizations represented an expense to the country's public health system in excess of 33 billion reais[10]. It was also observed that the average value of hospitalizations increased from 845.15 million reais in 1998 to 3,971.82 million in 2013, despite the reduction in the number of hospital admissions by 5.9% and the number of beds by 34.1%[10]. These data suggest that the reduction in hospitalizations can be explained by an increase in the quality of life of the older population and, consequently, a reduction in the needs for hospitalization. However, hospitalizations became more complex, given that the growth in the updated average cost of a hospitalization grew by more than 45%[10].

Thus, the provision of care for this complex profile of needs requires a continuous and interprofessional organization of treatment from the health system, modifying the work process and ensuring the performance of health actions and services that promote the health and well-being of the older population on a permanent basis. A set of measures is necessary, such as the assessment of the needs of the older population, and the efficient management of the clinical treatment and care for older adults, in order to prevent adverse outcomes, optimizing specialized and high-cost care[10,11].

Literature has described how the Interdisciplinary Medicine Instrument Method (INTERMED) has proved to be effective in identifying biopsychosocial and health system aspects, allowing professionals and health managers to provide better, more qualified care for hospitalized older adults[12-15]. In clinical practice, the use of INTERMED may allow nursing managers to identify patients with greater psychosocial needs and specify the challenges that patients face individually. By using data profiles from the application of the INTERMED method, healthcare teams can direct care and organize resources to improve the patient's clinical results. This can reduce medical costs and prevent spending on future medical appointments, addressing the psychosocial challenges outlined by the method[16].

In a previous study, there was a relationship between the psychological domain of INTERMED and cognitive decline in hospitalized older adults, and relationships between the INTERMED Method and performance in BADL[15].

However, in Brazil, few studies have documented information on sociodemographic characteristics and measures of functional independence according to the complexity of care of hospitalized older adults. Therefore, the collection of this information can assist in the planning of care and the identification of the demand for long-term care in hospitalized older adults. In this sense, the objective of the present study was to investigate the relationship between the complexity of care of hospitalized older adults and characteristics of sociodemographic and functional independence.

METHOD

A quantitative, cross-sectional and descriptive study was carried out at the medical clinic and

surgical clinic of the Hospital Universitário da Universidade de São Paulo (the University Hospital of the University of São Paulo, or HU-USP), located in the west of the city of São Paulo, Brazil, from 2010 to 2012, a period in which the INTERMED method had already been adapted and validated for use in Brazil. Thus, the study resulted in a database that allowed detailed analyzes of the life and health profile of the hospitalized older people investigated and which can help to understand the needs of this population.

From the 258 beds at HU-USP and the total of 11,956 hospital admissions to the medical and surgical clinics, 382 older people were evaluated. This sample number was chosen as it is close to the 384 cases necessary to reach the degree of complexity of care of at least 50% of the population and with a 95% confidence interval in finite samples. The sample was selected for convenience criteria. The recruitment of participants was carried out based on the records of hospitalized patients aged 60 years or older, updated periodically by the nursing staff of the medical and surgical clinics. The inclusion criteria for the participants were: age 60 years or older and having been hospitalized for more than 48 hours. Patients with aphasia and who had a diagnosis of advanced dementia were excluded.

To characterize the participants, socio-demographic data (name, sex, age, ethnicity, income, and marital status) and total days of hospitalization, information present in the medical records, were collected. To survey the complexity of care and measures of functional independence, patients were interviewed individually, using standardized instruments. The first instrument applied was the INTERMED method, a tool based on data from the medical records, and a semi-structured interview conducted with the patient.

The INTERMED method is composed of 17 questions that allow the completion of a table, and consists of 20 variables that cover history, current state and vulnerability, in relation to the biological, psychological, social and health system domains, to be completed based on the answers of the interviewees. Its purpose is to improve information and communication among professionals about the health risks of patients and their needs, in order to neutralize these risks and promote preventive and cost-effective care[12].

The scores for each variable in the INTERMED method domains follow a Likert scale with values estimated from 0 to 3. The scores are classified in an increasing order of complexity, with the score 0 (zero) corresponding to the absence of complexity and 3 (three) corresponding to the highest level of complexity of a given variable. The total sum of the 20 variables can vary from 0 to 60 points, indicating the degree of complexity of the patient's care[11,12]. In this study, the older adults were classified by the INTERMED method as complex or non-complex. Older adults with a score less than 20 were classified as non-complex and older people with a score equal to or greater than 20 were classed as complex[12-14].

In Brazil, the instrument was translated, adapted and used to identify biopsychosocial and health system aspects, as well the complexity of care of patients[15,17,18].

For overall cognitive assessment, the Mini Mental State Examination (MMSE) was used and the score equivalent to standard deviation below the medians was considered: illiterate - 17 points; 1 to 4 years of schooling - 21 points; 5 to 8 years - 24 points; 9 to 11 years - 26 points; 12 years or more - 27 points[19,20]. To assess functional independence in activities of daily living related to self-care, the Katz Index of Independence in Activities of Daily Living was applied and the sample was classified as independent, semi-dependent or dependent[21].

The data were analyzed using non-parametric statistical tests, as most variables did not follow normal distribution. Chi-square or Fisher's exact tests were used for the categorical variables, in the case of variables with categories with less than five cases. For the discrete quantitative variables, the Mann-Whitney test was used for comparisons between two groups and the Kruskal-Wallis test for comparisons between three groups or more, followed by post-hoc analyzes of comparisons between pairs. The variables with p value below

0.20 in the bivariate associations were hierarchized to compose a multiple logistic regression model. The final model was constructed using Wald's Forward Stepwise method, with adjustments for sociodemographic variables, functional dependence, and days of hospitalization, composed of variables with *p* below 0.05. The dependent variable was categorized as 0 and 1, with 0 corresponding to non-complex older adults according to INTERMED and 1 to complex older adults according to INTERMED. For all analyzes, a significance level of 5% ($p<0.05$) was used.

The present study complied with the recommendations of Resolution 196/2012 and was approved by the Ethics Committee for Research Involving Human Beings of the USP University Hospital under CAAE number – 0102.0.000.198-10, approval registration CEP-HU/USP - 973/10.

RESULTS

The complexity of care of hospitalized older people was associated with sex, marital status, income, dependence in Basic Activities of Daily Living (BADL), cognitive decline and higher scores in the INTERMED domains (Tables 1 and 2). It was also observed that complex care participants had higher averages in all the INTERMED domains and more days of hospitalization (Table 2).

As shown in Table 3, in the multiple logistic regression model the variables sex, dependence in one or more BADL and cognitive decline in the MMSE remained associated with complexity of care. The other variables lost statistical significance. Together, these data indicated that participants classified as having complex care were more often women and participants with a decline in cognition and BADL.

Table 1. Sociodemographic characteristics associated with the INTERMED complexity of care of hospitalized older adults. São Paulo, Brazil, 2010-2012.

Variables	Non-complex (n=245) n (%)	Complex (n=137) n (%)	*p*-value
Age range (years)			0.309*
60 |- 69	103 (42.8)	52 (38.7)	
70 |- 79	94 (38.4)	47 (34.3)	
80 |- +	46 (18.8)	37 (27.0)	
Sex			0.003*
Female	118 (48.2)	88 (64.2)	
Male	127 (51.8)	49 (35.8)	
Marital status			
Married	127 (51.8)	51 (37.2)	0.002*
Widower	80 (32.7)	50 (36.5)	
Single or separated	38 (15.5)	36 (26.3)	
Education			
No schooling	44 (18.0)	29 (21.2)	0.443*
Incomplete elementary	177 (72.2)	96 (70.1)	
Complete Elementary/high school	24 (9.8)	12 (8.8)	
Income (minimum wages)			
No income	68 (27.9)	55 (40.1)	0.022*
1	119 (48.8)	58 (42.3)	
2	36 (14.8)	12 (8.8)	
3	7 (2.9)	5 (3.6)	
4 or more	14 (5.7)	7 (5.1)	

to be continued

Continuation of Table 1

Variables	Non-complex (n=245) n (%)	Complex (n=137) n (%)	*p*-value
Reported ethnicity			
White	167 (68.2)	87 (63.5)	0.67**
Brown (Mixed Race)	32 (13.1)	27 (19.7)	
Black (Afro-Brazilian)	41 (16.7)	22 (16.1)	
Yellow (Asian-Brazilian)	5 (2.0)	1 (0.7)	

* Chi-squared test; **Fisher's exact test – $p \leq 0.05$

Table 2. Functional performance and INTERMED domains associated with the INTERMED complexity of care of hospitalized older adults. São Paulo, Brazil, 2010-2012.

Variables	Non-complex (n=245)			Complex (n=137)			
	Mean	(sd)	Median (Quartiles 25-75)	Mean	(sd)	Median (Quartiles 25-75)	*p*-value
Days of Hospitalization	14.82	(12.5)	11 (7 – 12)	18.54	(17.21)	12 (9- 24)	*0.010**
INTERMED domains							
Biological	7.22	(2.21)	7 (6 – 9)	9.06	(2.08)	10 (8 – 11)	*0.000**
Psychological	0.82	(1.41)	0 (0 – 1)	5.07	(2.83)	5 (3 – 7)	*0.000**
Social	1.53	(1.68)	1 (0 – 2)	5.35	(3.36)	5 (3 – 7)	*0.000**
Health System	3.85	(1.44)	3 (3 – 4)	5.13	(2.32)	4 (3 – 6)	*0.000**
INTERMED Total	13.48	(3.30)	14 (12- 16)	25.21	(5.43)	24 (21 – 27)	*0.000**
	n (%)			n (%)			
BADLS - Katz							
Independent	184	(75.1)		57	(41.6)		*0.000+*
Semi-independent	26	(10.6)		35	(25.5) [a]		
Dependent	35	(14.3)		45	(32.8) [b]		
MMSE							
No cognitive decline	176	(71.8)		53	(38.7)		*0.000**
Cognitive decline	69	(28.2)		84	(61.3)		

* Mann-Whitney Test; + Kruskal-Wallis Test – $p \leq 0.05$; [a]Semi-independent < Independent (p=0.000); [b]Dependent < Independent (p=0.000).

Table 3. Final multiple logistic regression model – Forward Stepwise Method. São Paulo, Brazil, 2010-2012.

Variables*	B (EP)	OR	CI (95%)	*p*-value
Sex				
Female	0.56 (0.24)	1.76	1.10-2.82	*0.018*
MMS				
Cognitive decline	1.19 (0.23)	3.31	2.07-5.27	*0.000*
BADLs – Katz				
One or more difficulties	1.26 (0.23)	3.54	2.21-5.66	*0.000*
Constant (B0)	-1.94 (0.23)			0.000

*Final model: chi-squared of model of 75.01; degrees of freedom: 3, p<0.001; R2=0.245.

The reference condition for the dependent variable was the condition of "non-complex" older adults, while for the sex variable it was the group composed of men, and for the MMSE and Katz, it was older adults with no cognitive decline and independence in BADL respectively.

DISCUSSION

In the present study, the complexity of care of hospitalized older people was associated with the female sex, not having a partner, having a lower income, cognitive decline and dependence in BADL. However, after inserting the variables in the multiple logistic regression model, the following variables remained: sex, cognitive decline and dependence in one or more BADL. Together these findings indicate that the complexity of care of hospitalized older people is related to demands related to care and the female gender.

In terms of the association between complexity of care and sex, studies have highlighted that in comparison with older men, women constitute a longer-lived sample with greater access to health services[22,23]. Recent data from the Brazilian multicenter study (or ELSI) indicated that women played the role of primary caregivers more often (72.1% versus 27.9% compared to men), but in return, reported receiving less help in BADL (16% versus 5.6% in relation to men)[24]. In this context, it is necessary to investigate the life and health conditions associated with older women, especially morbidities, functional dependence, and use and access to health services.

Functional dependence, in turn, proved to be a guiding measure of health care in old age, in line with the World Health Organization (WHO) and Brazilian health policies[25,26]. This is because functional dependence increases the demands of care, which are not always met by the family and health services, revealing insufficient health care or a lack of care[24]. In this sense, the hospital becomes the gateway for the most dependent, frail and clinically complex users. A study carried out in a medical clinic at the Hospital Universitário de Ribeirão Preto (the University Hospital of Ribeirão Preto) (São Paulo) found that of 85 hospitalized older adults, 95.2% were considered frail[27]. Other studies suggest a relationship between functional impairment and high prevalences of hospital readmission, which can be explained by the high demands of care and scarcity of time, resources and long-term care services.[28-31].

Thus, functional dependence can bring together a set of changes that lead to greater complexity of care and, consequently, greater biological, social, psychological and health vulnerability, given that the classification as "complex" grouped participants with higher scores in all the domains that make up the INTERMED Method. However, the relationship between functional dependence and the components needs to be further explored, as well as the analysis of the social, family, individual (emotional and psychological) and health resources that predisposed hospitalization[32,33]. Another limitation relates to the absence of previous data from the participants, as well as the use of screening instruments, instead of more specific instruments to assess functional independence. In this sense, new studies are justified.

Despite these limitations, INTERMED proved to be an important tool for measuring complexity of care due to its association of variables of functional independence, living conditions and health. In a study carried out with 56 hospitalized older Japanese people (24 men and 32 women) using the INTERMED method, it was observed that the psychological domain was the most important variable for classifying participants in clusters, followed by sex, the social domain and the health system domain. In this study, Cluster 1 was composed of non-complex, male participants[33]. Cluster 2 participants (median of 11 points in INTERMED) were all female, with high scores in biological complexity[34]. The participants in cluster 3, considered complex, were mainly women with higher scores in all domains and with longer hospital stays, death within the hospital, and medical expenses[34]. In the present study, complex participants also had longer hospital stays, however the associations between complexity and hospital stay lost significance after adjustments to the multiple model.

In relation to cognitive decline, the findings in this study confirm that participants with cognitive changes had more complex care, which may be associated with reduced autonomy and independence[15,33]. In view of this, the creation of services such as day centers for older adults, psychoeducational programs for caregivers and the creation of psychogeriatric services can be alternatives for medium and long-term care,

maximizing the well-being of the family, the older adult and the community[15,35].

It is important to note that the prevalence of cognitive decline in the present study was higher than in older adults residing in the community and may have been associated with clinical conditions resulting from hospitalization. In this sense, in the context of mental health, it is possible that INTERMED can collaborate in the identification of patients' needs and provide more specialized care[35]. Additionally, INTERMED has the potential to identify a considerable subset of complex patients admitted to a medical clinic, for whom corrective actions related to non-biological risk factors can be adopted and properly implemented, in order to assess domains that are not discovered during normal medical assessments[35].

Literature also revealed that through the retrospective use of INTERMED, it was possible to quantify the biopsychosocial complexity of patients with clinical comorbidities, mental illnesses and substance use disorders, with these being the most complex patients[16]. Finally, the INTERMED method has good applicability with other instruments and was effective in identifying patients who needed complex care[35].

CONCLUSION

The results of the present study indicate that the conditions associated with the complexity of care determined by INTERMED in hospitalized older adults were: being female, suffering cognitive decline and experiencing dependence in BADL, alerting managers and nursing professionals to the importance of instruments for measuring functional independence when assessing the complexity of care of hospitalized older adults. Limitations in BADL and cognitive decline require actions by interprofessional teams in both the health and social areas aimed at rehabilitation, integration of care and planning of care resources for older adults. In this sense, it is necessary to adopt services that are integrated with home care and health care networks for older adults, in order to implement follow-up services in the post-hospital discharge period and prevent deaths, unsatisfactory health outcomes and new hospitalizations.

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Body image, nutritional status and quality of life in long-lived older adults

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Abstract

Objective: To evaluate the body image and nutritional status (NS) of older adults aged 80 and over and its relation with quality of life (QoL). *Method*: A cross-sectional, quantitative study, with no intervention, using non-probabilistic sampling, was conducted from October 2016 to September 2017 with 103 older individuals aged ≥80 years old from the state of São Paulo. NS was evaluated according to OPAS/SABE; body image was evaluated by the Kakeshita fifteen silhouette scale, and the WHOQoL-bref and WHOQoL-old were used to measure QoL. The Chi-square test was used to verify the association between the studied variables and sex. To compare QoL with nutritional status and body image, the ANOVA Factor test was used. The level of significance was 5% (p<0.05). *Results*: The majority of the interviewees were female (69.2%) and the average age was 82.75 (±2.98). When comparing the perception of QoL with NS, there was a significant difference (p=0.027) in the self-evaluation of QoL of obese older adults only. The QoL related to body image of both sexes presented a significant difference (p=0.020) in the environmental domain of the WHOQoL-bref in the evaluation of body satisfaction. *Conclusion*: The body image distortion identified by these older adults did not interfere with their perception of QoL. However, when NS was considered, overweight older adults had a higher perception of QoL.

Keywords: Aged 80 and Over. Body Image. Nutritional Status. Quality of Life.

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INTRODUCTION

Population aging is a worldwide phenomenon, and among older adults, those of greater age grow old at an accelerated rate. From the age of 80 onwards[1] such individuals are considered long-lived older adults[2]. Terms such as octogenarians, nonagenarians and centenarians can also be used for this population, based on the decade of life of the older adult[2]. For gerontology, the increase in life expectancy has brought a new challenge for the care of older adults aged over 80 years[3].

The increase in the number of older adults people is accompanied by a higher prevalence of Chronic Noncommunicable Diseases (CNCD)[4-6]. These are considered a natural part of the aging process and can aggravate or promote the appearance of other diseases[4]. The diseases that most affect older adults are cardiovascular illnesses, high blood pressure, stroke, diabetes and cancer[6].

Other changes resulting from aging include biopsychosocial changes such as sagging skin and muscles, weight gain, loss of hair shine and color, which can lead to dissatisfaction with body image. This is the mental representation of the body identity of human beings, and involves psychological, social, cultural and biological factors related to changes caused by the aging process[7].

Loss of muscle mass and overweight are changes in nutritional status that negatively affect the quality of life (QoL) of older adults[8]. These physical changes interfere with the representation of the body itself, and can cause a difference in the perception of the desired and real images in a way that impacts on the health and QoL of the individual[9].

Specific studies with older adults related to the perception of body image have been carried out in Brazil[1,7,10,11], however, most were not performed exclusively with older adults aged 80 or over. These studies have found a positive relationship between QoL and advancing age and physical activity[1] and a negative relationship with overweight[7] and non-normal nutritional status[10,11]. There has been a growing number of studies aimed at verifying how QoL impacts health promotion among older adults[1,12]. Thus, it is essential to carry out further studies that advance knowledge in this area in a manner that contributes to the generation of public policies that serve the fastest growing public in the world, namely, long-lived older adults. The objective of this study was to assess body image and nutritional status and their relationship with the quality of life of older adults aged 80 and over.

METHOD

This is a cross-sectional, quantitative, non-intervention study, performed with non-probabilistic sampling[13]. Data collection was carried out between Oct 2016 and Sep 2017, with 103 older adults aged 80 and over, of both sexes, living in different community contexts in the state of São Paulo. Among the participating municipalities are: São Paulo (n=39), São José dos Campos, (n=29), Jundiaí (n=18) and São Caetano do Sul (n=17).

Older adults were selected by a non-probabilistic convenience sample in five institutions which provide free activities in the areas of education, sports, leisure and culture, in addition to health promotion and care services for older adults.

All the participants met the inclusion criteria, being: of both sexes, aged 80 years or older; able to answer the questionnaires and carry out the proposed tests without the help of third parties. No exclusion criteria were defined, since older adults who participated in the study answered the invitation that was voluntarily delivered in each institution. Thus, when older adults were unwilling to participate in a test, they were considered absent in the database.

The data were collected by a team of researchers (physical educators, pharmacists, physiotherapists, nutritionists and psychologists) trained in the techniques of collection and evaluation. A questionnaire was used to obtain information on sociodemographic variables and the presence of diseases. Double entry validation was used when entering the data. Thus, all the survey questionnaires were typed and retyped. In case of disagreement, the researcher responsible for the instrument made the correction based on the respective questionnaire.

To measure body mass, a Plenna® brand portable digital scale with a maximum load of 150 kg and a precision of 0.1 kg was used. Height measurement was performed with a Welmy® portable stadiometer, with a scale of 0.5cm scale and a maximum height of 2m. Abdominal circumference (AC) and calf circumference (CC) were measured with an inelastic tape with a precision of 1mm.

Nutritional status was classified by the Body Mass Index (BMI) and analyzed according to the cutoff points recommended by the Pan American Health Organization (PAHO/SABE)[14], with older adults classified as underweight (<23.0 kg/m^2), normal weight (23.0 - 28.0 kg/m^2), overweight (28.0 - 30.0 kg/m^2) and obese (>30.0 kg/m^2).

Abdominal Circumference (AC) was classified as normal for men (<94 cm) and women (<80 cm); increased risk for men (94 - 102 cm) and women (80 - 88 cm); greatly increased risk for men (> 102 cm) and women (> 88 cm)[15]. For Calf Circumference (CC) three measurements were taken and the mean was used for classification, with CC>31cm[16] considered normal.

The Kakeshita fifteen silhouettes scale[17] was used to assess body image. This scale is composed of 15 cards for adults, in both a female and male version, with the shapes of both sexes shown according to variations in BMI. During the application of the test, the images were placed randomly on a table, and older adults chose the silhouette they considered the most similar to their current silhouette (CS) and what they believed to be the ideal silhouette (IS), while the real silhouette (RS) was established according to BMI result.

Body image was considered normal when RS=AS, overestimated when RS<AS and underestimated when RS>AS. In terms of body satisfaction, older adults were considered satisfied when AS=IS, dissatisfied due to thinness when AS<IS and dissatisfied due to excess weight when AS>IS.

For the subjective assessment of quality of life, the instruments developed by the Quality of Life Group, known as the World Health Organization Quality of Life (WHOQOL), as adapted for the Brazilian population by Fleck[18] and Fleck, Chachamovich, Trentini[19], were used in the abbreviated version (WHOQoL-Bref) and the specific for older adults version (WHOQoL-Old). A final score on both instruments close to 100 (maximum score) represents a high QoL, and a final score distant from 100, a low QoL.

The data were presented through descriptive statistics (mean and standard deviation), median, interquartile range, absolute and relative frequency. To identify the associations between the variables studied and sex, the Chi-square test and Fisher's exact test were used.

To compare QoL with nutritional status and body image, the Single Factor Anova Test was used, followed by the Tukey test. The level of significance was set at 5% (p<0.05) for all variables assessed.

The present study arose from the multicenter project entitled *Patterns of physical, cognitive and psychosocial aging in long-lived older adults living in different settings*, of the National Academic Cooperation Program (or PROCAD) proposed by the Universidade Estadual de Campinas (Campinas State University, or UNICAMP) in partnership with the Universidade Católica de Brasília (the Catholic University of Brasília, or UCB) and the Universidade de Passo Fundo (Passo Fundo University, or UPF). A partnership was signed between the three universities and the Universidade São Judas Tadeu (São Judas Tadeu University, or USJT), and each institution has the prerogative to propose objectives that meet the profile of the program in which the project is included. Thus, this project was approved under opinion nº 3327599.

Older adults signed an Informed Consent Form (ICF) created in accordance with the National Health Council (Resolution Nº466, dated 12 December 2012).

RESULTS

A total of 103 older adults people took part in the study, and the average age was 82.75 (±2.98). There was a minimum age of 80 years and a maximum age of 94 years. The majority of participants were female (69.2%), and most described themselves as

white (82.7%), widowed (58.7%), with a complete elementary school education (51.9%), living with others (66.3%), and earning between one and two minimum wages (51.9%).

When verifying morbidities, all older adults reported having at least one disease, the most frequent being Arterial Hypertension (82.2%), followed by Arthrosis (26.7%), Diabetes Mellitus (23.3%), Hypercholesterolemia (20.0%) and Arthritis (13.3%).

Table 1 shows that when nutritional status and body image were compared by sex, only the AC variable exhibited a significant association (p<0.001), with 81.7% of women presenting a much increased risk for cardiovascular diseases.

When comparing the perception of QoL (in its different domains and facets) with nutritional status, there was a significant difference (p=0.027) only in the self-assessment of QoL. Obese older adults had a significantly higher perception of QoL than overweight people (Table 2).

When considering sex, the perception of QoL in the autonomy facet is significantly (p<0.001) higher in women who are overweight than those who are obese or of normal wight. In the intimacy facet, the perception of QOL is significantly (p=0.045) higher in overweight older women than women of normal weight (Table 3). No significant difference was found in the domains and facets assessed for men.

QoL related to body image (perception and body satisfaction) evaluated for both sexes showed a significant difference (p=0.020) in the environment domain of the WHOQoL-Bref in the assessment of body satisfaction (Table 4). According to the Tukey test, the perception of QoL in the environment domain is significantly higher in older adults who are satisfied with their body than among those who are dissatisfied due to thinness.

When the domains and facets of QoL based on body perception were compared by sex, it was observed that men with overestimated and underestimated body perception had a significantly higher perception of QoL in relation to satisfaction with health (p=0.006), than men who saw themselves as normal. Older women with underestimated body perception have a significantly higher perception of QoL in the functioning of the senses (p=0.042) and autonomy (p=0.039) facets, compared to those who have an overestimated body perception (Table 5). When analyzing body satisfaction, no significant difference was found for either sex.

Table 1. Distribution of older adults (N=103), according to anthropometric measures and body image. São Paulo, 2016-2017.

Variables	Men	Women	Total	Chi-squared	*p**
	n (%)	n (%)	n (%)		
Nutritional status					
Low weight	05 (15.6)	10 (14.3)	15 (14.7)	0.899	0.826
Normal Weight	19 (59.4)	37 (52.9)	56 (54.9)		
Overweight	04 (12.5)	09 (12.9)	13 (12.7)		
Obesity	04 (12.5)	14 (20.0)	18 (17.6)		
Total	32 (100.0)	70 (100.0)	102 (100.0)		
Abdominal circumference					
Normal	14 (43.8)	2 (2.8)	16 (15.5)	37.542	<0.001
Increased risk	10 (31.3)	11 (15.5)	21 (20.4)		
Greatly increased risk	08 (25.0)	58 (81.7)	66 (64.1)		
Total	32 (100.0)	71 (100.0)	103 (100.0)		
Calf Circumference					
Not normal	02 (6.3)	06 (8.6)	08 (7.8)	0.164	0.686
Normal	30 (93.8)	64 (91.4)	94 (92.2)		
Total	32 (100.0)	70 (100.0)	102 (100.0)		
Body Perception				2.626	0.269
Normal	07 (22.6)	13 (18.6)	20 (19.8)		
Overestimated	12 (38.7)	39 (55.7)	51 (50.5)		
Underestimated	12 (38.7)	18 (25.7)	30 (29.7)		
Total	31 (100.0)	70 (100.0)	101 (100.0)		
Body Satisfaction				0.533	0.766
Normal	15 (48.4)	31 (44.3)	46 (45.5)		
Dissatisfied due to thinness	05 (16.1)	09 (12.9)	14 (13.9)		
Dissatisfied due to excess weight	11 (35.5)	30 (42.9)	41 (40.6)		
Total	31 (100.0)	70 (100.0)	101 (100.0)		

*level of significance ($p<0.05$).

Table 2. Distribution of older adults (N=103), according to nutritional status and quality of life. São Paulo, 2016-2017.

Quality of Life	Underweight (n= 13) Mean QoL ± sd	Normal Weight (n=52) Mean QoL ± sd	Overweight (n=12) Mean QoL ± sd	Obesity (n=16) Mean QoL ± sd	F	*p*	η2 partial
WHOQoL-Bref							
Physical	67.30 ± 16.55	70.19 ± 15.48	69.35 ± 14.48	69.42 ± 16.65	0.12	0.949	0.4
Psychological	73.40 ± 14.08	72.76 ± 10.35	65.97 ± 13.74	74.45 ± 12.35	1.42	0.244	4.6
Social relationships	69.23 ± 20.52	69.39 ± 14.27	70.14 ± 13.97	78.13 ± 13.90	1.44	0.236	4.6
Environment	71.40 ± 15.35	70.19 ± 12.70	68.75 ± 13.06	72.27 ± 12.28	0.20	0.897	0.7
Self-assessment of quality of life	75.00 ± 14.43[ab]	78.84 ± 15.95[ab]	72.92 ± 16.71[a]	89.06 ± 12.81[b]	3.20	0.027	9.7
Self-assessment of health satisfaction	75.00 ± 17.68	72.59 ± 25.85	70.83 ± 14.43	89.06 ± 12.81	0.07	0.976	0.2
Quality of Life	Underweight (n=12) Mean QoL ± sd	Normal Weight (n=50) Mean QoL ± sd	Overweight (n=12) Mean QoL ± sd	Obesity (n=13) Mean QoL ± sd	F	*p*	η2 partial
WHOQoL-old							
Functioning of senses	71.35 ± 21.73	70.63 ± 22.53	79.17 ± 19.46	79.81 ± 22.12	0.94	0.424	3.3
Autonomy	70.83 ± 17.94	63.38 ± 16.89	76.04 ± 18.43	62.98 ± 17.76	2.16	0.099	7.2
Past, present and future activities	78.13 ± 13.98	73.13 ± 17.78	76.56 ± 18.49	77.40 ± 12.64	0.47	0.703	1.7
Social participation	76.04 ± 16.82	70.63 ± 15.68	78.65 ± 18.36	76.44 ± 11.74	1.24	0.301	4.3
Death and dying	76.56 ± 21.00	68.12 ± 27.53	63.54 ± 26.36	66.35 ± 28.24	0.53	0.661	1.9
Intimacy	76.56 ± 17.09	72.00 ± 18.39	76.56 ± 25.86	79.33 ± 16.41	0.65	0.584	2.3

[ab]In the self-assessment of quality of life compared to nutritional status, means followed by the same letter[ab] do not differ among one another and means followed by different letters[a,b] differed among one another according to the Tukey test; QoL: quality of life; sd: standard deviation; F: force; *p*: level of significance ($p<0.05$); η2 partial: n partially squared.

Table 3. Distribution of older women (n=61) according to nutritional status and quality of life, classified by sex. São Paulo, 2016-2017.

Sex	Quality of Life	Underweight (n=8) Mean QoL ± sd	Normal Weight (n=33) Mean QoL ± sd	Overweight (n=8) Mean QoL ± sd	Obese (n=12) Mean QoL ± sd	F	*p*	η2 partial
Women	WHOQoL-Bref							
	Physical	71.42 ± 17.70	71.64± 15.46	71.42 ± 16.31	69.94 ± 18.50	0.03	0.992	0.2
	Psychological	76.56 ± 12.28	73.59 ± 9.42	65.10 ± 14.93	73.95 ± 14.00	1.55	0.213	7.5
	Social relationships	81.25 ± 16.51	71.46 ± 13.50	70.83 ± 14.88	80.55 ± 14.46	2.00	0.124	9.5
	Environment	75.49 ± 14.41	73.10 ± 11.31	69.53 ± 14.44	72.65 ± 14.23	0.29	0.831	1.5
	Self-assessment of quality of life	78.12 ± 16.02	75.00 ± 18.90	75.00 ± 18.99	89.68 ± 12.98	2.12	0.108	10.0
	Self-assessment of health satisfaction	75.00 ± 18.90	71.21 ± 25.10	68.75 ± 11.57	66.77 ± 28.97	0.22	0.882	1.1
	WHOQoL-old							
	Functioning of senses	78.57 ± 14.81	68.03 ± 21.90	87.50 ± 12.04	77.09 ± 24.80	2.26	0.092	11.0
	Autonomy	73.21 ± 16.42[ab]	65.18 ± 15.91 [b]	85.15 ± 12.01 [a]	55.66 ± 14.13 [b]	5.99	<0.001	24.6
	Past, present and future activities	82.14 ± 11.09	72.85 ± 18.97	82.81 ± 17.91	78.47 ± 12.92	1.16	0.335	5.9
	Social participation	73.21 ± 21.97	69.64 ± 16.05	86.71 ± 14.34	74.30 ± 11.02	2.50	0.069	12.0
	Death and dying	79.56 ± 12.35	69.38 ± 26.13	64.84 ± 27.73	58.33 ± 24.40	1.01	0.394	5.2
	Intimacy	81.25 ± 11.97 [ab]	73.92 ± 16.00 [b]	90.62 ± 13.88 [a]	81.94 ± 16.95 [ab]	2.87	0.045	13.5

[ab]In the self-assessment of quality of life compared to nutritional status, means followed by the same letter[ab] do not differ among one another and means followed by different letters[a,b] differ among one another according to the Tukey test; QoL: quality of life; sd: standard deviation; F: force; *p*: level of significance ($p<0.05$); η2 partial: n partially squared.

Table 4. Distribution of older adults (N = 103), according to body image and quality of life. São Paulo, 2016-2017.

Quality of Life	Body Image			F	*p*	η2 partial
	Normal	Overestimated	Underestimated			
	(n=16) Mean QoL ± sd	(n=48) Mean QoL ± sd	(n=28) Mean QoL ± sd			
WHOQoL-bref						
Physical	71.20 ± 15.57	68.75 ± 16.28	70.41 ± 14.45	0.19	0.826	0.4
Psychological	70.83 ± 13.86	72.74 ±12.15	71.58 ± 11.17	0.18	0.837	0.4
Social relationships	70.31 ± 17.47	73.44 ± 14.04	68.16 ± 15.22	1.13	0.326	2.5
Environment	69.93 ± 15.89	71.29 ± 12.98	69.53 ± 11.46	0.18	0.836	0.4
Self-Assessment of Quality of Life	75.00 ± 18.26	80.73 ± 16.50	79.46 ± 13.70	0.77	0.467	1.7
Self-assessment of health satisfaction	68.75 ± 28.14	70.83 ± 25.44	76.79 ± 19.16	0.74	0.480	1.6
Quality of Life	Body Image			F	*p*	η2 partial
	Normal	Overestimated	Underestimated			
	(n=18) Mean QoL ± sd	(n=45) Mean QoL ± sd	(n=23) Mean QoL ± sd			
WHOQoL-old						
Functioning of senses	72.22 ± 23.70	70.56 ± 22.24	79.62 ± 20.83	1.30	0.279	3.0
Autonomy	65.28 ± 19.79	64.17 ± 17.14	69.02 ± 19.35	0.54	0.584	1.3
Past, present and future activities	71.88 ± 14.74	72.50 ± 18.09	81.25 ± 13.98	2.50	0.088	5.7
Social participation	73.61 ± 11.25	70.97 ± 16.22	76.36 ± 18.75	0.87	0.422	2.1
Death and dying	75.57 ± 22.50	68.75 ± 26.48	63.32 ± 29.21	0.66	0.527	1.5
Intimacy	69.79 ± 16.50	76.67 ± 15.27	73.10 ± 25.87	0.91	0.406	2.2

to be continued

Continuation of Table 4

Quality of Life	Body satisfaction Satisfied	Dissatisfied due to Thinness	Dissatisfied due to Excess Weight	F	*p*	η2 partial
	(n=42) Mean QoL ± sd	(n=13) Mean QoL ± sd	(n=37) Mean QoL ± sd			
WHOQoL-Bref						
Physical	71.47 ± 16.24	61.26 ± 16.74	70.66 ± 13.50	2.33	0.103	5.0
Psychological	74.31 ± 12.17	66.67 ± 13.07	71.40 ± 11.20	2.13	0.124	4.6
Social relationships	73.61 ± 14.94	69.23 ± 17.14	69.37 ± 14.44	0.92	0.402	2.0
Environment	74.11 ± 13.63[a]	63.46 ± 13.98[b]	68.92 ± 10.60[ab]	4.07	0.020	8.4
Self-assessment of quality of life	82.74 ± 15.11	75.00 ± 17.68	77.03 ± 16.01	1.84	0.163	4.0
Self-assessment of health satisfaction	72.62 ± 23.95	67.31 ± 25.79	73.65 ± 24.26	0.33	0.717	0.8
Quality of Life	Body satisfaction Satisfied	Dissatisfied due to Thinness	Dissatisfied due to Excess Weight	F	*p*	η2 partial
	(n=40) Mean QoL ± sd	(n=12) Mean QoL ± sd	(n=34) Mean QoL ± sd			
WHOQoL-old						
Functioning of senses	73.59 ± 22.71	71.35 ± 23.30	73.71 ± 22.02	0.05	0.948	0.1
Autonomy	65.78 ± 19.46	71.86 ± 16.96	63.42 ± 17.07	0.96	0.389	2.3
Past, present and future activities	76.86 ± 15.26	78.13 ± 13.19	70.96 ± 19.02	1.46	0.238	3.4
Social participation	73.59 ± 16.17	76.04 ± 17.24	71.14 ±15.77	0.47	0.630	1.1
Death and dying	69.84 ± 27.07	78.65 ± 23.90	62.32 ± 25.63	1.90	0.156	4.4
Intimacy	77.19 ± 17.48	69.30 ± 20.78	69.30 ± 20.78	2.03	0.138	4.7

[ab]In the self-assessment of quality of life compared to body satisfaction, means followed by the same letter[ab] do not differ among one another and means followed by different letters[a,b] differ among one another according to the Tukey test; QoL: quality of life; sd: standard deviation; F: force; *p*: level of significance ($p<0.05$); η2 partial: n partially squared.

Table 5. Distribution of older adults (N=103), according to body image and quality of life, classified by sex. São Paulo, 2016-2017.

Sex	Quality of Life	Body image			F	*p*	η2 partial
		Normal	Overestimated	Underestimated			
		(n=16) Mean QoL ± sd	(n=12) Mean QoL ± sd	(n=12) Mean QoL ± sd			
Men	WHOQoL-Bref						
	Physical	65.81 ± 15.13	64.58 ± 13.40	68.75 ± 15.54	0.25	0.779	1.8
	Psychological	63.69 ± 10.95	72.92 ± 11.02	73.96 ± 13.19	1.84	0.178	11.6
	Social relationships	64.28 ± 17.16	64.58 ± 10.13	65.97 ± 16.84	0.04	0.961	0.3
	Environment	61.61 ± 16.11	67.45 ± 10.53	67.71 ± 13.41	0.57	0.572	3.9
	Self-assessment of quality of life	67.86 ± 18.90	79.17 ± 20.87	79.17 ± 14.43	1.05	0.363	7.0
	Self-assessment of health satisfaction	53.57 ± 30.37[a]	83.33 ± 16.28[b]	85.41 ± 16.71[b]	6.28	0.006	40.0
	Quality of Life	Body image			F	*p*	η2 partial
		Normal	Overestimated	Underestimated			
		(n=07) Mean QoL ± sd	(n=10) Mean QoL ± sd	(n=10) Mean QoL ± sd			
	WHOQoL-old						
	Functioning of senses	66.96 ± 28.56	80.63 ± 16.52	72.50 ± 26.39	0.71	0.501	5.6
	Autonomy	54.46 ± 21.56	71.88 ± 16.20	61.25 ± 18.82	1.90	0.171	13.7
	Past, present and future activities	67.85 ± 17.09	70.00 ± 14.37	78.75 ± 13.57	1.37	0.272	10.3
	Social participation	72.32 ± 11.33	73.13 ± 11.04	75.00 ± 19.76	0.07	0.929	0.6
	Death and dying	82.14 ± 26.13	70.63 ± 29.02	59.38 ± 33.24	1.20	0.319	9.1
	Intimacy	65.18 ± 26.13	74.38 ± 14.86	60.00 ± 28.75	1.08	0.355	8.3

to be continued

Continuation of Table 5

Sex	Quality of Life	Body image Normal (n=09) Mean QoL ± sd	Overestimated (n=36) Mean QoL ± sd	Underestimated (n=16) Mean QoL ± sd)	F	*p*	η2 partial
Women	WHOQoL-Bref						
	Physical	76.39 ± 13.82	70.14 ± 17.08	71.65 ± 13.95	0.39	0.679	1.3
	Psychological	76.39 ± 12.66	72.69 ± 12.66	69.79 ± 9.44	0.87	0.424	2.9
	Social relationships	75.00 ± 17.18	76.39 ± 14.02	69.79 ± 14.23	1.15	0.325	3.8
	Environment	76.39 ± 13.01	72.57 ± 13.57	70.90 ± 9.99	0.56	0.583	1.8
	Self-assessment of quality of life	80.56 ± 16.67	81.25 ± 15.09	79.69 ± 13.60	0.06	0.941	0.2
	Self-assessment of health satisfaction	80.56 ± 20.83	66.67 ± 26.73	70.31 ± 18.75	1.20	0.308	4.0
	Quality of Life	Body image Normal (n=11) Mean QoL ± sd)	Overestimated (n=35) Mean QoL ± sd	Underestimated (n=13) Mean QoL ± sd	F	*p*	η2 partial
	WHOQoL-old						
	Functioning of senses	75.57 ± 20.81[ab]	67.68 ± 23.01 [a]	85.10 ± 14.10 [b]	3.36	0.042	10.7
	Autonomy	72.16 ± 15.90 [ab]	61.96 ± 16.97 [a]	75.00 ± 18.22 [b]	3.45	0.039	11.0
	Past, present and future activities	74.43 ± 13.24	73.21 ± 19.15	83.17 ± 14.52	1.60	0.210	5.4
	Social participation	74.43 ± 11.68	70.36 ± 17.50	77.40 ± 18.67	0.90	0.413	3.1
	Death and dying	66.48 ± 18.59	68.21 ± 26.14	66.35 ± 26.70	0.04	0.964	0.1
	Intimacy	72.73 ± 14.60	77.32 ± 15.54	83.17 ± 18.82	1.28	0.286	4.4

[ab]In the environment domain compared to body satisfaction, means followed by the same letter[ab] do not differ among one another and means followed by different letters[a,b] differ among one another according to the Tukey test; QoL: quality of life; sd: standard deviation; F: force; *p*: level of significance ($p<0.05$); η2 partial: n partially squared.

DISCUSSION

The present study discusses relevant themes related to the nutritional status, body image and Quality of Life of older adults aged 80 and over. Regarding perception of QoL and nutritional status, obese older adults had a better self-assessment of QoL. This is related to body satisfaction and perception, which was higher in the environment domain and in the assessment of body satisfaction (WHOQoL-Bref) of older adults of both sexes who were satisfied with their body.

In self-reported diseases, there was a predominance of arterial hypertension followed by osteoarthritis. In the longitudinal study entitled *EpiFloripa* carried out with older adults people from the urban area of Florianópolis (Santa Catarina), diseases were also investigated in a self-reported manner. At the study baseline (2009/2010) 58.1% of older adults reported being hypertensive, while following the study in 2013/2014 the percentage of hypertensive patients increased to 65.1%, although the data did not identify a statistically significant difference (p=0.059)[20]. Araújo et al.[21] found that the high incidence of chronic diseases, associated with the increase in chronological age and decreased functional capacity, can contribute to the reduction of the ability of older adults people to perform activities independently.

In assessing nutritional status, the older adults studied were mostly of normal Weight, a similar result to that observed in the study by Sass and Marcon[22] in which 37.5% of older adults were of normal weight, followed by 31.7% who were obese. In the group aged 80 and over, the older adults had normal weight, with a mean BMI of 25.13±3.50 among men and 26.02±5.40 among women.

A survey carried out in Brazil with a population-based sample presented data similar to those found in this study, with 43.8% of long-lived older Brazilians (80 years or older) being of normal weight, however, the authors highlight that this age group presented the highest percentage (26.3%) of underweight older adults, according to the classification proposed by the Food and Nutrition Surveillance System (SISVAN), 2011[23].

In a study carried out with older adults aged over 80, attending a physical activity program at the Universidade de São Francisco in the city of Petrolina (Pernambuco), the mean BMI was 24.98±0.79. The authors assessed BMI by two criteria, WHO (2000) and NSI (1994). According to both, the mean BMI value classified the older women as of normal weight. When BMI was assessed separately, there was a difference in the assessment according to the WHO, with 66.7% of older women being underweight and 33.3% normal weight[8].

Most of the cutoff points for BMI available in scientific literature are for North Americans and Europeans. The World Health Organization criteria are widely used in Brazilian and international studies, even though it has been established for the diagnosis of BMI in adults. The classification proposed by the NSI considers body changes in older adults, and is recommended for the use of studies with this public. The Pan American Organization also presents cutoff points for older adults, however, which consider the characteristics of the Latin American population[20].

Thus, given the different criteria for the classification of BMI, it is important to choose the cut-off point that is closest to the characteristics of the population to be studied, so that the results obtained are more reliable. It is emphasized that they should be used with caution, as when applied in isolation they do not represent a parameter for assessing body composition.

Abdominal visceral fat assessed by AC identified a significantly increased risk for cardiovascular diseases in the older adults studied. A similar result was found by Nascimento et al.[8], with octogenarian older adults having a mean value of 89.0 ± 9.84, with a risk for metabolic complications; while in the study by Fan et al.[24] the mean AC values were 88.83 cm in men and 87.96 cm in women. According to the Asian Health Standard, only women had abdominal obesity, with AC above 85 cm. The assessment of adiposity should be more effective, as underweight, obesity, arterial hypertension, type 2 diabetes and abdominal obesity increase the risk of morbidity and mortality[8,24]. AC reflects visceral fat and has been shown to be strongly associated with cardiovascular disease and mortality, in comparison with BMI[24,25].

Older adults who were satisfied with their bodies exhibited a positive perception of QoL in the environment domain, which suggests that older adults are satisfied with their bodies and are concerned with health-related care, financial resources, information, home environment, physical environment, transportation, recreation and security physical.

Older adults with an overestimated or underestimated body image have a higher perception of QoL through self-rated health satisfaction. Older women with underestimated body image present a positive QoL in the facets of sensory functioning and autonomy. This finding suggests that for these older women, having a lower body image favors improved performance in activities that involve sensory skills, in addition to greater independence in making their own decisions. Having awareness of one's own body can positively reflect on the inherent acceptances of the aging process[7] and contribute to decision making. Independence (self-care) and autonomy (acting and making decisions) are perceived by older adults as important components of healthy aging[26].

It was observed that older adults with body image distortion, whether under or overestimated, had a more positive perception of QoL in relation to those with normal body image, which suggests that their QoL does not depend on their body image, unlike what has been found in literature. For Martins et al.[11] this fact may be related to the different cultures and regional historical experiences of the individual, which conflict with dissatisfaction of body image. Menezes et al[7] argue that a satisfactory perception of body image can be influenced by aspects such as acceptance/adaptation with age, satisfactory living conditions, favorable financial conditions, good relationships with children, social contact, and acceptance of changes in the aging process, among other factors that can intervene positively in the health status of individuals.

There are few studies in literature that assess body image in long-lived older adults. This may be due to the concern with body image being more present in younger older adults, who are still very much aware of the search for the perfect, rejuvenated body, which does not bear the marks of the aging process[24]. For Menezes et al.[7], this non-acceptance of aging is worrying, as it can trigger compensatory attitudes that put the health of older adults at risk.

A study with older adults from Campina Grande (Paraiba), found that 67.7% of a group aged 80 years or older (n=164) had a satisfactory perception of body image according to the Stunkard et al. scale, while 41.1% of older adults and 15.8% of older adults had a greater prevalence of dissatisfaction with their perception of body image. However, the authors observed that octogenarian older adults were more satisfied with their body image than younger older adults. These data can be explained by the fact that long-lived individuals are more concerned with the health and functionality of the body than with aesthetics[7].

Body image research has focused on younger women because older women were presumed to be immune to body dissatisfaction. However, studies presented in the review by Cameron et al., indicate that older women experience different levels of body dissatisfaction. Concerns about the body among older women involves dissatisfaction with gray hair, wrinkles, loss of muscle tone and weight gain[27].

Obese older adults presented a positive self-assessment of QoL. Only in underweight older women was a significant difference found in the perception of QoL in the facets of autonomy and intimacy, which was higher when compared with other classifications of nutritional status. It is inferred that these older women do not abstain from a social life because of their weight, much less let this interfere with their decision making. During the data collection process, it was observed that for older women, there is a belief that being overweight is understood as healthy, since thinness is associated with diseases.

A different result from this study was found by Miranda, Soares and Silva[1], with 55.9% of overweight older adults considering their QoL and satisfaction with health to be poor. However, when age group was considered (70-79 years and ≥80 years), advanced ages were associated with better perception of QoL. This result reaffirms the findings in the literature that older adults accept old age more than younger older adults, who still deny the aging process.

Among the limitations of this study, it should be noted that the convenience sampling technique included older adults interested in participating in the study and who, therefore, were active in their community in some way, and did not include frail older adults. Furthermore, the lack of specific Brazilian and international literature with older adults aged over 80 made comparative analysis difficult. Additionally, as this is a cross-sectional study, it was not possible to establish a cause and effect relationship between the factors associated with the QoL of older adults.

CONCLUSION

The exponential growth of long-lived older adults currently occurring in Brazil and around the world challenges different segments of society to produce knowledge that results in the understanding of factors that directly affect the Quality of Life (QoL) of this age group. Thus, the identification of these factors is essential to promote interventions aimed at meeting the needs of this population.

The present study showed that the distortion of the body image of older adults did not interfere in their perception of QoL. On the other hand, when assessing nutritional status, overweight older adults had a better perception of QoL, which suggests that older adults aged 80 and over are better adapted to the changes that occur in the body in the aging process.

It is important to carry out longitudinal studies in order to identify factors that directly affect QoL throughout the aging process, thus providing conditions for the adoption of preventive and health promotion measures.

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Parkinson's disease: coping and coexistence

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Abstract

Objective: To know the ways of coping when living with Parkinson's disease. *Method:* The methodological framework used was the Grounded Theory. Thirty people diagnosed with Parkinson's disease registered at the Parkinson Santa Catarina Association, SC, Brazil. participated in the in-depth interview. After the data coding process, five people with the disease validated the findings. Data collection took place between September 2013 to April 2014. *Results*: The categories that emerged were: Share activities with people with Parkinson's disease; Have family support; Seek healthy living: activities for self-esteem and quality of life. Discussion: The study highlights the importance of family company in promoting patient stability and self-esteem, where family support helps in coping with the health condition. *Conclusion*: It was possible to know the ways of coping to live with the disease, especially in sharing experiences with peers; family support, leisure activities, and lifestyle changes; Such characteristics are pertinent to the health care of people with neurodegenerative diseases.

Keywords: Parkinson Disease. Social Support. Nursing. Family. Qualitative Research.

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INTRODUCTION

Chronic diseases can cause disabilities and physical, cognitive and social dependence, resulting in a significant impact on society. These diseases can produce limitations in activities of daily living, difficulties in self-care and dependence on others, such as caregivers/family members[1].

Health policies should be aimed at promoting the autonomy and functionality of those living with chronic illness. This approach is essential to reduce costs through early retirements, social security and sick leave due to illness and, for the individual and their family, who can foresee a better quality of life, greater social participation and autonomy to exercise their citizenship[2].

One important non-transmissible chronic disease (CNCD) is Parkinson's disease (PD), considered a neurological disorder, which is progressive in nature, characterized by "degeneration of the cells of the ventral layer of the compact part of the *substancia nigra* and the *locus ceruleus*"[3], with impairment in the motor and non-motor areas, influencing the quality of life of sufferers. Thus, holistic assistance through the use of prevention tools, health education, support and treatment for people with PD, their family members and caregivers could allow them to live healthier.

As well as the physical aspects of the disease, non-motor dimensions should be considered, as they can affect quality of life as much as motor impairments, ensuring that individuals have a better quality of life, supporting their social lives for a longer period[4].

Literature describes a variety of non-pharmacological interventions that can affect the quality of life of people with PD, such as: dance, yoga, acupuncture, reflexology, music therapy, Nordic walking, physiotherapy and group cognitive-behavioral therapy. Such activities have a positive impact in improving neuropsychiatric symptoms, in addition to reducing the severity of the motor and non-motor symptoms of PD, improving the adaptive response of individuals in coping with the disease[5].

It is important to note that none of the therapeutic interventions currently available, whether used alone or in combination, offers an entirely satisfactory strategy for caring for people with PD[6]. However, it is up to health professionals to understand the meaning of living with the disease, providing the individual with information and helping them to live a healthy life.

The guiding question of the present study was therefore: what are the ways of coping with living with Parkinson's disease? The objective was: to identify ways of coping with living with Parkinson's disease.

METHOD

A qualitative study was performed, using the Grounded Theory (GT) methodological framework. In this method, the researcher evaluates the data to understand an established situation, and "how" and "why" the informants behave in a certain way in relation to a phenomenon or situation[7] .

The study respected the precepts of theoretical data saturation, conducting an in-depth interview with three sample groups, according to time since diagnosis of PD: Sample group 1 - people diagnosed up to 5 years ago; Sample group 2 - those diagnosed from 5 years to 10 years ago; Sample group 3 - people diagnosed over 10 years ago.

In this context, 30 people with PD, registered with the Santa Catarina Parkinson's Association (or APASC) participated in the study. This association is a private, non-profit civil organization, founded in March 2004 with the aim of incorporating, supporting and guaranteeing the rights of its 139 members. To achieve this goal, it works with educational, health and community institutions in general to offer activities that promote health, treatment, self-care and healthy coexistence with PD. The multidisciplinary activities offered in partnership with higher education institutions in the region are: meetings of the Mutual Help Group (MHG) mediated by nurses; group speech therapy; ballroom dancing; physiotherapy and bocce ball.

In addition to APASC registration, the inclusion criteria for the study were: preserved cognitive condition, according to Mini Mental State Examination score[8] (score of 30 to 27 - preserved

cognitive function. Score of 26 to 24 - alteration not suggestive of deficit. Score of 23 points or less - suggestive of cognitive deficit); and the ability to communicate verbally with the researcher. Non-older people with PD were included, to consider how the disease, as well as other neurodegenerative diseases, accelerates the aging process, and coping with aging with the disease.

The interviews were conducted by the researcher from September 2013 to April 2014. For data collection, an in-depth interview was used, guided by the following questions: - *Tell me how the disease was diagnosed; Tell me about your experience with Parkinson's disease; After the diagnosis of the disease, did you have any changes in your daily activities?*; *Have there been changes in your family?; What about other relationships?; How do you cope with this chronic condition?; How do you feel about living with other people who also have the disease?* Other questions emerged from the dialogue established by the initial questions, and in order to expand upon the findings of previous interviews. The interviews lasted between 30 minutes and two hours, and were recorded in mp3 and then transcribed. Afterwards, they were returned to the participants so that they could make corrections or insert other necessary information.

People with PD were invited to participate in the study by telephone or in person, and interviews were arranged at their homes or at the Center for the Study of Older Adults (NETI), where MHG meetings take place. During data collection and analysis, memos and diagrams were used to record information and perceptions and to better visualize data and concepts.

For the analysis and codification of the data, the techniques established by the GT were used (open coding - allows the data to be separated, examined and related in order to visualize similarities and differences, which allows effective discrimination and differentiation between categories; axial coding - the categories are related to and defined by their subcategories to elicit more precise and complete clarifications, and selective coding - refers to the process of integrating and refining categories)[7]. In the present study, Word documents, rather than data analysis software was used to manage the data coding process.

The study was approved by the Human Research Ethics Committee of the Universidade Federal de Santa Catarina (the Federal University of Santa Catarina), under Opinion number 329,662. Authorization was obtained from the APASC management committee, to invite those registered with the Association to participate. Participants signed an Informed Consent Form (ICF) before the interview. All phases of this research were based on the international and national ethical standards of Resolution 466/12 of the National Health Council[9]. In relation to confidentiality, participants were identified with the letter "P" followed by a number corresponding to data collection, for example: participant with interview number 1 = P1, and so on.

The validation of the theoretical model used is the criterion of bringing scientific rigor to the study. In this way, after the theory has been elaborated, it is essential that the researcher validates the categories and their relationship with the central theme[7]. During validation, the participants must recognize themselves in the story being told. Therefore, the model was validated through the assessment of the findings by another group of people with PD who did not participate in the previous stage.

Five people participated in the validation process, four men and one woman, with ages varying from 41 to 75 years, and a time since diagnosis of PD of between two and 18 years. The validation took place through dynamics, in which the validators were asked to look at the model presented in order to concentrate and reflect on it, to allow comparison with their experiences, and the consideration of whether they did or did not recognize themselves in the experience of PD described.

RESULTS

Table 1 represents their characterization of the study participants in terms of sex, age and time since diagnosis of PD.

Table 1. Characterization of study participants in terms of sex, age group and time since diagnosis. (n=30) Florianópolis, Santa Catarina, 2015.

Variables	n (%)
Sex	
Female	19 (63.3)
Male	11 (36.7)
Age group (years)	
Below 60	10 (33.3)
60 – 69	07 (23.3)
70-79	11 (36.7)
≥80	02 (6.7)
Time since diagnosis	
Up to 5 years	14 (46.7)
5 to 10 years	07 (23.3)
Over 10 years	09 (30.0)

Source: the authors.

It was observed that in the study population, there was a greater predominance of PD in women and older adults aged between 70 and 79 years. Most interviewees had been diagnosed with PD in the previous five years.

Through the codifications it was possible to reveal the central phenomenon: *Living with Parkinson's disease* and therefore, the categories that make up the forms of coping with living with PD: Sharing activities with people with Parkinson's disease; Having the support of the family; Seeking to live healthily: Activities for self-esteem and quality of life.

Sharing activities with people with Parkinson's disease

This category is revealed by the testimonies that identify the sharing of activities with people with PD, especially when living with members of APASC. This association invites people with PD and their families to participate in activities in order to promote health; living with other people with the disease, and sharing their experiences. It also allows people with PD to see themselves through others; help themselves and feel belonging to a group.

The first positive impact is to meet other people with PD, sometimes with a degree of limitation greater or less than their own.

> "[...]I see the disease progressing as it will, which is not as scary as it first seemed, it is still scary, but less so, and I think it's good because we see it happening, the others see us, and we see the others, and one helps the other, people comment, talk, so we're alert". (P6)

People with PD, through activities linked to APASC, share perceptions about the disease. For some, this can generate tension and negative expectations, and for others, comfort, through meeting people who are trying to accept the disease.

> "[...] we are on the same level, we are in the same boat. So it's a situation, like this, that brings a certain responsibility, like family, as if we were all brothers or sisters. We get along well because we are in the same boat, our affinity is only the care of health, body, and mind. So it's really good to spend time with people here at Parkinson's, it's very important, and really like family, we are all like a family, it's very important". (P17)

The coexistence in a group provides the sharing of wisdom, knowledge, experiences, allowing the mutual help between the participants of the group to be visualized.

> "[...] these meetings that we held here, these meetings twice a month that we held here, we learn a lot, and we carry on going, integrating and having quality of life, trying to have quality of life". (P17)

Through the interaction between people with PD the importance of interpersonal relationships, and having knowledge about the disease through others, was identified.

> "[...] We are in the same boat, I notice friends, especially when we are playing bocce ball, when they have a relapse, it's time to take the medication... Our friend, he feels weak, he keeps dragging his feet and stuff, and I say: look, it's time for the medicine, it's time for the medicine. And... well, I'm not going to say his name either... at 11 o'clock I know he takes the medicine, and sometimes he forgets, and I don't want him to have a relapse, so he has to take it first to carry on. So we are in the same boat, so each one warns the other, one helps the other". (P15)

In addition, friendship, companionship, and coexistence are extremely positive for coping with such a chronic condition, as it is perceived that people with PD take care of each other and value improvements in others, sharing common anxieties and joys. Through the testimonies, the importance of participating in the mutual aid group, and sharing the experiences, is perceived.

Having the support of the family

The family plays an important role for people with PD. Many report that the support of their families for the acceptance of and living with the disease and its limitations is essential. Others perceive that the discovery of PD and the changes imposed by the disease, such as the slowness and difficulty of carrying out daily activities, have a great impact on family members. Some report that they notice the suffering of the family and the non-acceptance of PD by family members, including avoid commenting on the disease with other people.

> "[...] At the Association there was a Parkinson's meeting, so I took my wife. There were people who were already experiencing difficulties, and I was still at the beginning of the disease, so for my wife it was quite difficult here, to see those people in that situation. So, at the end, the hymn of the Parkinson's Center was sung, and I know it made her cry. So it was a shock, especially for my wife, who was more sensitive to understanding the process ". (P18)

Individuals with PD perceive how their new health condition affects the feelings of their family members. Some interviewees saw how difficult it was for children, spouses and even for parents to learn about the disease and the limitations it can bring, showing that the anxieties arising from the new condition were shared with family members.

> "[...] I think they (my daughters) haven't come to terms with it yet, neither of them, they just say things like: "Oh, mom, you better have treatment." Sometimes, I say to them: you have to help your mother a little more, I'm experiencing a lot of limitations... But they still haven't taken it in. They think I have normal Parkinson's, which will not limit me in any way". (P19)

Perhaps due to the difficulty of knowing that a family member has a chronic and neurodegenerative disease, or even due to the lack of knowledge of the characteristics of the disease, some see that their relative does not understand their health condition. The family, like the individual with PD, goes through a conflictive process until the disease is accepted.

The support of family members is seen as essential for living better with the disease, either by stimulus/incentive, or by the need for help from the family caregiver in carrying out daily activities and health care.

> "[…] I have a lot of support from my children. My children are wonderful... They call in the morning, they call at night, and they come here every day. So we feel comfortable, with the affection they give us, we feel more relaxed, and not so upset". (P5)

The support of family members makes PD easier to deal with, as the daily lives of these people with the disease are permeated with new situations, in which there is a need to socialize with the family. It is important to be able to count on someone who is willing to listen, talk about, understand and assist in providing solutions for the daily events that arise from the disease.

Seeking healthy living: activities for self-esteem and quality of life

The new condition of health and disease makes people seek activities that improve their self-esteem and quality of life. Some reported that, before suffering from the disease, they worked too much, with no time for walks or enjoyable activities. The participants reflected on whether it is possible to have a healthy life with PD:

> "[...] You start to behave differently, from the moment that you... Like, I got more depressed, I take antidepressants, because you get quite down. So there are times you think: But why me? I've done nothing wrong! You keep questioning yourself, but you know the answer is because it is a lottery, it can affect better people than me. There are times you think about it, you think: I have Parkinson's! Your life is different now, you can evolve, you try and keep thinking that". (P8)

> "[...] then you start to question your quality of life, knowing that it is a neurodegenerative disease, it is progressive, there is still no cure". (P18)

It is important to recognize how the process of dealing with the disease takes place, based on the meanings and experiences of each person. The testimonies show that when rethinking their lives, people try to relate more to family and friends, making positive use of those around them. The limitations imposed by the condition make people try to adapt to healthy living even when in a chronic condition of health.

> "[...] I'm trying not to fight the disease so much anymore. Over time, I learn to live with the disease, with the difficulties, and comprehend, understand and accept it, respect my limits, because there is no point in wanting to do things that I can't do anymore. So there's no point, I have to learn to respect these limits, these difficulties that appear". (P16)

According to each type of limitation or difficulty imposed by the disease, the individual seeks ways to learn and adapt to daily activities, such as performing tasks using the side of the body where there are fewer tremors. Another way of learning to live with the disease is to seek religiosity and hope that it is possible to live well even with PD. The performance of activities that give pleasure is seen as a facilitator of living with the disease.

> "[...] there is no other way, except proper treatment, exercises, stretching, stretching is very important, stretching before getting up, stretching well, for at least 10 minutes, and pulling here, pulling there (demonstrating with the arms), so as not to tighten the muscles, you know, and we manage it". (P17)

> "[...] people are very understanding like that, those closest to you, aren't they, and they even understand certain things. For example, we have another group, a group of couples who do work in the church. So there are certain jobs that I can't do, we make lunch for the party, and I can't manage the kitchen, but then I just fold the napkins, arranging them... So, in view of that, they all understand why, and sometimes, if I overdo it a little they stop me, they are very understanding people, good companions". (P1)

People with PD seek emotional resources to cope with the disease, adapt to their new health condition, harmonize their experience with the disease and have a healthy life.

DISCUSSION

The present study had a greater number of women with PD. However, a study conducted in France and the UK in 2020, found that males are associated with a higher incidence and prevalence of PD, as well as an earlier onset and more severe progression of the disease than females[10]. Another relevant aspect found in this study was the predominance of people with PD diagnosed in the previous five years. This characteristic is important in relation to coping with the disease, since the period from diagnosis until acceptance is long and usually filled with arduous and complex feelings and experiences[11].

The GT framework made it possible to understand people's experiences of coping and living with PD. Data analysis revealed the actions and interactions reported by these people when living with a chronic, neurodegenerative, progressive and stigmatizing disease. The deductive reasoning of the data proposed by the GT enabled the formation of categories and the identification of themes that arose from the identification of basic elements - the codes. The reflective consideration of these codes allowed the categories to be reordered based on their content and ability to explain part of the phenomena.

Living with people who are going through the same situation was positively assessed for maintaining a network of relationships. Coexistence makes those with the disease feel the same and see themselves through others. Mutual help groups and the association of people with PD help with the well-being of the participants, as they promote a sense of control over the situation, resilience, self-confidence and knowledge about the disease[12]. Among the benefits of participating in mutual help groups, the following stand out: reducing costs for the treatment of the disease; lifestyle interventions and, a reduction in the length of hospital stays[12,13].

Such groups can be important for people with chronic diseases, as they provide opportunities not only for obtaining valuable information, but also offer perspectives from those who experience similar conditions[1]. These tools should be implemented and encouraged to allow a better understanding of the condition of people with PD, and thus, enable alternative care to be proposed.

The inclusion and participation of family members and caregivers in the groups is important so that they develop skills and help in the process of coping with PD[4,14]. The family nucleus experiences all the changes and feelings caused by the existence of a chronic disease, meaning family members play a crucial role in supporting sufferers, and in this sense, their needs must also be met to reduce their stress levels, as well as allowing them to have a better quality of life[15] .

The family member of a person with PD may have different feelings, questions about the disease and its progression. It is essential that the interaction and sharing of wishes among family members is valued. The care process and the acceptance of the new condition can be less painful and distressing when support is offered to the caregiver, both by other family members and by health professionals[16].

The study highlights the importance of the company of family in promoting the patient's stability and self-esteem, where family support helps in coping with health conditions. The interaction of the family with the patient is directly related to their quality of life, or in other words, the more the family is involved with care and attention, the greater the quality of life of the individual with PD. Support and family life reduce social isolation and contribute to participation in daily activities, as they help with actions that the person may have difficulties performing due to the physical limitations imposed by the disease[17]. Such support is seen as fundamental for the acceptance of and adaptation to PD. In addition, it improves the response of people with the disease to treatment and the limitations arising from it[18.19].

In a study related to PD, performed by the Health Service of Navarra (Spain), in 2014, it was identified that many people seek a healthier life, based on positive attitudes and feelings of harmony and balance as a result of the changes required by their new situation. Learning to live with the disease means adapting to their new condition, and such learning encourages control of the symptoms of PD, and improves knowledge and the response to changes in daily life[19].

In view of these aspects, knowledge of how people live with PD is fundamental for the understanding

and approximation of the patient and their family, in order to assist them in the process of adhering to treatment and maintaining a good quality of life, and considering family caregivers who also need care, guidance and strategies for stress relief[16,20].

A Swedish study in 2015, with people with PD and their spouses, pointed out the importance of identifying the needs of individuals with the disease, involving their family members in making decisions about care, as well as relieving the impact of the disease and promoting emotional support for all involved[21].

Certain limitations of the present study should be considered, namely that, as a qualitative study, the selection of participants is prone to selection bias. However the methodological framework chosen, the Grounded Theory, helps to minimize such a limitation. Another limitation that affects generalization is that the sample includes people with PD from a single geographic region, and a group that participates in the interdisciplinary activities offered by the Association, which directly affects living with the disease, and therefore the results of the study may not be representative of the experiences of people with PD who live in situations without social and professional support from a specialized Association for the illness.

CONCLUSION

Participating in activities with people who have a similar condition, whether through mutual help groups or an association of people with Parkinson's disease (PD) is of paramount importance for coping with living with the disease. The vital role of the family, from the perception of the first signs and symptoms, to the confirmation of diagnosis and follow-up care throughout the day to day process, is seen by the participants as fundamental to living with the chronic condition.

The ways of coping of people who experience chronic PD should be perceived in the context of their daily lives, as it is in the nuances of their particular environment that they cope with their day to day difficulties.

Due to the qualitative approach of the study, generalizations cannot be made, therefore, we recommend that future studies, in dyads, with individuals with PD and their caregivers examine the ways of coping of people who experience the chronic condition of Parkinson's through investigations with different designs, comparing focused interventions in groups with other alternative therapies that share common elements.

The implications of the results of the present study for geriatric and gerontological health services are that strategies such as self-help groups and multidisciplinary activities in associations of people with Parkinson's disease are useful for improving aspects of emotional functioning and promote healthy living between individuals and their caregivers, creating environments that contribute to coping with the disease.

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Double incontinence: associated factors and impact on the quality of life of women attended at a health referral service

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Abstract

Objective: To evaluate the prevalence, associated factors, and impact on quality of life of double incontinence in a group of women with urinary incontinence. *Method:* A cross-sectional study was performed, including female patients with urinary or double incontinence (urinary and fecal incontinence) treated at a tertiary hospital from the public healthcare system. Information about sociodemographic and clinical characteristics was collected, and quality of life was assessed using validated questionnaires. The Mann-Whitney, Chi-square, and Fisher tests were used to evaluate the association between the variables and the types of dysfunction (urinary or double incontinence) and a worse general health perception. *Results:* Of 227 incontinent women included in the study, 120 (52,9%) were older individuals. The prevalence of double incontinence was 14.1% (32 patients). Double incontinence was associated with a higher number of comorbidities (p-value=0.04), polypharmacy (p-value=0.04), and rectocele (p-valor=0.02). Higher BMI (p-value=0.02) and number of comorbidities (p-value=0.05), but not double incontinence (p-value=0.36), were associated with low general health perception scores. *Conclusion:* the prevalence of double incontinence was different from other studies conducted in similar scenarios. The group of women included in the study presented low general health perception scores, but this was not associated with the presence of double incontinence. A higher number of comorbidities was associated with both double incontinence and a lower general health perception.

Keywords: Pelvic Floor Disorders. Fecal Incontinence. Urinary Incontinence. Quality of Life. Women's Health.

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INTRODUCTION

Due to the female pelvic anatomy, which not only allows the elimination of urinary and gastointestinal tracts products but also enables parturition, women are more susceptible to pelvic floor dysfunctions (PFDs), which include anal and fecal incontinence, genital prolapse and urinary incontinence[1,2]. These can occur separately or in combination in the same patient[3]. PFDs have an important negative impact on quality of life (QoL) and, in certain cases, cause greater impairment of the QoL than chronic diseases, such as heart failure and chronic obstructive pulmonary disease[4].

According to the standard nomenclature of the International Continence Society (ICS) and the International Urogynecological Association (IUGA), urinary incontinence (UI) is defined as the complaint of any involuntary loss of urine[5]. Its cause is multifactorial, with age, number of deliveries, vaginal deliveries, obesity, being postmenopausal and undergoing gynecological surgery the main risk factors. Anal incontinence (AI) corresponds to the involuntary loss of feces or flatus, while fecal incontinence (FI) is the involuntary loss of solid and/or liquid stools[6]. The main risk factors for AI are age, vaginal deliveries, obesity, genital prolapse, diarrhea and trauma to the anal sphincter[7].

With changes in life expectation and lifestyle, other risk factors for PFDs have emerged. The combination of several chronic diseases and the multiple medications used to treat them may be involved in mechanisms that lead to urinary and fecal incontinence[8].

As they have the same pathophysiology and share risk factors, the combination of UI and FI, known as double incontinence (DI), is not uncommon, and is considered the most severe and debilitating manifestation of female pelvic floor dysfunction.

A population-based study carried out among American women aged over 62 years old found a prevalence of DI of 7%[9]. Studies in Brazilian populations have found a prevalence of 2% in women over 20 years old[10], and 4.9% in those over 65 years old[11].

DI severely affects QoL[2,12]. Women who suffer this condition avoid leaving home, must constantly use geriatric napkins or diapers and are concerned about exhaling urine and/or feces odors, which also affects their sex life. All of these conditions are associated with low self-esteem and impaired mental health[13].

The impact of PFDs on QoL can be assessed through questionnaires developed specifically for this purpose, translated and validated in several languages. These include the King's Health Questionnaire (KHQ)[14], for UI, and the Fecal Incontinence Quality of Life Scale (FIQL)[15], both translated and validated for Brazilian Portuguese.

The existence of myths and beliefs, which lead women to believe that pelvic floor dysfunctions are a natural consequence of processes such as pregnancy and aging, coupled with patients' feeling of shame and embarrassment, often prevent them from seeking help. On the other hand, health professionals are not always trained to investigate the symptoms of PFD[16].

The Brazilian population, which is mostly made up of women, has undergone a rapid aging process, and these two conditions are associated with a higher prevalence of PFD. Therefore, the present study aimed to assess the prevalence of DI in a specialized outpatient clinic and to identify sociodemographic factors, past pathological history, gynecological obstetric history, and gynecological examination findings associated with DI in comparison to UI alone. In addition, the present study aimed to identify the impact of DI on self-perceived health, controlling for sociodemographic factors, past pathological history, gynecological obstetric history and gynecological examination, and to assess the impact of FI on QoL.

METHODS

A cross-sectional, retrospective study was carried out using the database of the Urogynecology outpatient clinic of Hospital Universitário Antônio Pedro, in Niterói (Rio de Janeiro, Brazil), from April 2010 to December 2016.

Patients from the municipal districts of the Metropolitan Region II of the state of Rio de Janeiro, composed of the Niterói, São Gonçalo, Maricá, Itaboraí, Rio Bonito, Silva Jardim and Tanguá districts, referred by the Unified Health System (SUS) network due to complaints of urinary incontinence, were evaluated at the gynecology outpatient clinic and referred for urogynecological evaluation.

The sample is therefore convenience based, in which the data included were of female patients, aged 18 years or older, who had maintained their cognitive capacity, had a clinical complaint of urinary incontinence, with or without fecal incontinence. Cases where there was a history of bowel cancer, a prior colostomy or inflammatory bowel diseases were excluded.

The diagnosis of urinary and fecal incontinences was established through the symptoms referred to during anamnesis, and the combination of the two was considered double incontinence.

The following sociodemographic, clinical history and physical examination information was collected: age, education, mode of deliveries, history of surgery for prolapse and hysterectomy, number of comorbidities, number of medications in use, history of constipation, body mass index diagnosis and diagnosis of genital prolapse according to the Pelvic Organ Prolapse Quantification system (POP-Q)[17].

The number of comorbidities variable was divided into three categories (none, one and two or more). Polypharmacy was considered to be the simultaneous use of five or more medications[18].

According to the BMI, the women were classified as normal weight (BMI values from 18.5 to 24.9 kg/m^2), overweight (values from 25 to 29.9 kg/m^2) or obese (index greater or equal to 30 kg/m^2). Women aged 60 years or above were considered older.

All patients had urinary incontinence and, therefore, responded to the KHQ questionnaire to estimate the specific impact of this condition on their quality of life on the first visit[14]. Patients with double incontinence (urinary and fecal) answered the Fecal Incontinence Quality of Life (FIQL) questionnaire on their return visit[15].

The King's Health Questionnaire (KHQ) assesses general health and the impact of urinary incontinence on daily, physical and social activities, in addition to the impairment of personal relationships, sleep and mood, and measures the severity of urinary incontinence. The higher the score calculated from the patient's responses, the worse the QoL. It was validated for Portuguese in 2003[14].

The FIQL was validated for Portuguese in 2004. It has four domains: lifestyle, behavior, depression and embarrassment. For this questionnaire, the lower the score calculated from the patient's answers, the worse the QoL[15].

The answers to the first KHQ question *How would you describe your health at the moment*? refer to the self-assessment of the general perception of health, and include the responses *very good, good, fair, poor* and *very poor*. It was considered that patients who chose the first two options had a better perception of health, while the others had a worse perception, and these two groups were therefore used for analysis. Although this option is controversial, it is the most commonly used in literature[19].

Initially, a descriptive or exploratory analysis was carried out for all the variables considered in the study. For the quantitative variables, including the FIQL domain scores, position and variability measures were calculated, while for qualitative variables, absolute (number of cases) and relative (percentage of cases) distributions were constructed.

To establish the association between the categorical variables (education, mode of delivery, history of gynecological surgeries (hysterectomy and perineoplasty), comorbidities, polypharmacy, constipation and stage of genital prolapse) and the types of dysfunction (urinary incontinence and double incontinence) and also with a worse general perception of health, the Chi-square and Fisher tests were used, where applicable. For the numerical variables, the Mann-Whitney test was used.

When assessing the significance of the effects of the variables on the outcome of the study, a level of significance of 5% was applied.

The study complied with resolutions no. 466/2012 and 510/2016, and was approved by the HUAP/UFF Ethics and Research Committee (approval number 51112315.2.0000.5243).

RESULTS

The study sample consisted of 227 women with a mean age of 60.07± 11.10 (30-86 years) years and an average BMI of 29.63 ± 5.84 (14.60-46.15 kg / m^2). Of these, 120 (52.9%) were considered older women. Regarding the mode of delivery, most patients (38.8%) had experienced both a vaginal and cesarean delivery. A total of 132 (58.1%) patients had two or more comorbidities, while 58 (25.6%) used more than four medications.

The prevalence of double incontinence in the sample was 14.1% (Table 1).

Regarding the quality of life domain "general health perception" of the KHQ questionnaire, 198 women had scores greater than or equal to 50, that is, fair, poor or very poor QoL (Table 2).

BMI and number of comorbidities exhibited a statistically significant association with a worse general health perception (scores ≥50), but there was no difference between women with only UI and those with double incontinence (Table 2).

Regarding type of dysfunction, polypharmacy, the presence of two or more comorbidities and posterior vaginal wall prolapse showed a statistically significant association with the presence of double incontinence (Table 3).

Among the patients with FI, 12 did not answer the FIQL questionnaire, due to reasons such as missing the return visit and refusal, as they considered answering the questionnaire tiring. Of the remaining 20 women, low mean QoL scores were observed in all domains, with the embarrassment domain being the most affected. When considering the median, the embarrassment and behavior domains were the most impaired (Table 4).

Table 1. Sociodemographic and clinical profile of 227 women with urinary or double incontinence attended at the urogynecology outpatient clinic of the Hospital Universitário Antônio Pedro, Niterói (Rio de Janeiro), 2016.

Variables	Percentage of patients (N=227) n (%)
Dysfunction group	
Double incontinence (UI and FI)	32 (14.1%)
UI only	195 (85.9%)
Education	
Up to and including primary	168 (74%)
Secondary or higher	59 (26%)
Mode of delivery	
Normal	85 (37.4%)
Cesarean	42 (18.5%)
Both	88 (38.8%)
No delivery	12 (5.3%)
Diabetes	
Yes	56 (24.7%)
No	171 (75.3%)
No. of comorbidities	
None	33 (14.5 %)
One	62 (27.3 %)
Two or more	132 (58.1 %)
Polypharmacy	
Yes	58 (25.6%)
No	169 (74.4%)
Constipation	
Yes	59 (26 %)
No	168 (74 %)
Abdominal hysterectomy	
Yes	50 (22%)
No	177 (78%)
Colpoperineoplasty	
Yes	49 (21.6%)
No	178 (78.4%)
Anterior prolapse	
Yes	135 (59.5 %)
No	92 (40.5 %)
Posterior prolapse	
Yes	85 (37.4%)
No	142 (62.6%)
Apical prolapse	
Yes	37 (16.3%)
No	190 (83.7%)

UI=Urinary Incontinence; FI=Fecal Incontinence.

Source: Authors.

Table 2. Association between sociodemographic and clinical variables and the general health perception of 227 women attended at the urogynecology outpatient clinic of the Hospital Universitário Antônio Pedro, Niterói (Rio de Janeiro), 2016.

Variables	General Perception of Health (PGS)		*p-value*
	Good (N=29) n (%)	Poor (N=198) n (%)	
Dysfunction group *			
Double incontinence (UI, FI)	2(6.2)	30 (93.8)	0.36
UI only	27(13.9)	168 (86.1)	
Age (in years) **	61.8±10.7	59.8±11.2	0.33
BMI (in kg / m2) **	27.3±4.6	30.0±5.9	0.02
Education			
Up to and including primary	19 (11.3)	149 (88.7)	0.26
Secondary or higher	10 (17)	49 (83.1)	
Type of delivery			
Normal	13(15.3)	72(84.7)	0.09
Cesarean	1 (2.4)	41 (97.6)	
Both	13 (14.7)	75 (85.3)	
No delivery	2(16.7)	10 (83.3)	
Diabetes Mellitus			
Yes	4 (7.1)	52 (92.9)	0.15
No	25 (14.6)	146 (85.4)	
No. of comorbidities			
None	10 (18.2)	46 (81.8)	0.05
One	15 (15.8)	80 (84.2)	
Two or more	4(9.8)	72 (90.2)	
Polypharmacy			
Yes	5 (8.6)	53 (91.4)	0.27
No	24 (14.2)	145 (85.8)	
Constipation			
Yes	8 (13.6)	51 (86.4)	0.83
No	21 (12.5)	148 (87.5)	
Abdominal hysterectomy			
Yes	3 (6)	47 (94)	0.10
No	26 (14.7)	151 (85.3)	
Colpoperineoplasty			
Yes	4 (8.2)	45(91.8)	0.27
No	25(14.0)	153 (86)	
Anterior prolapse			
No	8(8.7)	84 (91.3)	0.13
Yes	21(15.6)	114 (84.4)	
Posterior Prolapse			
No	15(10.6)	127 (89.4)	0.20
Yes	14 (16.5)	71 (83.5)	
Apical Prolapse			
No	21(11.1)	169(88.9)	0.08
Yes	8 (21.6)	29 (78.4)	

UI=Urinary Incontinence; FI=Fecal Incontinence; *Fisher's Exact Test (bilateral); **Mann-Whitney Non-Parametric Test (bilateral); other analyses=Chi-square (bilateral); $p \leq 0.05$.

Source: Authors.

Table 3. Association between sociodemographic and clinical variables and the dysfunction group of 227 women attended at the urogynecology outpatient clinic of the Hospital Universitário Antônio Pedro, Niterói (Rio de Janeiro), 2016.

Variables	Dysfunction		*p value*
	UI and FI (n=32) n (%)	UI Only (n=195) n (%)	
Age (in years) *	60.1±10.5	60.1±11.2	0.93
BMI (in kg / m2) *	28.6±5.90	29.7±5.8	0.32
Education			
Up to primary	26 (15.5)	142 (84.5)	0.31
Secondary or higher	6 (10.2)	53 (89.8)	
Mode of delivery **			
Normal	11 (12.9)	74 (87.1)	0.41
Cesarean	4 (9.5)	38 (90.5)	
Both	16 (18.1)	72 (81.9)	
No delivery	1 (8.3)	11 (91.7)	
Diabetes Mellitus			
Yes	11 (19.6)	45 (80.4)	0.17
No	21 (12.3)	150 (87.7)	
No. of comorbidities			
None	4 (7.2)	52 (92.8)	0.04
An	11 (11.6)	84 (88.4)	
Two or more	17 (22.4)	59 (77.6)	
Polypharmacy			
Yes	13 (22.4)	45 (77.6)	0.04
No	19(11.2)	150 (88.8)	
Constipation			
Yes	8 (13.6)	51 (86.4)	0.89
No	24 (14.2)	144 (85.8)	
Abdominal hysterectomy			
Yes	8 (16)	42 (84)	0.66
No	24 (13.56)	153 (86.44)	
Colpoperineoplasty			
Yes	6 (12.2)	43 (87.8)	0.67
No	26 (14.6)	152 (85.4)	
Anterior prolapse			
No	10 (10.9)	82(89.1)	0.25
Yes	22 (16.3)	113 (83.7)	
Posterior Prolapse			
No	14 (9.9)	128 (90.1)	0.02
Yes	18 (21.2)	67 (78.8)	
Apical Prolapse			
No	30 (14.8)	173 (85.2)	0.39
Yes	2 (8.3)	22 (91.7)	

UI=Urinary Incontinence ;FI= Fecal Incontinence; *Mann-Whitney Non-Parametric Test (bilateral); **Fisher's Exact Test (bilateral); other analyses =Chi-square (bilateral); *$p \leq 0.05$.

Source: Authors.

Table 4. Impact of symptoms of Fecal Incontinence on quality of life according to Fecal Incontinence Quality of Life (FIQL) questionnaire in 20 women with Fecal Incontinence attended at the outpatient clinic of the Hospital Universitário Antônio Pedro, Niterói (Rio de Janeiro), 2016.

Domain	Mean ± sd	Median (AI)
Embarrassment	1.67 ± 0.96	1.50 (1.33)
Behavior	1.69 ± 0.89	1.31 (1.50)
Lifestyle	2.19 ± 1.05	2.30 (1.78)
Depression	2.28 ± 0.99	2.36 (1.79)

sd=standard-deviation; AI= interquartile range.

Source: Authors.

DISCUSSION

The sample of the female population with urinary incontinence, combined or not with fecal incontinence, included in this study was characterized as being over sixty years old and overweight, as well as having at least one comorbidity and using several medications. Double incontinence, present in 14.1% of cases, was associated with a greater number of comorbidities, polypharmacy and a diagnosis of rectocele. Most women (87.2%) had a negative perception of their health, which was associated with a higher BMI and the presence of a greater number of comorbidities, but not with the presence of double incontinence.

The prevalence of fecal incontinence (14.1%) should be assessed in the context of the population studied, who had at least one pelvic floor dysfunction, UI, and therefore represent a specific group that differs from the general population. The same consideration applies to the analysis of the associated factors and the general perception of health.

The prevalence rates of double incontinence in the overall Brazilian population vary between 2 and 18.1%[10,11,20], whereas in the USA they vary between 6 and 7%[9,21]. Studies carried out in populations with urinary incontinence treated at specialized services are more closely related to the sample of the present study, and prevalence rates of 5.5% in Turkey[22], 8% in Thailand[23], 18% in the USA[24], and 40.5% in Brazil have been identified[25].

Such disparity in relation to the findings of the present study may be due to the genetic and pelvic floor make up of each population (predominantly white, among North American women, of flatus miscegenated, in Brazil, and Thai or Turkish in Asia), as well as cultural differences between Western and Eastern populations regarding the embarrassment of describing symptoms and how to deal with them. Another factor that may explain the difference are the different definitions used by the authors, as the Brazilian and Thai studies investigated the diagnosis of anal incontinence, and it is possible that patients with only flatal incontinence, which is more common, were included among those with double incontinence.[22,25]

With regard to self-perceived health, the fact that all the women also have UI, which represents not only hygienic discomfort, but also results in social, sexual, psychological and economic problems, may justify the high proportion of women with a negative perception of health. According to Reigota et al.[26], 64.1% of a sample of 325 incontinent Brazilian women aged 50 and over also classified their health as fair, poor or very poor.

There was no association between DI and a worse general health perception, in comparison with women with only UI. Similarly, there was no difference in the scores of the general perception of health assessed using the SF-36 between Brazilian women with only AI, with AI and prolapse, and with double incontinence[27]. In the USA, worse health-related QoL scores were observed in women with FI and urinary incontinence, when compared with women who presented only urge urinary incontinence[26]. These patients were younger, and most likely had greater demands in relation to labor activity, social relationships and sex life, and the presence of FI may have constituted an additional factor for impaired QOL.

In contrast, the factors that were associated with a worse general health perception in the population of women with UI studied were BMI and number of comorbidities.

The prevalence of obesity and overweight individuals has reached epidemic proportions worldwide, and women in the menopausal transition and post-menopause periods – such as the population included in the present study – are more susceptible to this[27]. Among obese women there is a record of lower quality of life scores[28]. Obesity is also associated with other comorbidities, such as hypertension, coronary disease, diabetes and metabolic syndrome, among others, and the number of comorbidities is associated with a worse quality of life. This impact is more pronounced in the female population[28,29]. It is worth mentioning that the risk of UI, another factor associated with worse QoL, increases as BMI increases[30,31].

Studies on the factors associated with DI in different population scenarios reveal contrasting results, which can be explained by the different characteristics of the individuals included, in relation to age, nutritional status, parturition, presence of comorbidities and genital prolapse. In addition, populations from different regions of the world have different genetic loads, which influences the resistance of the tissues that make up the female pelvic floor. It should also be considered that the authors of each study choose to include certain variables that they consider most plausibly associated with DI, and these variables often do not coincide among researchers.

Camtosun et al.[22], in Turkey found no association between stage 2 and 3 rectocele and DI, which is at odds with the findings of the present study. On the other hand, among the variables studied that are common to the present study, there was also no association between DI and age, BMI, type of delivery, hysterectomy or diabetes.

Markland et al.[24], meanwhile, in a similar manner to the analyses of the present study, observed an association between posterior wall prolapse and DI, and found no association with education, diabetes and hysterectomy, among other variables. In contrast, however, an association was found between BMI and number of normal births with DI.

According to Wu et al.[21], double incontinence in women was associated with non-Hispanic, white ethnicity, depression, more than three comorbidities, hysterectomy and diarrhea. For Yuaso et al.[11], in a Brazilian population, the factors associated with double incontinence were the presence of hypertension, polypharmacy and falls in the previous year. Both studies did not include the presence of genital prolapse among the studied variables.

In American women with UI, FI and genital prolapse alone or in combination, Andy et al.[32] found no association between posterior prolapse and symptoms of FI. However, it was observed that FI was associated with polypharmacy, which may be due to the presence of several comorbidities. Matthews et al.[9] found that comorbidities, in addition to depression and multiparity, were more associated with DI than with UI or FI in isolation.

Prolapse of the posterior wall, or rectocele, especially in its more advanced stages, is associated with neuromuscular and functional defects, which lead to a variety of symptoms ranging from obstructed defecation to fecal incontinence[33].

The present study was carried out in a tertiary hospital of the Brazilian National Health Service, or SUS, whose clientele frequently presents multiple comorbidities and makes use of several medications simultaneously, representing polypharmacy[18]. Such characteristics are also found in the scope of SUS primary care[18]. The greater the number of drugs used, the greater the risk of drug interactions and adverse effects. Various medications can have effects on the gastrointestinal tract, either leading to diarrhea, such as metformin, or constipation (opioids, antidepressants, anticholinergics), both related to the presence of FI in literature[34,35].

There was no association between constipation and double incontinence, in contrast to the study by Andy et al.32, who observed greater severity of fecal incontinence when related to constipation, and the study by Camtosun et al.[22].

In the present study, information on the presence of constipation was obtained through anamnesis, without using a specific instrument, which differs from the study by Andy et al.[32], who used a validated questionnaire, and this may have influenced the result. On the other hand, although the findings of Camtosun et al.[22] were also based on medical history, the population was younger, included patients with fecal and/or flatal incontinence in the same group and found a lower prevalence of these symptoms when compared with the present study, which may explain the differences in results.

Regarding the assessment of the impact of FI on QoL through the FIQL questionnaire, lower scores were observed for the domains of embarrassment and behavior. Such a result is similar to that of Portella et al.[25].

Although they studied populations with DI, the studies by Camtuson et al.[22] and Markland et al.[24] did not use specific questionnaires to assess the impact of FI on QoL. They observed, however, that women with DI have worse scores in the questionnaires to assess the specific impact of UI on QoL, than women with only UI.

The limitations of the present study are its selection bias, as it was carried out in a tertiary health unit, the use of convenience sampling, involving mainly more severe cases, and the loss of patients with regard to the completion of the FIQL questionnaire. Its strengths, however, relate to the novelty of the environment, as there are few studies on prevalence and factors associated with DI in the Brazilian population, the use of a specific instrument, validated for the Portuguese language spoken in Brazil, to measure the impact of FI on quality of life, as well as the assessment of genital prolapse through the POP-Q system, and not simply clinical complaints relating to such dysfunction.

CONCLUSIONS

In the studied population, the prevalence of double incontinence was 14.1%, lower than that observed in studies carried out in similar scenarios.

The factors associated with double incontinence were a higher number of comorbidities, polypharmacy and the presence of rectocele.

The general health perception was negative for 87.2% of the patients. An elevated BMI and a greater number of comorbidities were associated with a worse general perception of health. There was no association between double incontinence and a worse general health perception.

Quality of life was impaired in all the domains of the FIQL questionnaire, with the lowest scores observed for the domains of embarrassment and behavior.

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Blood pressure pattern following a combined exercise session in hypertensive older women

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Abstract

Objective: The aim of the present study was to verify the behavior of hemodynamic variables in hypertensive older women following a combined exercise session and to identify the intensity of effort achieved in this session. *Method*: The study included 14 hypertensive older women (72.0±6.7 years old) who regularly practiced physical activities. The participants underwent a one-hour combined exercise session performed in a group, with intensity of effort monitored by accelerometry (Actigraph, model GT3X+). The hemodynamic parameters (systolic blood pressure, diastolic blood pressure, heart rate, stroke volume, cardiac output and peripheral vascular resistance) were individually measured by finger photoplethysmography (Finometer) before and after (60 min) the exercise session. *Results*: The sessions consisted predominantly of low-light intensity activities (60%) and 20% of class time was spent on sedentary behavior. None of the evaluated variables exhibited changes when the pre and post-exercise values were compared (p>0.05). Systolic blood pressure behavior correlated positively with time spent in sedentary behavior (r=0.541; p=0.045). *Conclusion*: The combined exercise sessions, as conducted, did not generate post-exercise hypotension. In addition, the time spent in typically sedentary activities during the classes positively correlated with changes in blood pressure, suggesting that combined exercise programs, applied in the form of collective aerobic exercises, should be composed of higher intensity activities.

Keywords: Post-Exercise Hypotension. Accelerometry. Aging. Combined Exercise.

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INTRODUCTION

Systemic arterial hypertension (SAH), characterized by systolic blood pressure (SBP) values greater than or equal to 140 mmHg and/or diastolic blood pressure (DBP) greater than or equal to 90 mmHh[1], is directly associated with age, with prevalences of 64% for men and 63% for women aged between 65 and 74 years [2]. The regular practice of physical exercise, primarily aerobic, but also that which focuses on muscle strength, is considered an essential non-drug therapy in the prevention and treatment of SAH, as it promotes a chronic reduction in blood pressure (BP) in the older population[1–3].

Furthermore, a single exercise session is capable of promoting a post-exercise reduction in BP, when compared with pre-exercise levels or to a control session, resulting in a phenomenon known as post-exercise hypotension (PEH) [4,5]. PEH can last for up to 24 hours, which is relevant not only because it means the cardiovascular system is exposed to elevated BP for a shorter period, but also because there are indications that individuals who are responsive to the acute effects of training tend to be responsive to chronic effects[6–8].

Different factors can interfere with the occurrence and magnitude of PEH, such as exercise intensity[9], but the minimum intensity for obtaining the best regulation of BP has not yet been established. In addition, it is noteworthy that most studies investigating the PEH phenomenon have been restricted to evaluating dynamic and isometric aerobic or resistance exercises considered in isolation. However, the combined practice of different exercise modalities in the same session has rarely been investigated, especially in exercise sessions in the form of dynamic group classes, which are often practiced by older adults.

In this sense, it is noteworthy that, although programs involving dynamic group gym classes are strongly encouraged for the older population, as they promote health benefits in general[10], it has still not been fully established whether the intensity achieved in training sessions, through collective classes, is suitable for achieving the expected results. A study by Borges et al.[11] demonstrated, for example, that collective aerobic sessions for older adults applied in basic health units in Florianópolis (Santa Catarina) were mostly composed of activities of light or sedentary intensity, but few studies have analyzed the intensity of this type of exercise session in an objective manner through accelerometry. It is also unknown whether the intensities achieved in these exercise sessions are capable of promoting a post-exercise reduction in BP, which would possibly be associated with the occurrence of a chronic decline in BP.

Therefore, it is important to investigate whether exercise sessions, in the form of collective aerobics classes, carried out in public projects aimed at promoting physical activity, are capable of causing PEH in the older population, as this type of class is one of the main forms of physical activity among this population. Thus, the present study aimed to analyze the behavior of the SBP, DBP, cardiac output (CO) and peripheral vascular resistance (PVR) variables after a session of combined physical exercise (aerobic + strength), in the form of a collective class, of hypertensive older women. In addition, we sought to investigate the correlation between post-exercise BP responses and the effort intensities achieved by the hypertensive older adults during these sessions. Finally, the correlation between post-exercise BP responses and the behavior of the CO and PVR variables was tested only among those older women who exhibited PEH.

METHOD

The present study was carried out between August and November 2018, using a quasi-experimental design, as there was no control group and/or session. No previous sample calculation was performed, so the study sample was recruited on a voluntary basis and selected for convenience, consisting of 14 older women (≥60 years), diagnosed with SAH, participating in an extension program at the Universidade Federal de Santa Catarina (Santa Catarina Federal University) (UFSC) in the city of Florianópolis, Brazil, which offers collective aerobics classes aimed at this population, twice a week. To

participate in the study, the older women were required to have been engaged in this program for at least six months and not have any more severe comorbidities (such as severe heart disease) or injuries that prevented exercise.

The study was approved by the local Ethics Committee (approval opinion number: 2,870,053), according to the rules of resolution 466-2012 of the National Health Council, and all participants signed an informed consent form (ICF), after being informed about the objectives and procedures of the study.

There were 14 sessions of combined exercises in the form of collective classes, with each participant being evaluated in one of these sessions, which were organized and structured in a similar way. In each assessment, at the beginning of the program, anthropometric and resting BP (pre-exercise) data were collected from the participants. Subsequently, an accelerometer was attached to each individual, above the iliac crest, before the beginning of the gym class, so that the intensity of the class was recorded. At the end of the session, the accelerometer was collected and BP was measured again over a 60 minute period (post-exercise) (Figure 1).

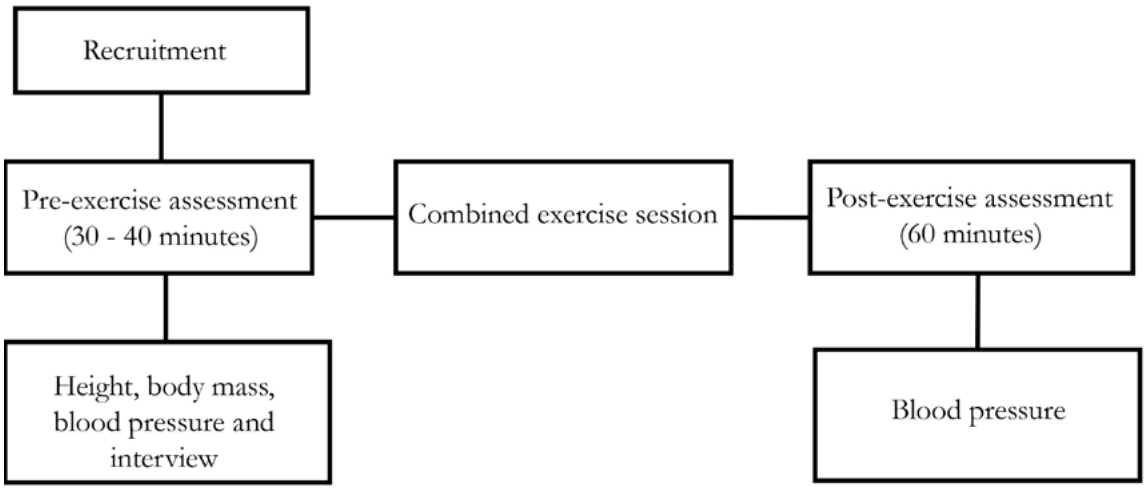

Figure 1. Experimental design of study. Florianópolis (Santa Catarina), Brazil, 2018.

For the general characterization of the sample, body mass measurements were performed using an Omron HBF-540C digital reading scale, with 0.1 kg accuracy, and height was taken with a stadiometer with 0.1 cm accuracy. From these measurements, the Body Mass Index (BMI) was calculated, with the division of body mass (in kg) by square height (in meters). Information was also collected about the marital status of the participants through an interview.

The finger photoplethysmography technique, with a single Finometer device (FMS - Finapress Medical System, Netherlands), was used to analyze the hemodynamic variables, beat by beat, in a non-invasive manner, in the pre- and post-exercise phases, by two previously trained evaluators, who performed all assessments in a standardized manner and followed all procedures according to the recommendations given by the manufacturers of the instruments used. The variables evaluated were SBP and DBP, heart rate (HR), stroke volume (SV), CO and PVR.

The older adults were instructed not to drink any type of caffeinated beverage, such as green tea, coffee or soda, for at least 12 hours before the evaluation, not to consume alcoholic beverages and not to perform intense physical exercise 24 hours before data collection and also to eat a light diet on the day. During both pre and post-exercise data collection they were placed in the supine position on a stretcher where they remained at rest for five minutes. To calibrate the device, data on age, sex, body mass and

height were provided according to the manufacturer's instructions. Two inflatable cuffs were attached to the middle finger of the left hand and the left arm of the individual. For the taking of measurements, the device was calibrated until the *excellent* signal was obtained. Subsequently, during the pre-exercise stage, the hemodynamic variables were monitored continuously for 10 minutes, with the average values from this period recorded for analysis purposes. During the post-exercise stage, after calibration, monitoring was performed continuously for 60 minutes, with the average of the variables recorded every 15 minutes for analysis purposes.

The exercise sessions took the form of collective aerobics classes, with an average duration of 50 minutes, consisting of warm-up, the main exercise part and relaxation, with the aim of developing aerobic capacity and muscle strength. The warm-up lasted 10 minutes and consisted of aerobic activities (such as walking around the room), together with warm-up of the joints of the upper and lower limbs. The main part of the exercise lasted approximately 30 minutes, and was composed of static and dynamic resistance exercises for the lower and upper limbs. At the end of the session, about 10 minutes were used for relaxation, through the performance of passive or active static stretching exercises.

The intensity of these classes was measured using an accelerometer (Actigraph, model GT3X +) attached to the participants' right hip. The cut-off point adapted by Buman et al.[12] was adopted to categorize the intensity of effort achieved in four levels: sedentary, low-light physical activity, high-light physical activity and moderate to vigorous physical activity.

First, a descriptive analysis was carried out to characterize the sample, with the presentation of quantitative data in means and standard deviations and categorical data in absolute and relative frequencies. The Shapiro-Wilk test was performed for the analysis of data normality. To compare the values of hemodynamic variables from the pre- to the post-exercise phase, a one-way analysis of variance (ANOVA) was performed for repeated measures, after confirming normality. The Bonferroni post-hoc test was used to identify the differences in the variables for which the ANOVA values found were superior to the established criterion of statistical significance ($p<0.05$). For variables without a normal distribution, the Kruskal-Wallis non-parametric test was used. To test the correlation between the deltas (Δ) of the SBP and DBP variables with the intensity of the classes and with the Δ of the CO and the PVR variables, the Pearson test was used for data with normal distribution and the Spearman test for data that did not show normality. The level of statistical significance established was $p<0.05$. All analyzes were performed using the statistical package R, version 3.5.3.

RESULTS

Table 1 presents the descriptive data of the sample and the pre-exercise values of the hemodynamic variables. Analyzing the mean BMI, the older women, in general, were classified as overweight. Half of the participants (seven) used two or more medications for the treatment of SAH. The sample was composed of six married women (43%), followed by four widows (28.6%) and four divorced women (28.6%).

Table 1. General characteristics of the sample and hemodynamic values prior to exercise (n=14). Florianópolis (Santa Catarina), Brazil, 2018.

Variables	Mean ± standard deviation
Age (years)	72.0 ± 6.7
Height (cm)	156.1 ± 6.7
Body mass (kg)	67.7 ± 9.6
Body mass index (kg/m^2)	27.8 ± 3.3
Time since diagnosis of hypertension (years)	18.0 ± 9.4
Pre-exercise SBP (mmHg)	142.4 ± 14.5
Pre-exercise DBP (mmHg)	69.5 ± 9.6
Pre-exercise HR (bpm)	64.2 ± 10.4
Pre-exercise SV (ml)	94.4 ± 32.8
Pre-exercise CO (l/min)	6.0 ± 2.2
Pre-exercise PVR (dyn.s/cm^5)	1502.7 ± 654.8

SBP = systolic blood pressure; DBP = diastolic blood pressure; HR = heart rate; SV = stroke volume; CO = cardiac output; PVR = peripheral vascular resistance.

Regarding the intensities of effort of the classes, it was observed that they were, predominantly, composed of low intensity activities (60%), which corresponded to 23.9 minutes of the classes. However, considerable class time (20%) was spent on sedentary behavior (8.1 minutes). Less time was devoted to activities of high-light (12%) and moderate to vigorous (8%) intensity, which corresponded to 4.8 and 3.2 minutes, respectively.

Figure 2 shows the behavior of the SBP, DBP, HR, SV, CO and PVR variables during the post-exercise follow-up period, compared to the pre-exercise values.

When comparing the pre and post-exercise values of all the measurement times, there was no statistically significant difference for any of the variables analyzed (p>0.05). For SBP, although the mean after 15 minutes showed a reduction in relation to the pre-exercise phase (137.2±14.8 vs 142.4±14.5), which would indicate post-exercise hypotension, the reduction was not significant (p>0.05). The increases visually identified for the different variables were also not statistically significant.

Table 2 shows the correlations between the SBP and DBP deltas (Δ), calculated using the average of the four post-exercise measurements (15', 30', 45' and 60') minus the pre-exercise value, with the average time spent at the different intensities achieved in the sessions: sedentary, low-light, high-light and moderate to vigorous.

A moderate positive correlation was observed between the Δ SBP and the time spent in sedentary behavior (r=0.541; p=0.045), suggesting that the greater the time spent in sedentary behavior during sessions, the greater the increase in SBP. The other correlations were weak and had no statistical significance (r <0.5; p>0.05).

Table 3 shows the correlation between the SBP and DBP deltas (Δ) and the CO and PVR deltas (Δ), for the participants with PEH only.

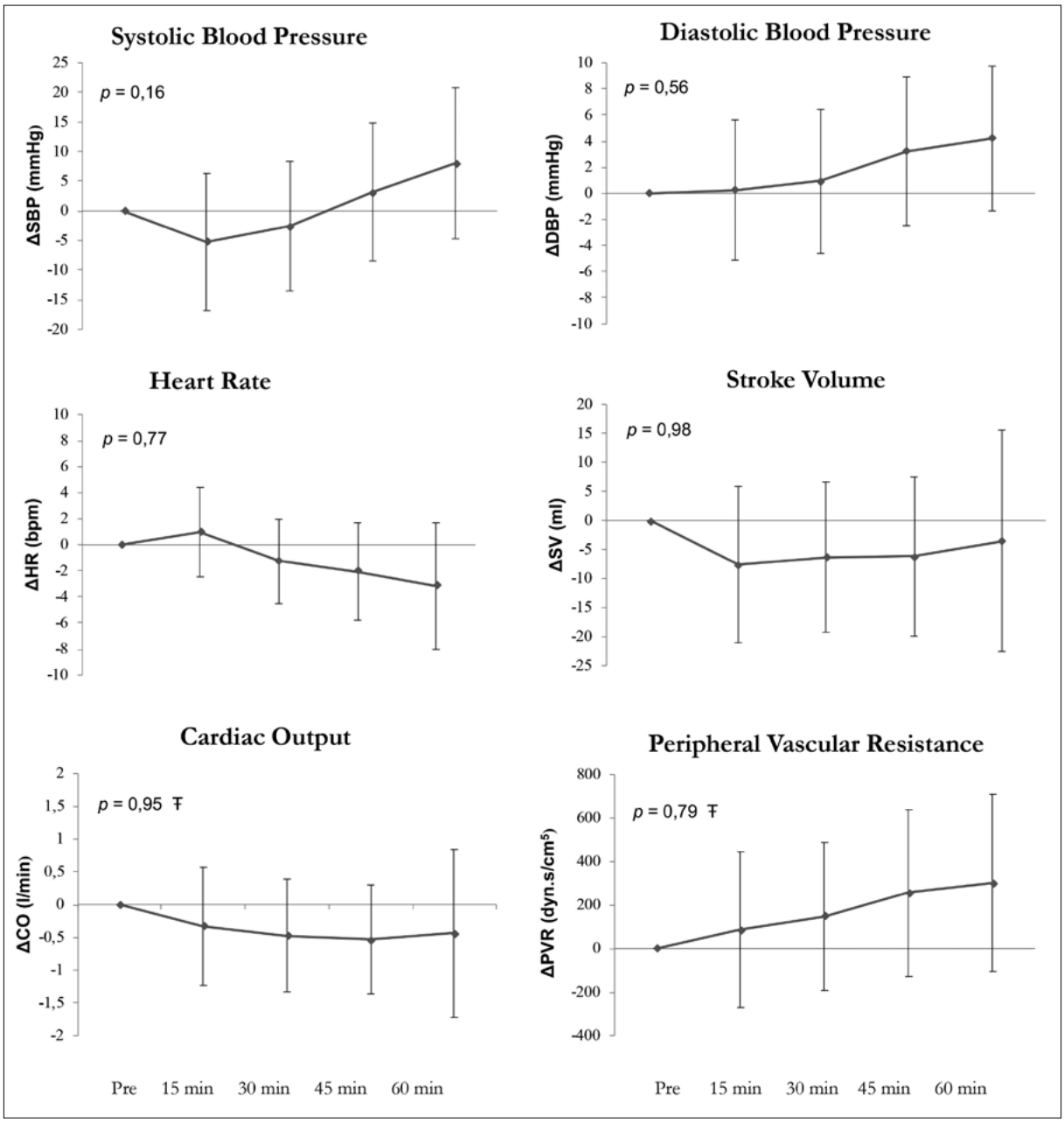

Figure 2. Behavior of the hemodynamic variables at moments 15, 30, 45 and 60 minutes post-exercise in relation to the pre-exercise phase. The values are represented by delta (Δ). The value adopted for statistical significance was $p<0.05$. Ŧ` value of *p* obtained through the Kruskal-Wallis test (n=14). Florianópolis (Santa Catarina), Brazil, 2018.

Table 2. Correlation between SBP and DBP deltas with the average time spent in class at each intensity of effort (n=14). Florianópolis (Santa Catarina), Brazil, 2018.

	SED	*p-value*	Low-Light PA	*p-value*	High-Light PA	*p-value*	MVPA	*p-value*
Δ SBP	0.541	0.045*	0.168	0.565	-0.189	0.516	0.114*	0.696
Δ DBP	0.257	0.374	0.115	0.694	-0.347	0.223	-0.064*	0.827

ΔSBP= changes observed in SBP between the pre-exercise phase and the mean of the post-exercise measurement times; ΔDBP= changes observed in DBP between the pre-exercise phases and the mean of the post-exercise measurement times; *Spearman's correlation; p-value<0.05.

Table 3. Correlation of SBP, DBP, CO and PVR deltas in participants with PEH (n=7). Florianópolis (Santa Catarina), Brazil, 2018.

	Δ CO	*p-value*	Δ PVR	*p-value*
Δ SBP	-0.336	0.460	0.573	0.177
Δ DBP	0.346	0.446	-0.273	0.553

ΔSBP, ΔDBP, ΔCO and ΔPVR= changes observed in hemodynamic variables between the pre-exercise phase and the mean of the post-exercise measurement times.

Among the seven older women with a reduction in SBP from the pre- to the post-exercise (the mean of all the post-exercise measurement times) phases, there was no significant correlation with the changes identified in PVR or CO (p>0.05). The same scenario was observed for the seven older women who exhibited a reduction in DBP from the pre- to the post-exercise phase (mean of all the post-exercise measurement times) (p>0.05).

DISCUSSION

The main findings of the present study indicate that PEH was not observed in response to a combined exercise session, in a collective class format, in hypertensive older women. According to the results found, at the end of the 60-minute post-exercise follow-up period, there were non-statistically significant increases of about 8 mmHg for SBP and 4 mmHg for DBP. In addition, the increase in SBP values was associated with time spent on activities classified as sedentary during the session (8.1 minutes). Thus, the greater the time spent in sedentary activities during class, the greater the increase in post-exercise SBP, which is similar to what has been observed in other studies that evaluated the association between sedentary periods and biomarkers in older individuals[13].

The results found in the present study differ from other previous studies that observed PEH in older women after an exercise session[6,14]. In the study by Santana et al., hypertensive older women undergoing an exercise session of moderate and vigorous intensity exhibited PEH in sessions of both intensities in comparison with the control session[14]. In the study by Moreira et al.[6], a resistance exercise session, performed with three sets of 12 repetitions at 60% of 1RM in each exercise, brought about PEH in medicated hypertensive older women. In both studies, the sessions were not performed with combined exercises and the intensities achieved were moderate to vigorous, which could explain the differences in results in relation to the present study.

Furthermore, the results observed in the present study are contrary to most previous studies that demonstrated a hypotensive effect in response to a combined exercise session[15–18]. Among these, the study by Ferrari et al.[16] demonstrated that combined exercise caused acute PEH after one hour, similar to aerobic exercise performed on its own. Similarly, in the study by Anunciação et al., carried out with controlled hypertensive older women, it was found that aerobic and combined exercise sessions promoted significant reductions in SBP and DBP at 30, 60, 120 and 180 minutes post-exercise[18]. The different results observed between such studies and the present study could be explained by the divergence between the exercise protocols used, since the present study was unable to strictly control the intensity of the strength exercises.

Furthermore, Teixeira et al.[19] evaluated young normotensive individuals who performed aerobic exercise at greater volume and at high intensities (75% of maximum VO_2) during the session, which seems to be the most effective protocol for PEH[5]. It is important to note that the studies cited evaluated subjects with different characteristics from the sample of the present study and that none measured intensity using an accelerometer, making comparative analysis difficult.

Additionally, a study by Menêses et al.[20], with medicated hypertensive women, evaluated the behavior of hemodynamic parameters for 30 minutes after a resistance exercise session at 50% of 1RM intensity and aerobic exercises between 50 and 60%

of reserve HR. The results did not demonstrate statistically significant changes in SBP and DBP after exercise, similar to the findings of the present study. On the other hand, in the control session conducted in that study, significant increases were identified for both SBP and DBP. As in the present study, CO and PVR also remained unchanged in the study by Menêses et al.[20]. However, in contrast with what was observed in the present study, reductions in SV and increases in HR were observed.

In the present study, the behavior of post-exercise BP was not associated with CO and PVR among the older women who exhibited PEH. Literature, in turn, suggests that either of these variables, if not both, would explain PEH, but this tends to vary from person to person. As stated by Queiroz et al.[21] PEH can be caused either by a reduction in PVR, or by a reduction in CO, which did not occur in the present study and prevented the finding of an association between BP responses and one or another determinant when the sample was analyzed as a set. In this context, Brito et al.[9] found that CO is usually the most influential factor in untrained male individuals, who are older (consistent with the findings of the present study) with a higher BMI, while PVR usually has a greater effect in the opposite cases. Specifically in older individuals, the increase in arterial stiffness and the decrease in endothelial function associated with aging could make it difficult to reduce PVR after exercise.

It is possible that the occurrence of PEH observed in the aforementioned studies was due to the higher intensity of effort in the exercise sessions, which is notable even when considering that different methods for determining intensity were used. In addition, in these studies it was possible to control intensity with greater rigor, due to the previously performed tests, which meant that all participants should have expended equal effort. This was not possible in the present study, since interfering with the characteristics of the class did not form part of the proposal. Instead the objective was precisely to identify the intensity of the classes taught in the project analyzed, and whether they were sufficient to promote PEH, without prescribing or controlling the same.

From a practical point of view, the present study is relevant, since it evaluates, in the specific aspect of post-exercise BP behavior, a collective exercise class for older women, which can provide reflections for professionals who work in this area regarding how to guide such classes. Despite some individuals exhibiting PEH, it was found that, in the manner in which it was applied, the class did not provide optimal results in terms of BP reduction for the studied group, older hypertensive women, who, perhaps, are those who have the treatment of the condition as one of the primary motivations for adherence to the exercise program. In this sense, it may be useful to seek strategies to intensify the class, or to use a more rigorous method to control it. It is worth mentioning that, in addition to the specific benefit of PEH, it is likely that the class will have a positive effect on other components of physical fitness related to health, well-being and functional capacity. These requirements, however, were not assessed in the present study.

The present study has certain limitations which must be considered. For example, a control session was not carried out, and it was not possible to verify whether the exercise sessions prevented an increase in BP which, perhaps, would occur in the absence of exercise. In addition, between the end of the class and the beginning of the assessment, time was required to move and calibrate the equipment, which in general amounted to almost 20 minutes, and only following this were the 15, 30, 45 and 60 minutes post-exercise calculated. In other words, the time immediately after the exercise was not considered, unlike in cases in which the measurements are made by means of an automatic device, which compromises, to a certain degree, the moment-to-moment comparison of BP behavior with other studies that did not use the Finometer device. Furthermore, it should be noted that while accelerometry is currently considered a reference measure for physical activity, there are limitations regarding the evaluation of muscle strengthening activities[22]. It should also be considered that the older women used medications of different classes and took them at different times, a factor which

was not assessed in the present study. The first case implies that hypertensive patients have their condition sustained, and therefore treated, through different mechanisms[1] and, therefore, may have responded to the exercises differently. In the second case, individuals who took medication just before the session may have suffered interference from its more immediate effects.

Furthermore, there are still gaps in the scope of the acute and chronic effect of physical exercise on BP. It is suggested that future studies investigate whether there would be chronic adaptation in BP using this class model, even in the absence of PEH. In addition, it is suggested that it is investigated whether, during the 24 hour period following exercise, a hypotensive effect is manifested, in comparison to days without exercise.

CONCLUSION

Based on the results, it can be concluded that a single session of combined exercises performed in group classes was not able to promote PEH in hypertensive older women. The intensity of effort achieved in classes was, predominantly, low-light and considerable time was spent in sedentary behavior. In addition, the time spent on typically sedentary activities during sessions showed a positive correlation with changes in SBP. Therefore, in order to promote the beneficial effects of exercise on blood pressure levels in hypertensive older women, it is suggested that combined exercise programs, applied in the form of collective aerobics classes, be made up of higher intensity activities.

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Can clinical and physical-functional factors predict falls in cognitively impaired older adults?

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Abstract

Objective: to investigate the frequency of falls and clinical and physical-functional factors associated with falls, and the accuracy of such factors to identify the risk of falling in cognitively impaired older adults. *Method:* a cross-sectional study with cognitively impaired older adults was carried out using the Mini-Mental State Examination. The dependent variable was a history of falls in the previous six months. The independent variables were self-reported mental confusion, hearing and visual impairment, physical fatigue, muscle weakness, dizziness, body imbalance, insecurity when walking, diagnosed depression, hospitalizations, continuous use medications (form from study used), muscle mass (calf circumference) and handgrip strength (dynamometry), functional capacity (Pfeffer) and mobility (SAM-Br). Descriptive statistics were applied. The groups were compared using the Mann Whitney U test, the risk factors were identified by univariate and multivariate logistic regression, and the area under the ROC curve (AUC) was calculated for the associated factors. *Results:* 216 cognitively impaired older adults were included in the analysis, 41.7% of whom were fallers. Multivariate regression analyzes indicated that complaints of visual impairment (OR=2.8; p=0.015) and body imbalance (OR=2.7; p=0.004), and greater medication use (OR=1.1; p=0.038) were associated with a history of falls. The AUC found poor accuracy for quantity of medications as a screening tool for fallers (AUC=0.6 [0.5; 0.7]; p=0.028). *Conclusion:* cognitively impaired older adults had a high frequency of falls. Complaints of visual impairment, body imbalance and polypharmacy were predictors of falls. The early assessment of these factors can contribute to the identification of cognitively-impaired older adults at risk of falling in clinical practice and research.

Keywords: Health of the Elderly. Cognition Disorders. Accidental Falls. Risk Factors. Mass Screening.

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INTRODUCTION

Cognitive impairment and dementia are important clinical syndromes and a common health concern in older adults[1]. Mild Cognitive Impairment (MCI) is considered an intermediate state between the normal cognitive changes of aging and the early clinical characteristics of dementia, particularly Alzheimer's disease[2]. Dementia, meanwhile, relates to progressive neurodegenerative processes that affect various areas of cognition[1]. It is estimated that MCI is present in 16% of the population aged over 70 years[3]. The consequent deficits in memory, temporal orientation, language, problem solving, attention, motor initiation and executive functions related to planning and working memory can result in impairments in the functional capacity of these older adults and increase the risk of falls[1,3].

Falls represent a severe problem for cognitively impaired older adults[4]. Approximately 60% of such adults fall each year[5]. This rate is approximately double that of non-cognitively impaired older adults[1]. Falls negatively affect function, can cause bone fractures, chronic pain, depression and fear of falling, reduce quality of life and are associated with frailty and death[3,6]. In addition, a long-lived cognitively impaired older adult who is a victim of falls is at greater risk of serious injury, resulting in excessive health costs[3,7].

Older patients with MCI have multiple chronic conditions, reduced mobility, deficiencies in muscle strength, reaction time, balance and sensorimotor, and a greater fear of falling, explaining their greater predisposition to falls[8,9]. A history of falls[6,10], poor performance in balance and gait tests and increased postural sway have been shown to be associated with the risk of falling [4,6,10–12]. Neuro-cardiovascular problems[11], declining verbal fluency [10], attention deficit, spatial disorientation, use of psychotropic drugs[13] and polypharmacy[8,10] are equally related to falls. In the same way, depression[6,8], high levels of anxiety[4] combined with impulsivity and agitation[4] increase the chance of falling in older adults with dementia.

These clinical and physical-functional characteristics have already been shown to be related to the increased likelihood of falls in older adults with cognitive deficits and dementia. However, most studies have investigated these risk factors using specialized instruments and with greater evaluation complexity[4,8–10,12].

The hypothesis of the present study is that common complaints related to the clinical and physical-functional components reported by older adults with cognitive deficits and/or by their caregivers are also associated with the occurrence of falls and enable the early identification of older adults at greater risk in a comprehensive manner by the entire health team. In this context, the objectives of the present study were to investigate the frequency of falls, the clinical and physical-functional factors associated with the same and the accuracy of these factors to identify the risk of falling in cognitively impaired older adults.

METHOD

An observational, cross-sectional and analytical study was undertaken. The sample, selected for convenience, was recruited from January 2018 to January 2019 at an older adults care service in a secondary care unit of the State Department of Health of the Distrito Federal (the Federal District), Brazil. This health unit serves, for the most part, older adults from the western health region of the Distrito Federal, in which approximately 90,000 older adults live, according to the District Household Sample Survey, 2015. This unit provides care for older adults aged over 60 years of age, referred from primary care units, with morbidities that are difficult to control, multi-comorbidities, polypharmacy or clinical conditions (such as neurocognitive diseases) that require specialized evaluation by the geriatric team. All referred older adults are evaluated during intake and, based on this first multidimensional evaluation, are admitted for follow-up at the geriatric service or counter-referred to primary care with appropriate instructions.

The present study included older community residents of both sexes, aged 60 years or older, who presented cognitive disorders according to the Mini-Mental State Examination (MMSE). To identify cognitive impairment, the following cutoff points

were adopted: 28 for individuals with more than 7 years of schooling, 24 for those with 4-7 years of schooling, 23 for those with 1-3 years of schooling and 19 for illiterates[14]. Older adults who presented records with ineligible or incomplete data from the cognitive assessment and/or the occurrence of falls were excluded.

The sample calculation was performed in the GPower version 3.1 program with the first 20 fallers and 20 non-fallers included in the study, based on the effect size of the intergroup comparison for the variables: amount of continuous use medications (d=0.70), muscle mass (d=0.78), functional capacity (d=0.50) and mobility (d=0.55). In order to guarantee a power of 90% and an alpha error of 5% in these comparisons, a minimum sample of 172 participants was calculated (86 fallers and 86 non-fallers older adults).

Falls were the dependent variable of the study and were defined as the occurrence of an unintended event that results in the individual's position changing to a lower level, in relation to their initial position[15]. This variable was identified through self-reporting, with the older adult and/or their caregiver asked: *Did the older adult suffer a fall in the last six months*? Those who responded positively were asked about the number of falls during this period. According to the number of falls reported, older adults were grouped into *non-fallers* (0 falls) or *fallers* (1 or more falls) individuals.

The independent variables were the clinical and physical-functional characteristics of older adults. Data were collected using an initial form, developed by the researchers, and specific instruments of rapid, low complexity application, validated for individuals with cognitive impairment, used in the intake service. The questions were directed at the older adult and/or their caregiver.

The clinical data, investigated by means of self-reporting (presence or absence) were: mental confusion, hearing and visual impairment, physical tiredness, diagnosis of depression, history of hospitalizations and number of continuous use medications. Mental confusion was characterized as a change in the level of consciousness with a reduced attention span accompanied by a change in cognition or disturbance of perception that developed over a short period of time (hours or days) and which tended to fluctuate throughout the day[16]. To identify the presence of hearing impairment, personal perceptions were identified through the question *Do you feel you have hearing loss*? Visual impairment was identified by asking the individuals about their ability to see clearly during routine activities, under various levels of light, considering visual acuity, contrast sensitivity and depth perception.[17] Physical fatigue was characterized by the sensation perceived by the older adult or by their caregiver as an unpleasant subjective symptom that varies from tiredness to exhaustion, and which interferes with the normal functioning capacity and quality of life of these individuals[18]. The presence of depression was identified by means of a previous medical diagnosis reported by the older adult or their caregiver and the history of hospitalizations through the report of hospitalization or admission to an emergency care unit for at least 24 hours in the previous six months. They were asked about the number of continuous use medication, and polypharmacy was defined as the regular use of five or more medications associated with the reported diseases (excluding dietary supplements)[19].

The physical and functional data investigated through self-reporting (presence or absence) were complaints of muscle weakness, dizziness, body imbalance and insecurity when walking. Muscle mass, muscle strength, mobility and functional capacity were also measured. The complaint of muscle weakness was identified through the question *Do you have difficulty getting up from a chair?*[20]. Dizziness was defined as the feeling of instability or imbalance, which can generate the fear of falling[21]. Body imbalance represented the loss of the ability to control the intentional movements of the body mass center on the support base during the performance of activities that involved the transfer of weight[22]. Insecurity when walking was determined by excessive worry or anxiety about falling that limits the performance of activities of daily living[23].

Muscle mass was inferred by measuring calf circumference (CC), in centimeters, using a tape measure. This measurement was performed on the dominant limb with the older adults sitting, with their knee flexed and their feet supported,

forming a right angle in the knee and ankle joints. The measuring tape was positioned horizontally around the maximum calf circumference[24].

Muscle strength was measured using the isometric handgrip strength (HGS) in Kgf using a Saehan® manual hydraulic dynamometer. This measure has excellent reliability in older adults with questionable, mild and moderate dementia, enabling its use in research and clinical practice.[25]. For the assessment of HGS, the older adults were seated, with their feet touching the ground and the dominant upper limb in adduction, the elbow joint flexed at 90° and the forearm in the neutral position[26]. Three attempts were made, with a one-minute interval between each, and the average of these measures was used for analysis.

The mobility of the older adults was assessed using the Brazilian version of the Southampton Assessment of Mobility (SAM-BR). This instrument assesses the performance of older adults with cognitive impairment in 18 items, based on the assessment of five tasks, for which they receive a score of 1 (if performed) or 0 (if not performed) in each item, with a total score from 0 to 18 points. It is a simple control instrument, with easy and effective clinical applicability, and which has demonstrated "almost perfect" intra-examiner and inter-examiner agreement for mild and moderate dementia (Kappa from 0.79 to 0.89)[27].

The functional capacity of the older adults was assessed using the Pfeffer[28] questionnaire, which was applied to the caregiver to assess the degree of independence of older adults for the performance of ten tasks. The final score was obtained by adding the scores of the items (0–30).

To characterize the participants, age, sex, years of schooling, level of physical activity, nutritional status and reports of previous diagnosis of dementia were identified. To determine the level of physical activity of the older adults, they were asked how many minutes per week they practiced physical exercise of moderate to vigorous intensity, and were classified into active (≥150 minutes of moderate activity per week or ≥75 minutes of vigorous activity) or sedentary[29]. Body Mass Index [BMI= body mass (kg) /height^2(m^2)] was calculated, which allowed the nutritional status of the older adults to be classified as underweight (BMI<22 kg/m^2), normal weight (BMI 22-27 kg/m^2) or overweight (BMI> 27 Kg/m^2)[30].

The collection of sociodemographic, clinical, anthropometric and physical-functional data was performed in a single day, by seven trained examiners from the nursing and physiotherapy team, and lasted approximately one hour.

Continuous data were expressed as mean and standard deviation and categorical data as percentage and absolute frequency. The non-normal distribution of continuous data was observed using the Kolmogorov-Smirnov test. The frequency of previous falls was calculated using the number of cases with reports of previous falls and the total number of older adults studied. Differences in continuous data between non-fallers and fallers subgroups were analyzed using the U Mann Whitney test and categorical data using the Chi-square test. Univariate logistic regression analysis was used to determine the association between each independent variable and the dependent variable. Odds Ratios (OR) were calculated for each explanatory variable with 95% confidence intervals. Subsequently, variables with an association with a *p*-value less than 0.05 in univariate regression analysis were included in the multivariate logistic regression analysis in order to investigate the independent effect, when taken together, of these variables to predict falls in older adults with cognitive deficits. The selection of the best model was carried out using the variable reduction procedure based on the forward stepwise method. In order to analyze the accuracy of the factors that remained associated with falls in multivariate regression analysis, Sensitivity (S), Specificity (SP), Positive Predictive Value (PPV) and Negative Predictive Value (NPV) were calculated. The ROC curve was constructed and the area under the curve (AUC) (with 95% confidence interval) was calculated for the continuous variables. AUC values between 0.51 and 0.69 represented weak discriminative capacity and AUC values equal to or greater than 0.70 determined satisfactory discriminative capacity. A significance level of 5% was considered.

The study was approved by the Ethics and Research Committee of the Ceilândia Faculty of the

Universidade de Brasília (the University of Brasília) under Opinion No. 2,202,958, on August 5, 2017 in accordance with Resolution No. 466 of 2012 of the National Health Council. Older adults included in the study signed an Informed Consent Term after approval by the Ethics Committee.

RESULTS

During the study period, 336 older adults admitted to the health unit were evaluated for eligibility, of whom 235 had cognitive impairment. Of older adults with cognitive impairment, 216 with complete medical records were included in the analysis, of whom 90 (41.7%) reported an average of 1.9 (±1.6) falls in the previous six months (Figure 1).

Most older adults included were female, had a low level of education, were sedentary and overweight (Table 1). There was no significant difference between groups in terms of age, sex, education, cognitive status and previous diagnosis of dementia, nutritional status and level of physical activity, representing homogeneity between the groups for possible confounding variables. The comparison of possible factors associated with falls among older adults with cognitive deficits revealed that those who fell used a greater number of continuous use medications, had a higher frequency of the diagnosis of depression and complaints of visual impairment, body imbalance and insecurity when walking. There was no significant difference for muscle mass and strength, mobility and functional capacity between the two study groups (Table 1).

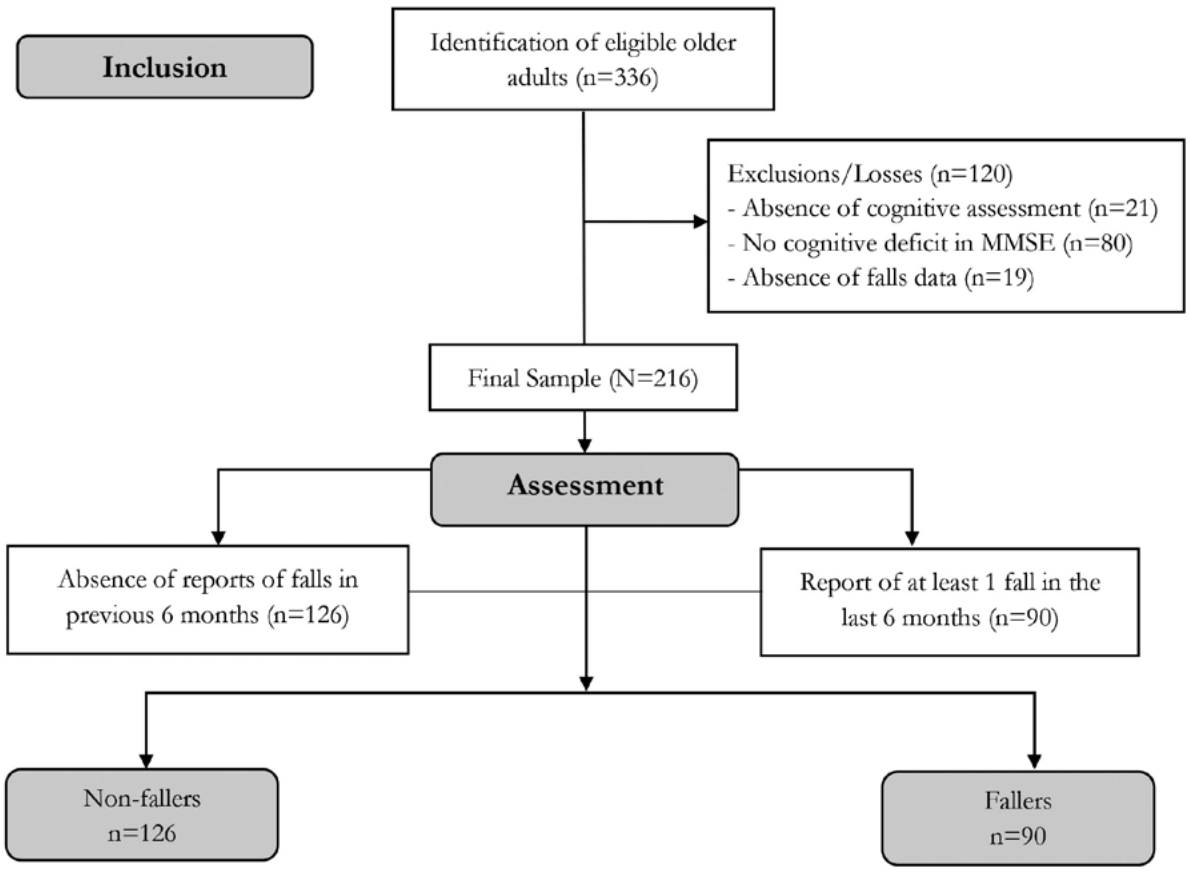

Figure 1. Flowchart of sample selection. Distrito Federal, 2018-2019.

Table 1. Characterization and comparison of sociodemographic, clinical, anthropometric and physical-functional variables among older fallers and non-fallers with cognitive impairment (N=216). Brasília, Distrito Federal, 2018-2019.

Variable	Non-fallers (n=126)	Fallers (n=90)	Mean difference between groups [CI 95%]	*p*-value
Sociodemographic, clinical and anthropometric characteristics				
Mean age (±sd) †	79.0 (±7.2)	77.7 (±7.2)	1.2 [-0.7; 3.2]	0.156
Sex, % (n) ‡			-	
Female	67.5 (85)	68.9 (62)		0.883
Male	32.5 (41)	31.1 (28)		
Years of study, mean (± SD) †	2.3 (±2.5)	2.8 (±3.1)	-0.5 [-1.2; 0.2]	0.339
Average cognitive state (MMSE) (± SD) †	14.1 (±5.8)	15.3 (±5.5)	-1.2 [-2.7; 0.4]	0.250
Illiterate	11.1 (±4.7)	12.3 (±3.9)		
1 to 3	14.6 (±5.9)	15.6 (±5.2)		
4 to 7	16.8 (±5.2)	16.1 (±4.6)		
≥ 8	19.7 (±5.5)	22.5 (±5.2)		
Previous diagnosis of dementia (yes),% (n) ‡	27.9 (34)	24.1 (21)		0.633
BMI, mean (± sd) †	26.5 (±4.5)	27.4 (±5.6)	-0.9 [-2.5; 0.7]	0.427
Nutritional status,% (n) ‡				
Low Weight	14.1 (13)	17.2 (11)	-	0.810
Normal Weight	40.2 (37)	35.9 (23)	-	
Overweight	45.7 (42)	46.9 (30)	-	
Active (yes), %(n) ‡	8.7 (11)	5.6 (5)	-	0.440
Clinical characteristics				
Pain (yes),% (n) ‡	57.1 (72)	68.9 (62)	-	0.089
Mental confusion (yes),% (n) ‡	66.1 (82)	68.9 (62)	-	0.768
Hearing deficit (yes),% (n) ‡	34.1 (43)	37.8 (34)	-	0.666
Visual impairment (yes),% (n) ‡ *	74.6 (94)	87.8 (79)	-	0.024
Incontinence (yes),% (n) ‡	59.5 (72)	71.6 (63)	-	0.080
Physical tiredness (yes),% (n) ‡	60.3 (76)	67.8 (61)	-	0.316
Diagnosis of depression (yes),% (n) ‡ *	33.3 (42)	48.3 (43)	-	0.034
History of hospitalizations (yes),% (n) ‡	24.0 (29)	24.7 (21)	-	0.903
Medications (quantity), mean (± sd) † *	5.4 (±2.8)	6.5 (±3.3)	-1.077 [-1.9; -0.2]	0.027
Polypharmacy (yes),% (n) ‡	63.1 (77)	69.0 (60)	-	0.461
Physical and functional characteristics				
Muscle weakness (yes),% (n) ‡	63.5 (80)	76.7 (69)	-	0.052
Dizziness (yes),% (n) ‡	56.3 (71)	57.8 (52)	-	0.890
Body imbalance (yes),% (n) ‡ *	58.4 (73)	80.9 (72)	-	0.001
Insecurity when walking (yes),% (n) ‡ *	56.5 (70)	70.5 (62)	-	0.044
Muscle mass (cm), mean (± sd) †	34.0 (±4.8)	34.1 (±5.2)	-0.0 [-1.5; 1.4]	0.794
Muscle strength (Kgf), mean (± sd) †	19.9 (±8.1)	17.5 (±5.9)	2.5 [-0.3; 5.3]	0.134
Functional capacity (Pfeffer), mean (± sd) †	18.6 (±9.7)	18.0 (±9.4)	0.6 [-2.3; 3.5]	0.627
Mobility (SAM-Br), mean (± sd) †	15.9 (±3.7)	16.1 (±2.7)	-0.6 [-1.7; 0.4]	0.250

†Mann Whitney U-Test; ‡Chi-Squared Test; *p<0.05 for comparison between fallers and non-fallers.

Table 2 shows the results of the assessment of the influence of each independent variable on the occurrence of falls among the older adults studied. Univariate analysis showed that the presence of complaints of visual impairment, muscle weakness, imbalance and insecurity when walking, the report of a previous diagnosis of depression and a greater number of continuous use medications explained falls in older adults with cognitive deficit. However, in multivariate analysis, only the complaint of visual impairment and body imbalance and the use of more medications remained in the final model as predictors of falls. Although these three variables were shown to be predictors, AUC analysis indicated the poor accuracy of polypharmacy (as an independent factor) to predict falls (Table 3).

Table 2. Univariate and multivariate logistic regression analyzes to verify associations between clinical and physical-functional factors and the history of falls in older adults with cognitive impairment (N=216). Brasília, Distrito Federal, 2018-2019.

Variables	Univariate Analysis		Multivariate	
	OR [95% CI]	*p*-value	OR [95% CI]	*p*-value
Clinical				
Pain	1.7 [0.9; 2.9]	0.081	-	-
Mental confusion	1.1 [0.6; 2.0]	0.671	-	-
Hearing deficiency	1.2 [0.7; 2.0]	0.581	-	-
Visual impairment	2.4 [1.1; 5.2]	0.019**	2.8 [1.2; 6.5]	0.015*
Incontinence	1.7 [0.9; 3.1]	0.072	-	-
Physical tiredness	1.4 [0.8; 2.4]	0.262	-	-
Diagnosis of depression	1.9 [1.1; 3.3]	0.028**	-	-
Hospitalization history (yes)	1.0 [0.5; 1.8]	0.903	-	-
Continuous use medications	1.1 [1.0; 1.2]	0.014**	1.1 [1.0; 1.2]	0.038*
Physical-functional			-	-
Muscle weakness	1.9 [1.0; 3.5]	0.040**	-	-
Dizziness	1.1 [0.6; 1.8]	0.834	-	-
Body imbalance	3.0 [1.6; 5.7]	0.001**	2.7 [1.4; 5.3]	0.004*
Insecurity when walking	1.8 [1.0; 3.3]	0.039**	-	-
Muscle mass (cm)	1.0 [0.9; 1.1]	0.936	-	-
Muscle strength (Kgf)	0.9 [0.9; 1.0]	0.086	-	-
Functional capacity (Pfeffer)	1.0 [1.0; 1.0]	0.672	-	-
Mobility (SAM-Br)	1.1 [0.9; 1.2]	0.249	-	-

Multivariate binary logistic regression with forward stepwise method. The data were expressed in OR [95% CI]; ** $p<0.05$ in the univariate analysis (variables were included in the multivariate regression analysis); *$p<0.05$ in multivariate analysis.

Table 3. Capacity of risk factors to predict falls in older adults with cognitive impairment (N=216). Brasília, Distrito Federal, 2018-2019.

	Visual impairment	Polypharmacy	Body imbalance
Cutoff	Yes	≥ 5 medications	Yes
Sensitivity (%)	87.8	68.9	80.9
Specificity (%)	25.4	36.8	41.6
PPV (%)	45.6	43.7	49.6
NPV (%)	74.4	62.5	75.4
AUC [95% CI]	-	0.6 [0.5; 0.7]	-
p-value	-	0.028	-

PPV = Positive Predictive Value; NPV = Negative Predictive Value; AUC = Area under the curve; ROC. CI = Confidence Interval.

DISCUSSION

Older adults with cognitive impairment had a high frequency of falls (41.7%). In these adults, complaints of visual impairment and body imbalance reported by older adults and/or their caregivers and the greater number of continuous use medications were associated with reports of falls, and were therefore predictors of falls, but with poor accuracy. The high frequency of falls observed in the present study reiterates that cognitive deficit represents a greater risk of falls among older adults, when compared to the rates of approximately 30% of fallers among older community members in general[19]. Additionally, it corroborates data from previous studies that observed rates above 60% for the incidence of falls in 6 to 12 months of follow-up among people with cognitive impairment or dementia, explained by the accumulation of associated comorbidities, reduced mobility and physical capacity, and the need for walking aids among these older adults[8,31].

In the present study, older fallers had 2.8 times the chance of older non-fallers to complain of visual impairment, with the perception of visual impairment correctly identifying 87.8% of older fallers, revealing that the assessment of this impairment can make an important contribution in clinical and research settings. The methodology for assessing visual impairment in older adults with cognitive impairment has varied greatly between studies[7,32]. Studies[7,32] that assessed visual status using the Multidimensional Dementia Assessment Scale and Comprehensive Geriatric Assessment did not indicate visual impairment as a risk factor for falls. However, studies that assessed the visual perception of older adults with dementia using the copy item of the two pentagons that intersect in the Mini-Mental State Examination and the report of history of cataracts showed that visual impairment behave as a risk factor for falls in these patients[1,6].

The frequencies of previous diagnosis of depression observed in the present study corroborate rates of approximately 30% of depression and/or depressive symptoms observed in patients with dementia[33]. Previous studies have shown that depressive symptoms in cognitively impaired older adults are associated with falls[1,6,32] while in the sample of the present study, older fallers had 1.9 times the chance of non-fallers to report a previous diagnosis of depression. Despite these findings, this factor was not maintained as a predictor of falls in the multivariate analysis of the present study. It is possible that the use of antidepressant drugs, which was not investigated in the present study, is a better independent predictor of falls than depressive symptoms, as observed by Whitney et al.[34].

Older adults who fell used on average one more continuous use medication than those who did not fall, with polypharmacy correctly identifying 68.9% of older adults who fell in the present study. The use of multiple medications has been consistently associated with a history of falls in older adults with and without cognitive impairment and/or dementia[10]. Previous studies have shown that drugs that act on the central nervous system, such as antipsychotics, anxiolytics, benzodiazepines, hypnotics, sedatives and antidepressants, increase the risk of falling in cognitively impaired older adults[1,6,34]. However, regardless of the class of drug, it is reiterated that polypharmacy requires special attention in screening, as it seems to increase the likelihood of falling among cognitively impaired older adults[6,32,34].

In the present study, muscle weakness was a highly frequent complaint in older fallers and non-fallers, accompanied by a high rate of physical inactivity and similar indicators of muscle mass and HGS in both groups of older adults. In univariate analysis, older adults who fell had 1.9 times the chance of older adults who did not fall to complain of muscle weakness, although this factor was not maintained as a predictor of falls in multivariate analysis. Previous studies have shown inconsistent results in relation to indicating muscle weakness as a risk factor for falls among cognitively impaired older adults[8,10,34]. It is also possible that the complaint of muscle weakness investigated in the present study reveals other physical-functional and personal aspects that go beyond the components of muscle mass and strength.

Older adult fallers complained 22.5% more about body imbalance than non-fallers and had 2.7 times the chance of non-fallers to describe the perception of this condition during intake. Additionally, the complaint of body imbalance correctly identified

80.9% of fallers, signaling the importance of continuing this line of investigation in order to improve the early identification of the risk of falling among older adults with cognitive impairment using this question. In previous studies, the decline in body balance in older adults with cognitive impairment was identified by means of stabilometric posturography variables[12,35], and these deficiencies in body balance were shown to be associated with an increased risk of falls in older adults with cognitive impairment and dementia[6,8,34]. However, despite these significant associations, simple balance assessment tests, such as Romberg and the Timed Get Up and Go, revealed lower estimates of accuracy for recognizing the risk of falls in older adults with cognitive impairment than those identified in the present study through the complaint of body imbalance[36].

Excess worry and anxiety about walking was more frequent among older adults who fell, but not enough to maintain the complaint of insecurity when walking as a predictor of falls in the older adults in the study. Despite the high frequency of insecurity when walking observed in the groups, older adults did not present significant mobility limitations when assessed by SAM-Br. Previous findings indicate that it is precisely changes in gait and mobility that are associated with an increased risk of falling in older adults with cognitive impairment and dementia[7,11,31,34]. However, these changes in gait can be subtle in the early stages of dementia, and do not justify the increased occurrence of falls alone[1].

The present study investigated several possible risk factors for falls among older adults with cognitive deficits, using mostly simple questions about the perception of signs and/or symptoms, in addition to rapid application tools validated for this older profile. The analyzes were performed in a sample size suggested by *a priori* calculation. The reporting of previous falls was restricted to the previous six months in order to reduce recall bias. However, despite these strengths, the heterogeneity of the severity of cognitive deficits and the different pathophysiological mechanisms included may have influenced the findings. In addition, the cross-sectional design of the study does not allow a causal relationship of the investigated risk factors and the occurrence of falls to be established.-

CONCLUSION

According to the results of this study, a high frequency of falls was identified among cognitively impaired older adults and it was found that polypharmacy and the perception of visual impairment and body imbalance by older adults or their caregivers are factors associated with falls, although with poor accuracy. These findings inform care teams of cognitively impaired older adults that the inclusion of these simple, quick questions in the clinical routine and in research can contribute to screening the risk of falling in this population and favor early intervention in modifiable factors.

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Loneliness in senescence and its relationship with depressive symptoms: an integrative review

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Abstract

The increase in life expectancy and the percentage increase in the older population are related to the reduction in quality of life and social life due to the biopsychosocial changes inherent to the aging process. The present study aimed to verify scientific evidence on the relationship between loneliness and depressive symptoms among older adults. An integrative review was carried out using the following databases: SCOPUS, PubMed, Medline, Web of Science, CINAHL and PyscINFO, applying the descriptors indexed in the Mesh Terms and DeCS "aged", "loneliness", "depression". The PICOS strategy was used to prepare the title and guiding question and the PRISMA methodological guidelines were used to write the report of this review. A total of 827 articles were identified, of which 23 were selected, 16 from the database and seven through a reverse search. Loneliness and depression have some characteristics in common, so that when one of these conditions develops in older adults, another is stimulated. Thus, loneliness is a major risk factor for the development of depression, just as depression is an aggravating factor for loneliness in older adults.

Keywords: Aging. Health of the Elderly. Loneliness. Depression.

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INTRODUCTION

Senescence is characterized as a natural process of human aging, and its percentage increase has arisen from the exodus of the population from rural areas and the reduction in the infant mortality rate[1]. However, the growth of the older population and increased life expectancy has resulted in psychological consequences, examples of which are depression and feelings of loneliness.

According to PAHO/WHO[2] data, depression is the main cause of social disability, affecting approximately 300 million people worldwide. In terms of its prevalence among the older population, a study found that about 30% of participants exhibited signs and symptoms of depression[3].

Depression is diagnosed when the individual has at least five specific symptoms of the disease for a minimum of two weeks, including: depressed mood, decreased interest in most activities, weight gain or loss equivalent to 5% of body weight, insomnia or hypersomnia, fatigue, feelings of worthlessness or guilt, reduced concentration and suicidal ideation, without an association with mourning or a medical condition[4].

Loneliness can manifest itself through the following aspects: absence of purpose and meaning in life, emotional reactions, undesirable and unpleasant feelings, feelings of isolation and separation, deficiency in relationships and a lack of intimacy, and detachment[5]. A study showed that 35.7% of older adults surveyed said they felt loneliness at different levels of intensity, varying from some to many times[6].

Given the prevalence of depressive symptoms and feelings of loneliness in the older population, the present study sought to consider the following question: *what is the relationship between loneliness and depressive symptoms in older adults*? Therefore, the objective was to verify the scientific evidence on the relationship between loneliness and depressive symptoms in older adults.

METHOD

An integrative literature review was performed using articles that addressed the theme of the relationship between loneliness and depressive symptoms in older adults.

The databases used were: SCOPUS, PubMed, Medline, Web of Science, CINAHL and PyscINFO, as these are considered important scientific bases of international scope. It was decided not to limit based on the year of publication of the articles, expanding the results of the study, in which articles published between the years 2000 and 2019 were included.

The inclusion criteria for the sample were: articles that addressed the theme of loneliness and depressive symptoms. The exclusion criteria were literature review articles. The following descriptors indexed in Mesh Terms and DeCS were used: "Aged" AND "Loneliness" AND "Depression".

The process of eligibility of articles for the sample of the present review followed three stages: reading of titles, to assess if meets theme of depression and loneliness in older adults; reading of abstract to investigate the suitability of the article for answering the research question; and reading of the full articles in order to extract the data for summarization of the outcomes. All articles included in the sample addressed loneliness and depressive symptoms in older people and the data were analyzed using the results.

In addition, a reverse search, consisting of searching for articles based on a survey of the references of the articles selected for the sample, was performed in order to broaden the search and diversify the results.

The study was prepared using the PRISMA method, which contains 27 criteria that must be applied in bibliographic reviews[7]. The PRISMA diagram shows the step-by-step selection in a summarized manner, from the retrieval of articles in the databases to their subsequent inclusion (Figure 1).

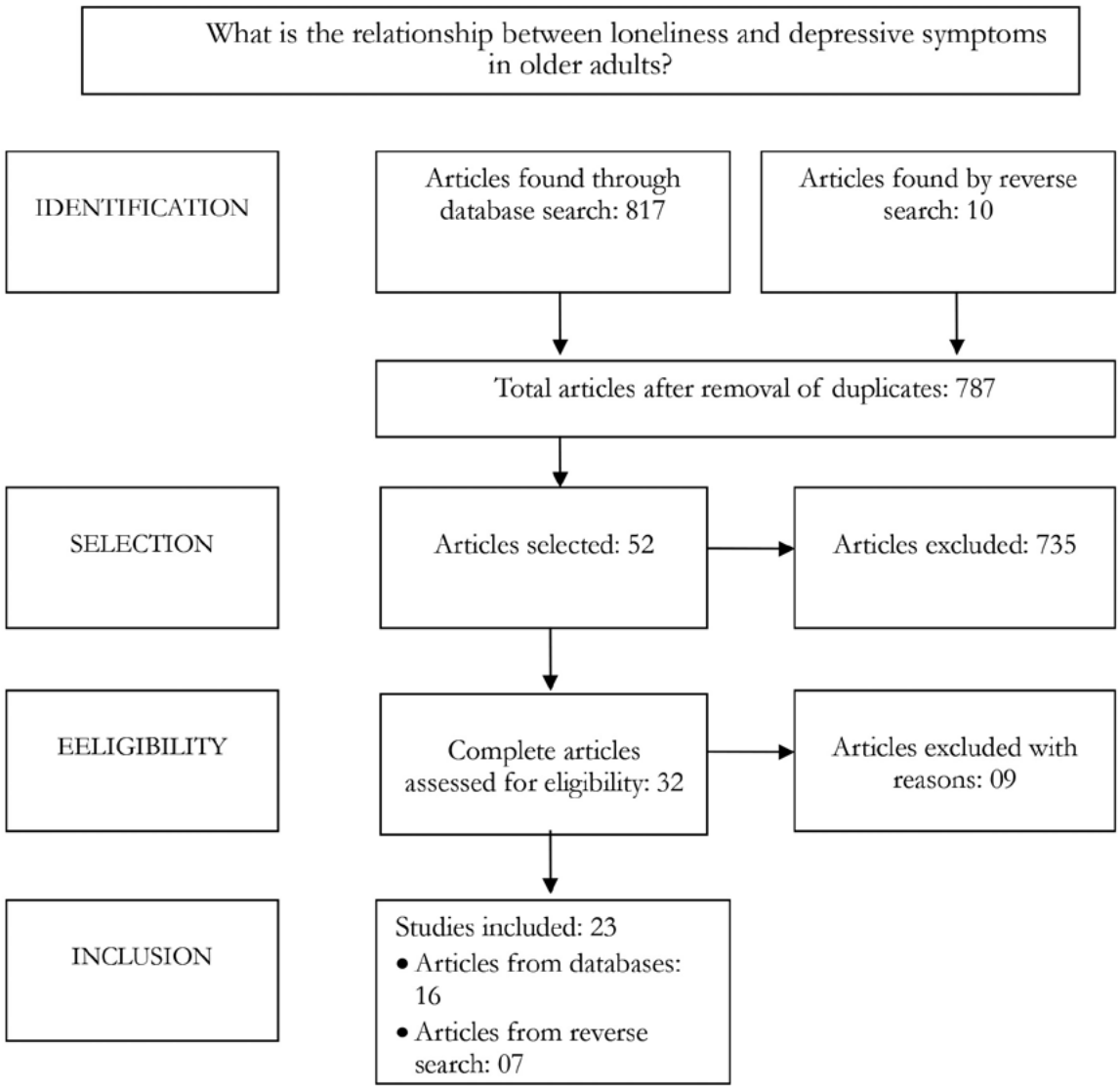

Figure 1. Flowchart of article selection process based on the PRISMA[7] method. Paraíba, 2019.

RESULTS

The searches in the databases retrieved a total of 817 publications, with 23 articles selected for the sample, of which 16 came from the databases and seven were retrieved through reverse search. The general panorama of publications shows the majority of articles were published in journals specializing in mental health. There has also been an increase in research on this topic in recent years, with 14 articles published between 2010 and 2019 addressing depressive symptoms and loneliness in aging.

As for the origin of the studies, the articles used for the sample were from Europe (n=09), Asia (n=07), North America (n=05), Oceania (n=01) and South America (n=01).

Table 1 summarizes the general information contained in the articles included in the sample.

Table 1. Overall characteristics of articles selected for sample, (n=28). Paraíba, 2019.

Author/Year	Methodological design	Sample	Main Results
Chou, K. L.; Chi, I.; Boey, K. W.[16] 2000	Cross-sectional study.	1,106 older adults.	Older adults living alone (social loneliness) report more depressive symptoms.
Ramos, M.; Wilmoth, J.[27] 2003	Cross-sectional study.	871 older adults.	A lack of social integration increases depressive symptoms and social integration reduces depressive symptoms.
Alpass, F. M.; Neville, S.[8] 2003	Cross-sectional study.	217 older adults.	Lonely men have higher scores on the GDS scale.
Chou, K. L.; Chi, I.[11] 2004	Cross-sectional study.	1,903 older adults.	Loneliness was associated significantly and positively with depression.
Adams, K. B.; Sanders, S.; Auth, E.[15] 2004	Cross-sectional study.	Older adults aged between 60 and 98 years.	Not everyone who is lonely is depressed. Loneliness is not a determinant of depression, but it is a risk.
Stek, M. L.[14] 2005	Longitudinal study.	476 older adults aged 85.	Those who suffered from depression and feelings of loneliness had a 2.1 times greater risk of mortality.
Tiikkainen, P.; Heikkinen, R. L.[20] 2005	Longitudinal study.	207 older adults aged 80 and 133 aged 85.	In women, depressive symptoms predict greater loneliness than in men; those who were lonely were more depressed and had less social interaction.
Paul, C.; Ayis, S.; Ebrahim, S.[22] 2006	Cross-sectional study.	999 older adults.	People who live alone or feel lonely had higher rates of psychological distress.
Barg, F. K. et al.[19] 2006	Cross-sectional study.	102 older adults.	Older adults participating in the study reported that loneliness is a precursor to depression and anxiety.
Aylaz, R., et al.[9] 2012	Descriptive study.	17,080 older adults.	There was a positive correlation between geriatric depression and loneliness.
Tsai, F. J.; Motamed, S.; Rougemont, A.[18] 2013	Longitudinal study.	Individuals aged 50 and above.	Older people who live without a partner, without children or who do not provide care to their grandchildren are at greater risk of feeling lonely and depressed.
Dahlberg, l., et al.[26] 2014	Longitudinal study.	Older adults aged 76 and above.	The increase in depression and recent widowhood were significant predictors of loneliness.
Houtjes, W., et al.[24] 2014	Longitudinal study.	Older adults with depressive symptoms.	Depression has been associated with higher levels of loneliness over time, especially in men and older adults.
Kvaal, K.; Halding, A. G.; Kvigne, K.[30] 2014	Comparative study.	101 older adults.	18% of older adults who felt lonely were diagnosed with depression. Loneliness was related to the feeling of emptiness and negative emotions.
Navarro, J. R.; Benito-Leon, J.; Olazaran, K. A. P.[12] 2015	Cross-sectional study.	1,126 older adults.	Lack of social support and loneliness were identified as factors that favor the onset of depressive symptoms. Widowhood and living alone are risk factors for depression.
Li, J.; Theng, Y. L.; foo, S.[10] 2015	Cross-sectional study.	162 older adults.	Among the main psychosocial factors, loneliness has a stronger association with geriatric depression.

to be continued

Continuation of Table 1

Author/Year	Methodological design	Sample	Main Results
Fried, E. I., et al.[17] 2015	Longitudinal study.	1,532 married older adults.	Grieving for a spouse mainly affected loneliness, which in turn activated other depressive symptoms.
Holvast, F., et al.[34] 2015	Cohort study.	Individuals between 60 and 90 of age with major depression, dysthymia or minor depression.	Lonely respondents had fewer social networks and experienced more severe depressive symptoms.
Holwerda, T. J., et al.[21] 2016	Cohort study.	2,878 individuals between 55 and 85 years old.	Women suffer more emotional loneliness and men, more social loneliness. Depression was associated with premature death in men, with higher mortality in the group of lonely people.
Wong, N. M. L., et al.[25] 2016	Cross-sectional study.	54 older adults.	Loneliness was a determinant of the negative affective processing of delayed depression.
Fernandes, S.; Davidson, J. G. S.; Guthrie, D. M.[35] 2017	Cohort study.	2,499 severely ill older adults.	Worsening symptoms of depression, declining social activities and not living with a primary caregiver increase the risk of loneliness.
Wang, G. et al.[13] 2017	Cluster trial.	814 older adults with at least one child.	Loneliness from empty nest syndrome leads to symptoms and major depressive episodes.
Conde-Sala, J. L. et al.[31] 2019	Cohort study.	31,491 older adults.	One of the risk factors associated with depressive symptoms was loneliness and the female gender.

Regarding the method used and the type of study, there was a predominance of quantitative studies that evaluated the depressive symptoms and loneliness of older adults through depression and/or loneliness scales, in addition to interviews or questionnaires. Among the scales most used in the articles were the Geriatric Depression Scale (GDS)[8-15] and the Center for Epidemiological Scale Depression scale (CES-D) [16-21] for depression, and the scale of the University of California, Los Angeles (UCLA)[8-10,13,15] for loneliness.

The minimum age of the participants in most articles included in the sample was 60. However, some articles studied people below this age group, but were not excluded from the sample of this review because they included older adults in their sample.

DISCUSSION

The analysis of the results on the scientific evidence on the relationship between loneliness and depressive symptoms in older adults shows a positive relationship between the two phenomena. In other words, when feelings of loneliness are more evident and social interaction is reduced, the reporting of symptoms of depressive disorders is greater, and levels of psychological distress are higher. In addition, women and older adults were considered more susceptible to feeling lonely and to depressive symptoms.

The results of this review corroborate findings in literature, which show a prevalence of emotionally

and socially lonely older adults with high scores on the depression scales used[8,9,16], with higher rates of psychological distress[22], which indicate possible depression or a depressive episode, predicting social and emotional loneliness[23]. Loneliness and depressive symptoms are therefore found in directly proportional quantities[24].

The analysis of the results corroborated results in literature by identifying loneliness as one of the main psychosocial risk factors for the development of depressive symptoms in older adults[10,11] processing negative stimuli[25]. In addition, it revealed mediating factors between emotional loneliness and obtaining a high score on the depression scales, where life events that cause loneliness predispose the individual to depressive symptoms, while depressive symptoms result in social isolation, causing loneliness. Other risk factors identified by the results and evidenced in literature were: loss of spouse[12,17,26], isolation or helplessness and separation from family members, as in the empty nest syndrome[13], the absence of a partner and not providing care to grandchildren[18]. All of these are factors that cause emotional loneliness, which results in depressive symptoms, which in turn causes social loneliness through the deprivation of social contacts. However, an increase in social relationships leads to a reduction in depressive symptoms[27].

Social and emotional loneliness have significant effects on depressive symptoms, as older adults who do not receive visits have higher loneliness scores[28], contributing to depressive symptoms[29]. Older adults themselves characterize loneliness as a precursor to depression and anxiety[19], and are related to feelings of emptiness and negative emotions[30].

In addition, women had higher average levels of psychological distress, revealing a greater tendency to develop depressive symptoms than men[31], which in turn is related to their experiences of loneliness[20]. Increased mortality rates, meanwhile, were related to depression combined with feelings of loneliness[14,21], especially in men[21]. The scientific evidence confirmed by the results of this review shows that these phenomena are not time-related and are more related to the psychosocial conjuncture of older adults[32]. Furthermore, they can be predictive aspects of suicidal behavior[33].

In addition, it was found in literature that only the most severe and persistent depressive symptoms are associated with loneliness[34]. It is understood that these are associated and complex phenomena, and so the research team behind this review stress the importance of long-term evaluations and follow-up for a better understanding of these phenomena and their relationships.

It can therefore be said that loneliness does not necessarily cause depressive symptoms, as there are older adults who feel lonely and do not have depression[15]. However, it can be stated that older depressive adults have a higher risk of feeling lonely [35].

The contributions of this review are related to its presentation of the relationship between loneliness and depressive symptoms, common phenomena in the existential reality of older adults, which contribute to the understanding of this scenario and can serve as guidelines for planning and implementing actions to promote mental health and the prevention of harm to the general health of this population, based on the premises listed. It is also believed that scientific evidence has been produced that is capable of collaborating with decision-making in healthcare practices for older adults through the interdisciplinary and interprofessional approach of the observation and active identification of lonely older adults and/or those who present depressive symptoms.

As a limitation of the present study, some articles in the sample carried out their analyzes considering the older population combined with middle-aged adults. Thus, it is suggested that further investigations are carried out on the relationship between loneliness and depression comparing the two populations.

CONCLUSION

The present integrative review provides an overview of the relationship between loneliness and depressive symptoms in older adults. Scientific evidence shows that lonely older adults have more depressive symptoms, and loneliness is associated with a feeling of emptiness and negative emotions. Thus, the relationship between these variables is

that loneliness is considered a high risk factor for depressive symptoms, and therefore for depression. It was also found that women and long-lived older adults are more susceptible to feeling lonely and depressive symptoms.

In addition, loneliness and depressive symptoms can be considered factors that develop jointly due to the similarities of the symptoms that cause them, so when exhibiting depressive symptoms, loneliness can develop, and vice versa. Furthermore, it can be said that there is a cycle between the variables, in which emotional loneliness predisposes the individual to depressive symptoms, which in turn stimulates loneliness.

Thus, the present study shows how important the duty of primary care health professionals is in observing and actively identifying older adults who meet one of the conditions described, in addition to encouraging greater social participation in the community, implementing activities to monitor the health of older adults in care units, while contributing to reducing their social isolation.

Given the above, the scientific evidence produced can contribute to the improvement of activities for older adults living in the community, focusing on the mental health of the older population.

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Evaluation of the clinical-functional vulnerability index in older adults

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Abstract

Objective: To evaluate the clinical-functional vulnerability index (CFVI) of older adults and its relationship with socioeconomic, behavioral, clinical and therapeutic indicators. *Method:* A cross-sectional epidemiological study with a quantitative design was performed with 318 randomly drawn older adults registered with the Family Health Strategy. Data were collected through the CFVI-20 questionnaire and analysis was supported by descriptive, bivariate and multivariate statistics, with results with p-value <0.05 considered significant. *Results:* most older adults (59.1%) were considered frail or potentially frail. Among the groups studied, there was a statistically significant difference in the CFVI for the variables age group (p<0.001), functional literacy (p=0.001), alcohol consumption (p<0.001), physical exercise (p<0.001), self-reported health problems (p<0.001) and medication use (p<0.001), as well as a positive correlation with stress (r=0.135; p=0.016). In the multiple linear regression model, the set of sociodemographic predictor variables explained the frailty of the elderly by 30.4% (R^2=0.304). *Conclusions:* The advancement of age, as a non-controllable variable, indicates a need to encourage the maintenance of functionality in old age, based on the health care strategies that prolong longevity with safety, autonomy and vitality.

Keywords: Aging. Health of the Elderly. Frailty. Geriatric Assessment. Health Education. Health Vulnerability.

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INTRODUCTION

Population aging is a contemporary reality that has occurred at different times and magnitudes in practically every country in the world[1]. The contingent of elderly people, evidenced on a global scale, especially in Brazil, has expanded considerably and rapidly, bringing important changes to how society is established[2].

According to the Brazilian Institute of Geography and Statistics (or IBGE), older adults represent the portion of the population with the highest growth rate, especially in recent years[3]. In 2019, there were more than 32 million older adults in Brazil, and it is estimated that by the year 2025 the country will have the sixth largest contingent in the world[4]. This demographic scenario is mainly due to a more significant decline in mortality and fertility rates[5].

Consequently, the increase in life expectancy has generated changes in the illness profile of older adults, with a predominance of chronic non-communicable diseases (CNCDs)[6], in addition to an increase in degrees of dependence and disabilities. The changes that occur in the body, whether morphological, functional, biological or psychological, promote a decrease in functional capacity (FC), which in turn promotes greater vulnerability and a higher incidence of diseases, especially CNCDs[7].

FC is defined as the ability of an individual to perform activities that allow them to exercise their autonomy and independence[8]. When an individual is in a frail state, the chance of being affected by comorbidities increases, thus augmenting the risks of falls, infections, hospitalization, institutionalization, disabilities and death, requiring, therefore, urgent health interventions[9].

Thus, the clinical-functional vulnerability index (CFVI) is an essential tool for identifying the functional impairment of older adults and their needs. Assessment with the tool represents a systematic attempt to objectively verify the capacity of an individual to perform the activities necessary to care for oneself, based on the evaluation of different skills, and, therefore, allows the development of an interdisciplinary health care plan especially aimed at the optimization of the performance of older adults[10].

The objective of the present study was to evaluate the clinical-functional vulnerability index in older adults, based on its relationship with socioeconomic, behavioral, clinical and therapeutic indicators.

METHOD

The present study consists of a cross-sectional observational epidemiological investigation with a quantitative approach, carried out in the municipal region of Cuité (Paraíba, Brazil), located in the Western Curimataú microregion. Based on a total population of 3,041 elderly people in the municipal region, the sample calculation resulted in an equivalent number of 342 required participants, considering a 95% confidence level and a 5% sampling error. With the exception of sample losses and refusals, 318 elderly people monitored by Basic Health Units (BHUs) participated in the study and were selected through a systematic probabilistic sampling model. Two inclusion criteria were considered: age of 60 years old or older; and be properly registered with the Family Health Strategy (FHS).

Data collection took place between the months of December 2018 and February 2019, following approval by the Research Ethics Committee of the Hospital Universitário Alcides Carneiro (HUAC) (Opinion No. 3.021.189), complying with the ethical and scientific aspects proposed in Resolution 466/2012 of the National Health Council (or CNS) relating to research involving human beings[11]. To identify the older adults in the study, a survey of the addresses of the homes of the participants was carried out, with Community Health Agents helping to identify the locations. The interviewees were informed about the aspects covered in the research and their own contribution to the study. After any queries were resolved, an Informed Consent Form (ICF) was duly signed by the participants. The chief researcher, the participating researcher and seven students from the Center for Studies and Research in Aging and Quality of Life (or NEPEQ) took part in data collection.

Two instruments were used to obtain the information: I) a sociodemographic, behavioral and clinical-therapeutic questionnaire, which

included the variables: age, sex, skin color/race, marital status, education, family income, family arrangement, current occupation, body mass index, alcohol consumption, smoking, physical exercise, stress level, use of health services, use of medications and self-reported health problems; and II) Clinical-Functional Vulnerability Index 20 (CFVI-20), which includes multidimensional aspects about the condition of older adults, comprising 20 items distributed in eight sections (age, self-perceived health, functional disabilities, cognition, mood, mobility, communication and multiple comorbidities). Each section is assigned a specific score, totaling a maximum of 40 points[12]. The clinical-functional evaluation of older adults is determined as follows: a) 0 to 6: robust older adults; b) 7 to 14 points: older adults with risk of frailty; and c) ≥15 points: older adults in a frail condition, suffering functional decline and unable to manage their life[13].

The data were entered and processed in the IBM SPSS (Statistical Package for the Social Sciences) software package version 20, to allow descriptive (univariate) and inferential analysis of the results that related the dependent and independent variables (outcome).

The Mann-Whitney and Kruskal-Wallis tests were applied when processing bivariate statistics in order to compare the difference between the groups with respect to the outcome (IVCF), while the Spearman Correlation Test was used for combinations of quantitative variables, with significance represented by *p*-values of less than 0.05. It Non-parametric tests were used as the set of quantitative data did not present normal distribution according to the Kolmogorov-Smirnov test. In the multiple linear regression model, the total CVFI score was considered as the outcome and the set of sociodemographic, behavioral and clinical-therapeutic variables were deemed the predictor variables, thus allowing the adjustment of the model based on the category of the variables previously identified as statistically significant and defining the coefficient of determination.

RESULTS

For the overall assessment of CFVI, the measures categorized from the calculation of the total score of each participant were used. The results of the stratification of the CFVI-20 are shown in Table 1.

The highest percentage of elderly people in the study were robust (40.9%), however the sum of frail and potentially frail elderly people totaled 59.1%, representing the majority of the older population of Cuité.

In order to substantiate the results found in CFVI categorization, the descriptive analysis of the total score was also considered, as can be seen in Table 2, in which a mean score of 9.90 and a median score of 8 indicate potentially frail older adults (score from 7 to 14 points).

Table 1. Total categorized Clinical-Functional Vulnerability Index (CFVI) score in older adults treated by the Family Health Strategy. Cuité, Paraiba (n=318).

Variable	Categories	Older Adults Assessed n (%)
CFVI	Robust older adults	130 (40.9)
	Potentially frail older adults	115 (36.1)
	Frail older adults	73 (23.0)
	Total	318 (100.0)

Source: Study data, 2019.

Table 2. Descriptive data of the total Clinical-Functional Vulnerability Index (CFVI) score in older adults treated by the Family Health Strategy. Cuité, Paraiba (n=318).

Variable	n	Minimum/Maximum	Mean	Median	Standard-deviation
Total CFVI Score	318	0/38	9.90	8	±8.293

Source: Study data, 2019.

To identify the relationship between the CFVI and the socioeconomic, behavioral, clinical and therapeutic characteristics of the older adults in the study, 15 hypotheses were tested that allowed inferences between the different groups studied to be identified and elucidated the set of explanatory variables for the variation in the CFVI among the older adults. The results are shown in Table 3.

When comparing the difference between the groups in terms of CFVI, statistical significance was observed for the variables age group (p<0.001), functional literacy (p=0.001), alcohol consumption (p<0.001), physical exercise (p<0.001), self-reported health problems (p<0.001) and medication use (p<0.001).

For the quantitative independent variables, tests of correlation with the CFVI were performed. The results are shown in Table 4.

There was a significant linear relationship between the CFVI and the variables years of schooling (ϱ= -0.151; p-value=0.007) and self-reported stress (ϱ=0.135; p-value =0.016). Between the variable years of schooling and the CFVI, a negative (inverse) correlation was identified, in which elderly people with lower education had higher CFVI scores; for the self-reported stress variable and the CFVI the correlation was positive, suggesting a higher prevalence of stress among those with greater frailty.

In the multiple linear regression model, considering the total CFVI score as the outcome variable and the set of sociodemographic, behavioral and clinical-therapeutic variables as the predictor variables, the model was adjusted by category of variables, only included those whose significance statistic was previously identified. The result is shown in Table 5.

Table 3. Comparison of total CFVI score mean ranks according to the socioeconomic, behavioral, clinical and therapeutic variables of the older adults followed by the Family Health Strategy. Cuité, Paraiba (n=318).

Variables	CFVI		Sig.
	n (%)	Mean rank	p-value
Sex**			
Men	137 (43.1)	150.75	p=0.139
Women	181 (56.9)	166.12	
Age range ***			
60 to 74	192 (60.4)	124.12	
75 to 89	107 (33.6)	201.81	p<0.001*
Above 90	19 (6.0)	278.76	
Skin Color/Race ***			
White	114 (35.8)	171.07	
Brown/Mixed Race	167 (52.5)	146.22	p=0.067
Yellow/Asian Brazilian	04 (1.3)	180.50	
Black/Afro-Brazilian	32 (10.1)	180.03	
Don't know/Did not respond	01 (0.3)	---	

to be continued

Continuation of Table 3

Variables	CFVI		Sig.
	n (%)	Mean rank	*p*-value
Marital status***			
Un married	35 (11.0)	177.10	
Married	178 (56.0)	151.30	
Divorced	12 (3.8)	112.50	*p*=0.061
Separated	04 (1.3)	143.38	
Widower	83 (26.1)	179.46	
Civil union	06 (1.9)	128.83	
Family arrangement ***			
Lives alone	30 (9.4)	122.33	
Lives with spouse only	75 (23.6)	156.25	
Lives with spouse and children	52 (16.4)	151.86	
Lives with spouse, children, son-in-law or daughter-in-law	12 (3.8)	192.21	
Lives with children only	30 (9.4)	192.23	*p*=0.079
Trigenerational arrangements	38 (11.9)	156.00	
Intragenerational arrangements	07 (2.2)	208.29	
Lives with grandchildren only	04 (1.3)	156.75	
Lives with non-family members	03 (0.9)	246.83	
Other arrangements	67 (21.1)	158.34	
Functional literacy **			
Yes	97 (30.5)	133.62	*p*=0.001*
No	221 (69.5)	170.86	
Body mass index***			
Underweight	65 (20.4)	169.01	
Normal weight	143 (45.0)	161.97	*p*=0.403
Overweight	110 (34.6)	150.67	
Smoking **			
Yes	50 (15.7)	157.43	*p*=0.862
No	268 (84.3)	159.89	
Alcohol consumption**			
Yes	38 (11.9)	95.12	*p*<0.001*
No	280 (88.1)	168.24	
Physical exercise **			
Yes	143 (45.0)	129.68	*p*<0.001*
No	175 (55.0)	183.87	
Self-reported health problems **			
Yes	254 (79.9)	172.37	
No	63 (19.8)	105.11	*p*<0.001*
Don't know / Did not respond	01 (0.3)	---	
Use of medicines **			
Yes	221 (69.5)	182.39	
No	96 (30.2)	105.15	*p*<0.001*
Don't know / Did not respond	01 (0.3)	---	

*Statistical significance (*p*-value <0.05); **Mann-Whitney Test; ***Kruskal-Wallis Test.

Source: Study data, 2019.

Table 4. Comparison of the total CFVI score mean ranks according to the variables *family income*, *years of schooling* and *self-reported stress* of older adults treated by the Family Health Strategy. Cuité, Paraiba (n=318).

Correlation	CFVI – Total score**
Family income	ϱ=-0.010 *p*-value=0.866
Years of schooling	ϱ= -0.151 *p*-value=0.007*
Self-reported stress	ϱ= 0.135 *p*-value=0.016*

ϱ: Correlation coefficient; ** Spearman's Correlation Test; *Statistical significance: *p*-value <0.05.

Source: Study data, 2019.

Table 5. Multiple linear regression model of CFVI and sociodemographic, behavioral and clinical-therapeutic variables. Cuité (Paraiba), 2019.

Variables	CFVI – Total score Sig. *p*-value	CFVI – Total score R^2
Sociodemographic		
Age range	*p*<0.001*	R^2 = 0.304
Functional literacy	*p*=0.001*	
Behavioral		
Alcohol consumption	*p*<0.001*	R^2 = 0.114
Physical exercise	*p*<0.001*	
Stress	*p*<0.001*	
Clinical-therapeutic		
Self-reported health-problems	*p*<0.001*	R^2 = 0.004
Use of medication	*p*<0.001*	

* Statistical significance: *p*-value <0.05; R^2 - Coefficient of Determination or Explanation.

Source: Study data, 2019.

The set of sociodemographic predictor variables has the highest Coefficient of Determination, with R^2=0.304 or 30.4%. This confirms that the sociodemographic conditions represented by the variables *age group* and *functional literacy*, explain the frailty of the older adults, according to the CFVI, by 30.4%. It is worth mentioning that, taken alone, age group is the main variable responsible for explaining the variation in CFVI (29.1%).

DISCUSSION

The impairment of FC and/or its effective risk clearly elucidated in the findings (59.1% of frail and potentially frail elderly) serves as a warning regarding the need for public policies aimed at the health of older adults, as well as for researchers, managers, health professionals, family members and society in general, so that health promotion and disease prevention measures are adopted to improve the autonomy and independence of this group.

The robust elderly are those who manage to exercise their autonomy and independence without exhibiting a decline in FC; potentially frail elderly person have suffered a reduction in FC, while they can exercise autonomy and independence, there are chances of a risk of functional dependence; and frail older adults exhibit some decline in FC, and are unable to manage their life independently and autonomously[14].

Another study found that older adults were frail or potentially frail, when compared to robust elderly[15]. In a study conducted in the municipal region of

Pombal (Paraiba), there was a predominance of potentially frail elderly[9]. Frailty increases the chances of older adults being affected by an adverse health event, meaning that greater care should be aimed at the risk of functional decline[16]. This decline, when viewed as a health problem for older adults, requires progressively strengthened coping strategies as the individual ages[17].

In order to alleviate the effects caused by aging and to stimulate actions that promote the quality of life (QoL) of this population, the National Health Policy for Older Adults (or PNSPI) addresses the need to recover, maintain and promote the autonomy and independence of this portion of the population, through collective or individual measures, based on the principles and guidelines of the National Health System (or SUS)[18].

When the data was analyzed in relation to age, it is observed that most of the participants (60.4%) were part of the young group of elderly people (60 to 74 years old), who are characterized as potentially active and have a participatory role in society. When comparing age group and CFVI, the highest mean rank was identified among older adults aged over 90 (278.76) with a statistically significant difference between the groups (p<0.001). Clinical-functional vulnerability and age group have a directly proportional dependency relationship.

In a study conducted in Fortaleza (Ceará), it was found that age is a predictive factor for the functional disability of older adults[19]. As age increases, basic and instrumental activities are affected. The greater the age, the greater the changes in the natural aging process, as well as the greater the limitations related to functional capacity. Elderly people aged 80 years and over also exhibited greater chances of having some functional impairment[20].

In terms of the variable functional literacy, it was found that 69.5% of the interviewees were classified as functional illiterates, with a mean of 2.79 years of schooling. This fact negatively affects old age, especially in the capacity for social insertion and access to means of care. Corroborating this finding, another study found that 76.48% of older adults had an educational level of up to four years of schooling, considered very low[21]. This social determinant potentiates the vulnerability of the individual when affected by certain diseases, as the lower the level of education, the greater the prevalence of functional disability, mainly due to the involvement of CNCDs[22].

Still regarding functional literacy, when comparing the different groups, based on statistical significance (p=0.001), the highest CFVI mean rank was among illiterate elderly (170.86), suggesting education is an important determinant for the maintenance of vitality and successful aging. Functionally illiterate elderly people exhibit greater clinical-functional vulnerability. Similar data were found in a study in which participants with low schooling had a greater decline in FC[23].

In order to improve the understanding and QoL of elderly people with low education levels, health professionals should assess the understanding and interpretation of health education actions, especially due to the difficulty of understanding some instructions[23]. In addition, this determinant impairs the adherence of healthy habits on the part of these elderly people and, therefore, promotes an increase in the use of health services due to the serious impairment of chronic disabling conditions that could have been prevented over time[24].

Regarding the consumption of alcoholic beverages, 88.1% of older adults did not drink alcohol. A study carried out in the state of Michigan (USA) found that alcohol consumption was associated with a lower risk of worsening frailty[25].

The highest mean rank was observed among individuals who did not consume alcohol (168.24), suggesting that older adults who did not consume alcohol had a higher CFVI score, that is, they are more frail. Although there is no causal relationship, older adults who consume alcoholic beverages showed greater vitality, which is justified by the fact that this portion is composed of active, autonomous, independent people with good functionality. While the consumption of alcoholic beverages is considered something harmful to health, depending on the amount consumed and the situation, this habit can be related to the greater participation of older adults in social activities, indicating the maintenance of functionality[26].

Regarding the practice of physical exercise, the majority of older adults (55.0%) did not perform any type of activity. However, the percentage of elderly people who did practice physical activity is relevant (45.0%). It is worth mentioning that the performance of physical exercise frequently has numerous health benefits, both physical and psychosocial, and constitutes an effective way of preventing the occurrence of future diseases[27].

In the comparison between the groups, the highest CFVI mean rank was among sedentary individuals (183.87), suggesting that the practice of physical exercises is directly related to the maintenance of the FC among older adults, ratified by statistical significance (p<0.001). Sedentary elderly people have a higher prevalence of the decline of CF. Greater physical inactivity and the prevalence of CNCDs create a vicious circle between disease and disability[28].

The decline in FC among older adults results in a reduction in resistance and a worsening of motor performance. Therefore, it is important to adopt measures to implement preventive actions such as physical exercise, since this intervention can improve, stabilize or even reverse this phenomenon, reducing the risk of falls and, consequently, improving the mobility and muscle strength of older adults[29].

The variable self-reported health problems showed that a significant majority of older adults (79.9%) reported suffering a health problem. In the comparison between the groups, the highest CFVI mean rank was found among older adults who self-reported having health problems (172.37), indicating that FC was more affected than in the opposite group. The statistical significance of this finding reveals that health problems are considered a determinant of FC in older adults.

Regarding the variable medication use, it was observed that 69.5% of the older adults reported using medications. The impact of chronic diseases on older adults transforms this public into large-scale consumers of health services, as well as increasing their use of medications. This population, in turn, is the most medicalized part of society and the group with the greatest signs of the incidence and prevalence of comorbidities[30]. When comparing the difference in CFVI between the groups, a higher mean rank was found among those who reported using medication (182.39), confirming that this group has a more frail FC.

Reinforcing these results, a study carried out in Erval Seco (Rio Grande do Sul) found that a large proportion of older adults interviewed reported making continuous use of medications, since they were frail or potentially frail[31]. In order to facilitate the maintenance of drug therapy and prevent damage or complications to older adults from the use of these drugs, health professionals can offer educational resources, guiding older adults in the best possible way, so that they can at least understand the dosage and the frequency to be followed[8].

The occurrence of stress is related to the incidence of cognitive deficits, which can be expressed in a very harmful manner among older adults[32]. It is common that the decline in FC causes stress in an individual, since the older person has a change in identity, as well as in their body image. Thus, it can be said that FC directly influences the mental health of older adults, as it is linked to the performance of the activities of daily living (ADL) of the individual[33].

In multivariate analysis, advancing age is shown to be an important risk factor for the decline of FC in older adults. This risk is explained by the decline in the functionality of the physiological systems that determine an individual's FC, which in turn will decline as age advances. From this perspective, it can be said that this relationship between advancing age and the decline of FC is simply a phenomenon common to older adults, thus requiring the development of strategies such as the follow-up care and monitoring of this population, aiming at lessening or avoiding these limitations[34].

The World Health Organization (WHO) has warned that healthy aging should be considered a global priority, thus promoting the development of strategies to deal with the health problems of this population and the impact of CNCDs on the QoL of older adults[35]. As age is a variable that cannot be controlled, it is necessary to train health teams to care for this population, thus guaranteeing the maintenance of the functionality of older adults, in order to safely prolong longevity, autonomy and vitality.

As a technical limitation of the present study, the difficulty in locating the older adults selected through the sampling procedure should be mentioned, especially in rural areas. However, with the effective collaboration of community health agents in the municipal region, this difficulty was gradually overcome.

CONCLUSION

Regarding the Clinical-Functional Vulnerability Index, the findings reveal a significant set of frail or potentially frail elderly people who deserve prioritized and qualified care in all social and health dimensions, in order to enhance their functional capacity.

Among the set of variables studied, it was statistically found that advanced age, physical inactivity, functional illiteracy, high stress, the presence of health problems and the use of medications are factors associated with clinical-functional vulnerability in older adults. In the multivariate model, the sociodemographic conditions represented by age group and functional literacy explain the frailty of the older adults, as identified by the Clinical-Functional Vulnerability Index, by 30.4%.

It is suggested that other studies should be devised and executed to assess the functional capacity of older adults, in order to improve the robustness of scientific knowledge in this area and encourage the adoption of measures to promote health and prevent diseases to enhance the autonomy and independence of older adults, thus ensuring a better quality of life.

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Analysis of consumption of omega 3 source foods by participants of social groups

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Abstract

Objective: To verify the consumption of omega 3 source foods by participants of social groups. *Method*: a cross-sectional, descriptive analytical study was carried out with 850 older participants of social groups of the Older Adult Care Coordination (or DATI) in a city in the state of Rio Grande do Sul, Brazil, through a questionnaire containing sociodemographic variables and the consumption of omega 3 source foods. Data were analyzed using the R 2.15.1 language and using the Chi-square and Fisher's exact tests. The level of significance used in the tests was $p \leq 0.05$. *Results*: The results showed that older women have a habit of consuming more omega 3 source foods than men, such as oils, dark green vegetables, seeds, fish and nuts, and people with greater purchasing power consume more products with omega 3. *Conclusion*: Families with greater purchasing power used more expensive sources of omega 3 fatty acid, and the consumption of these products did not differ significantly in terms of age, BMI, marital status and whether the individual lived alone or with others.

Keyword: Nutrition. Health of the Elderly. Fatty Acids Omega-3. Food Consumption.

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INTRODUCTION

With the advances in medicine, technology and lifestyle of recent decades, life expectancy has increased significantly[1]. According to the Brazilian Institute of Geography and Statistics[2], there are 30.2 million people aged over 60 in Brazil, causing a significant change in the country's age pyramid.

Aging is a natural process of human life. Over time, physiological, physical, psychological, brain and social changes occur as a result of this process[3,4]. However, healthy habits developed throughout life, such as the practicing of physical activity, a healthy lifestyle, autonomy and suitable food choices play a fundamental role in quality of life[5].

Dietary patterns are one of the main determinants of health. The beneficial effects of eating foods with protective functions are well known, and include a reduction in the risk of mortality[4]. The consumption of omega 3 fatty acids is associated with numerous health benefits[1,5], such as the improvement of the metabolic syndrome, the reduction of abdominal obesity, insulin resistance, dyslipidemia and hypertension. There is also a reduced risk of cardiovascular disease, symptoms of depression, weight, postprandial satiety and inflammatory diseases[6-10].

The fatty acids of the omega 3 series, formed by linolenic acid, docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA) and docosapentaenoic acid (DPA), constitute a group of lipids that exercise significant functions in the body, being incorporated into the phospholipids of the membranes of the cells and optimizing their biological function. This optimization particularly occurs in the structure and function of the glia and endothelium brain cells, strengthening memory and neuroinflammatory control, as well as in the retina, testicles, heart, liver and kidneys[4,11-14]. Various benefits have been reported from the ingestion of omega 3, such as the reduction of inflammatory eicosanoids, cytokines and reactive oxygen species, preventing and treating cardiovascular diseases, inflammatory diseases and infections and reducing the occurrence of injuries, immunological changes and acting in the reduction of cognitive decline[7,8].

With the aging process, there is the possibility of the appearance of cardiac, endocrine and dementia pathologies and the development of inflammation and oxidative stress[8]. The use of omega 3 supplementation can lead to reductions in oxidative stress, a decline in the expression of pro-inflammatory proteins and an increase in the expression of anti-inflammatory proteins, as well as improvement in the cognitive decline associated with pathologies, classified as mild to moderate[8-10].

An integrative literature review study[15], with the objective of identifying the use of omega 3 supplementation and its performance in cognitive development in older adults, found a reasonable improvement in cognitive performance, memory and cerebrovascular and arterial function, while also pointing out that further studies are still required.

There is a lack of data in Brazilian[15] and international[16,17] literature on the food-based consumption of omega 3 and its benefits among participants of social groups. Early diagnosis to identify the absence of these acids is intended to prevent disease and improve quality of life. Thus, the objective of the present study was to assess the consumption of omega 3 source foods by participants of social groups.

METHOD

A cross-sectional, descriptive/analytical and population based study was carried out in 2016, with 850 older adults participating in social groups of the Elderly Care Coordination (or DATI) in a city in the state of Rio Grande do Sul. The sample size (n=850) was defined for a finite population of 3,600 older adults and with a 95% confidence interval, based on a sampling error of 3%. The convenience sampling technique was used. The selection of participants was based on their availability to undertake activities in the DATI workshops.

The inclusion criteria were: participants linked to DATI social groups, while people with beta blockers, pacemakers or autoimmune diseases were excluded.

Before signing the Informed Consent Term (ICF), the researchers explained the objectives of the

research and how the instrument should be completed. Afterwards, the participants signed the informed consent form and completed the questionnaire, in the classroom and during workshop activities at the DATI, which included dance, music, yoga and reading, etc. and lasted 15 minutes. The instrument consisted of sociodemographic variables (age, sex, education, marital status, risk factors such as muscle pain, medication use, bone disorders); questions about omega 3 supplementation in capsules and the consumption of omega 3 source foods, with a table with the source food and frequency of consumption: *never, weekly, biweekly, monthly* and *yearly* (animal and vegetable sources of omega 3 foods, such as DHA, EPA and ALA); soy oil and other oils (olive oil, canola and corn oil); vegetables (broccoli, cabbages and spinach); fish (sardines, salmon, tuna and cod); seeds (such as chia and flaxseed) and nuts, as well as the measurement of body mass index (BMI)[18,19].

The data were analyzed using the R 2.15.1 language. Pearson's Chi-square and Fisher's exact tests were applied. The level of significance used in the tests was $p \leq 0.05$. The study was approved by the Ethics Committee of the Universidade de Passo Fundo (Passo Fundo University) (UPF), under opinion no. 1,023,088.

RESULTS

Of the 850 older participants, 739 (86.9%) were women and 111 (14%) were men. The mean age was 67.9 ± 8.0 years; in terms of education, 339 (42.1%) had up to 4 years of schooling, 367 (45.6%) from 5 to 10 years and 99 (12.3%) 11 years or more. In relation to income, 586 (71.9%) received up to R$1,575.99; with regard to marital status, 62 (7.3%) were single, 338 (39.8%) were married, 100 (11.8%) were separated or divorced, and 348 (40.9%) were widowed. A total of 524 (63.0%) of the older adults lived with someone.

Table 1 shows the results of the association between the sex of the sample studied (n=850) and the consumption of omega 3 source foods.

The results in Table 1 indicate a significant difference in relation to the consumption of seeds between the sexes, with women consuming more seeds than men (p=0.001).

Table 2 shows the results of the relationship between the age group of the sample studied (n = 850) and the consumption of omega 3 source foods.

Table 1. Association between the sex of the sample (n=850) and the consumption of omega 3 source foods.

Omega 3 source foods		Sex		*p*
		Female	Male	
Soy oil	Yes	560 (85.6%)	83 (84.7%)	0,760
	No	94 (14.4%)	15 (15.3%)	
Other oils	Yes	269 (45.1%)	35 (37.6%	0,217
	No	328 (54.9%)	58 (62.4%)	
Dark green vegetables (broccoli, kale and spinach)	Yes	652 (95.6%)	96 (93.2%)	0,314
	No	30 (4.4%)	7 (6.8%)	
Fish	Yes	521 (78.3%)	81 (80.2%)	0,795
	No	144 (21.7%)	20 (19.8%)	
Seeds (chia and flaxseed)	Yes	372 (58.7%)	32 (34.8%)	0,001
	No	262 (41.3%)	60 (65.2%)	
Nuts	Yes	431 (69.1%)	63 (67.0%)	0,721
	No	193 (30.9%)	31 (33.0%)	

Fisher's Exact Test; Significant value = $p \leq 0.05$.

Table 2. Association between the age group of the sample studied (n = 850) and the consumption of omega 3 source foods.

Omega 3 source foods		Age range			*p*
		From 50 to 59 years	From 60 to 79 years	80 years or over	
Soy oil	Yes	101 (92.7%)	491 (83.9%)	51 (87.9%)	0.051
	No	8 (7.3%)	94 (16.1%)	7 (12.1%)	
Other oils	Yes	42 (40.8%)	234 (43.6%)	28(56.0%)	0.183
	No	61 (59.2%)	303(56.4%)	22 (44.0%)	
Dark green vegetables (broccoli, kale and spinach)	Yes	110 (94.8%)	584 (95.6%)	54 (93.1%)	0.674
	No	6 (5.2%)	27 (4.4%)	4 (6.9%)	
Fish	Yes	84 (73.7%)	472 (79.2%)	46 (82.1%)	0.336
	No	30 (26.3%)	124(20.8%)	10 (17.9%)	
Seeds (chia and flaxseed)	Yes	64 (60.4%)	314 (55.5%)	26 (48.1%)	0.333
	No	42 (39.6%)	252 (44.5%)	28 (51.9%)	
Nuts	Yes	73 (67.6%)	387 (69.5%)	34 (64.2%)	0.695
	No	35 (32.4%)	170 (30.5%)	19 (35.8%)	

Pearson's Chi-square test; Significant value = $p \leq 0.05$.

The results of Table 2 do not indicate significant differences for consumption of omega 3 source foods, when compared with the age group.

Table 3 shows the results of the relationship between the income of the sample studied (n=850) and consumption of omega 3 source foods.

The results in Table 3 indicate a significant difference in relation to the consumption of fish (p=0.014) and nuts (p=0.004) based on income, showing that people who have an income greater than or equal to R$1,576.00 tend to consume more omega 3 source foods.

Table 4 shows the results of the relationship between the marital status of the studied sample (n=850) and the consumption of omega 3 source foods.

The results of Table 4 do not indicate significant differences in the consumption of Omega 3 source foods based on marital status.

Table 5 presents the results of the relationship between the Body Mass Index (BMI) of the studied sample (n=850) and the consumption of omega 3 source foods.

Table 3. Association between the income of the sample studied (n=850) and the consumption of omega 3 source foods.

Omega 3 source foods		Income		*p*
		Up to R$ 1,575.99	R$ 1,576.00 or more	
Soy oil	Yes	441 (85.5%)	174 (84.9%)	0.817
	No	75 (14.5%)	31 (15.1%)	
Other oils	Yes	199 (42.5%)	96 (49.5%)	0.104
	No	269 (57.5%)	98 (50.5%)	
Dark green vegetables (broccoli, kale and spinach)	Yes	505 (94.7%)	214 (97.7)	0.79
	No	28 (5.3%)	5 (2.3%)	
Fish	Yes	393 (76.2%)	184 (84.4%)	0.014
	No	123 (23.8%)	34 (15.6%)	
Seeds (chia and flaxseed)	Yes	268 (54.8%)	120 (58.0%)	0.454
	No	221 (45.2%)	87 (42.0%)	
Nuts	Yes	322 (66.1%)	157 (77.3%)	0.004
	No	165 (33.9%)	46 (22.7%)	

Fisher's exact test; Significant value = $p \leq 0.05$.

Table 4. Association between the marital status of the studied sample (n = 850) and the consumption of omega 3 source foods.

Omega 3 source foods		Marital status				*p*
		Single	Married	Separated/ Divorced	Widowed	
Soy oil	Yes	48 (90.6%)	255 (85.9%)	78 (82.1%)	261 (85.3%)	0.568
	No	5 (9.4%)	42 (14.1%)	17 (17.9%)	45 (14.7%)	
Other oils	Yes	14 (32.6%)	123 (43.6%)	38 (44.7%)	129 (46.1%)	0.423
	No	29 (67.4%)	159 (56.4%)	47 (55.3%)	151 (53.9%)	
Dark green vegetables (broccoli, kale and spinach)	Yes	52 (94.5%)	304 (95.6%)	90 (94.7%)	300 (95.5%)	0.978
	No	3 (5.5%)	14 (4.4%)	5 (5.3%)	15 (4.8%)	
Fish	Yes	40 (76.9%)	242 (78.1%)	74 (80.4%)	244 (78.7%)	0.956
	No	12 (23.1%)	68 (21.9%)	18 (19.6%)	66 (21.3%)	
Seeds (chia and flaxseed)	Yes	22 (48.9%)	172 (57.9%)	52 (59.8%)	157 (53.0%)	0.413
	No	23 (51.1%)	125 (42.1%)	35 (40.2%)	139 (47.0%)	
Nuts	Yes	33 (64.7%)	212 (72.4%)	56 (65.1%)	191 (66.8%)	0.362
	No	18 (35.3%)	81 (27.6%)	30 (34.9%)	95 (33.2%)	

Pearson's Chi-square test; Significant value=$p \leq 0.05$.

Table 5. Association between Body Mass Index (BMI) of the sample studied (n= 850) and the consumption of omega 3 source foods.

Omega 3 source foods		Body Mass Index (BMI)			*p*
		Malnutrition	Normal Weight	Obesity	
Soy oil	Yes	53 (84.1%)	266 (82.6%)	324(88.3%)	0.102
	No	10 (15.9%)	56 (17.4%)	43 (11.7%)	
Other oils	Yes	28 (46.7%)	132 (44.3%)	144(43.4%)	0.889
	No	32 (53.3%)	166 (55.7%)	188(56.6%)	
Dark green vegetables (broccoli. kale and spinach)	Yes	66 (97.1%)	321 (95.0%)	361(95.3%)	0.759
	No	2 (2.9%)	17 (5.0%)	18 (4.7%)	
Fish	Yes	51 (76.1%)	253 (76.7%)	298(80.8%)	0.398
	No	16 (23.9%)	77 (23.3%)	71 (19.2%)	
Seeds (chia and flaxseed)	Yes	34 (55.7%)	166 (54.4%)	204(56.7%)	0.845
	No	27 (44.3%)	139 (45.6%)	156(43.3%)	
Nuts	Yes	40 (65.6%)	213 (69.4%)	241(68.9%)	0.842
	No	21 (34.4%)	94 (30.6%)	109(31.3%)	

Pearson's Chi-square test; Significant value = $p \leq 0.05$.

The results of Table 5 do not indicate a significant difference in the consumption of Omega 3 source foods based on Body Mass Index (BMI).

DISCUSSION

Omega 3 fatty acids are associated with preventing or reducing the severity of a multitude of diseases, from metabolic diseases such as heart disease, diabetes and kidney disease, neurodegenerative diseases, such as Alzheimer's disease, and inflammatory diseases, including osteoarthritis. Omega 3 acts by attenuating the development of atherosclerosis or arterial plaques, reducing concentrations of inflammation-signaling molecules[1,5].

Western diets, due to the disproportionate and high consumption of saturated fatty acids among a large part of the population, derived from foods of animal origin, contain fewer omega 3 fatty acids, a factor that increases the risk of type 2 diabetes and cardiovascular diseases[7,20,21]. Omega 3 fatty acids are found in greater quantities in the diet of the Mediterranean population, including older adults, as they are found in natural foods, such as nuts, flax seeds, chia and salmon.

Table 1 of the present study shows that men consume fewer seeds than women, possibly influenced by different eating habits. Consequently, it is women who have healthier diets, because, in most cases, they have the responsibility of taking care of their family's diet, whether buying, choosing or preparing food[22], thereby consuming more seeds, such as those that are sources of omega 3, identified in this study, which bring more health benefits. For this reason, in addition to caring more for their health and carrying out periodic examinations more frequently, women aspire to a greater life expectancy[23] and generally participate more in social groups[24].

Flaxseed is a seed rich in omega 3 and has been studied for its benefits in reducing the risk of chronic diseases and its antioxidant, anticancer and hyperglycemic agents, and also due to its effect on estrogen levels, blocking the enzymes active in hormonal metabolism, in order to interfere with the growth of tumor cells[25]. Flaxseed is the most abundant plant source of omega 3 and has been associated with health, the prevention and treatment of heart disease, arthritis, inflammatory and autoimmune diseases and cancer[25].

The data in Table 2 shows that there were no significant differences in the consumption of Omega 3 source foods based on age group. However, the results, according to Table 3, reveal that there is a significant difference in the consumption of fish (p=0.014) and nuts (p=0.004) by income, demonstrating the participants with income greater than or equal to R$1,576.00 consume more Omega 3 source foods.

According to Borges et al.[26], the consumption of food by Brazilian families is influenced by income and prices. This was confirmed by the record of food purchases provided by the Family Budget Survey (POF 2008/2009), which identified that the health status of individuals is directly related to the inadequate quality of their diet and is directly influenced by social class, as the results found that the quality of health of people belonging to the highest social class is superior to that of the lower classes.

The study by Coelho, Aguiar and Fernandes[27] assessed the impossibility of the lower social class of the population maintaining an adequate diet, following national proposals, such as the Food Guide for the Brazilian Population. Low-income families purchase less healthy foods, such as whole grains, skimmed milk and by-products, lean meats, fruits, vegetables, fish and nuts.

Fish and nuts contain notable amounts of omega 3 fatty acids and can provide a preventive action against the incidence of many diseases, including cardiovascular illnesses[28]. The American Heart Association suggests the consumption of 226.8g of fish twice a week[29]. The study by Rohrmann and Faeh[28] found that people who eat nuts more than three times a week can prevent premature deaths from cardiovascular disease and cancer in comparison with non-consumers.

The study by Darmon et al.[30], the objective of which was to explore the relationship between income and healthy eating and the impact of healthy food pricing policies on the expenditure on and nutritional quality of foods chosen by low- and middle-income women, showed that the amount of unhealthy products purchased by the low-income group was twice that of those purchased by women in the middle-income group. As such, low-income women had diets of low nutritional quality, compared to middle-income women who purchased food products with protective characteristics to the body, generating more health among their families.

As such, the regular consumption of omega 3 fatty acids contributes to a healthier diet and better quality of life, protecting older adults from cardiovascular, inflammatory and chronic diseases, fighting cancer, obesity and improving bone health, as it strengthens the brain metabolism[28,30].

The limitations of the present study revolve around the need to undertake more detailed analyzes to expand the discussion, verifying the relationships between the consumption of Omega 3 source foods and the socio-demographic and nutritional profile of older adults participating in other social groups, showing that the consumption of these source foods generates a healthier nutritional status.

CONCLUSION

In accordance with the purpose of the study, the results showed that older women consume more Omega 3 source foods than men. One of the justifications for this is that, culturally, women were responsible for taking care of their family's food and, consequently, became aware of the importance of consuming healthier products, such as oils, dark green vegetables, seeds, fish and nuts. Regular consumption of these products, which are rich in omega 3, generates a better quality of life for the general population and especially for older adults. In addition, it was found that people with greater purchasing power consume more expensive sources of omega 3 fatty acid and that the consumption of Omega 3 source foods did not differ significantly in relation to age, BMI, marital status and whether the individual lived alone or with others.

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Prevalent skin and dermatoses care in older adults treated at a private clinic and its relationship with comorbidities

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Abstract

Objectives: To identify and assess the prevalence of skin changes in the older adults surveyed, as well as to detect skin phototype according to the Fitzpatrick classification and to assess whether there was an association between the changes identified and predisposing factors (smoking, diabetes *mellitus* and hypertension). Additionally, evaluate the level of knowledge of the subjects regarding skin care. *Method:* A cross-sectional study was conducted in April to August 2018, based on a convenience sample of 80 older adults attending a private clinic. A questionnaire was applied among the subjects to identify their skin care and an answer sheet was completed by the researcher with information about the physical examination of the skin. Data were analyzed by the chi square or Fisher's exact method. Poisson regression was used to determine the independent effect of the exploratory variables on the response variable. *Results:* The sampled population had a low level of education and was low-income and did not take proper care of their skin, while 70% were skin phototype 4. Most (73%) were aware of what skin cancer is and a significant portion 50% did not use sunscreen or moisturizer. There was no significant difference between the sexes ($p>0.05$). About half of the older adults reported having been instructed about skin care. Seventy two percent knew about the dangers of sun exposure. The most common skin alteration was melanosis and an association was found between diabetes and keratosis. *Conclusions:* The study population was low income, with a low level of education. They were exposed to the sun and did not make proper use of sunscreen or moisturizers, but sought health information from their doctor and knew what skin cancer was.

Keywords: Aging. Skin Aging. Skin Diseases. Diabetes Mellitus.

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INTRODUCTION

Many studies have sought to address population aging from different perspectives, however, skin aging, considered from the point of view of older adults themselves, has still not been addressed[1].

Skin aging is a complex and multifactorial phenomenon. There is no single explanation for this process and many aspects remain unknown[2]. Its complexity is due to the structure of the skin itself, which is composed of the epidermis, dermis, extracellular matrix, vascular structures and skin annexes[2]. At 65 years of age, the dermis loses structure, becoming flat, and there is a decrease in cell proliferation, leading to greater susceptibility to trauma and penetration by infectious agents[3].

The chronic diseases that affect older adults, especially diabetes, can predispose them to lesions[4], however, they also have to deal with many other skin disorders such as purpura and senile melanosis, many of which are confused with diseases.

In view of all the physiological changes of aging[5] which affect about 40% of this population and contribute to the occurrence of lesions on the skin of older adults, such as dryness, itching, calluses, vesicles, blisters, ulcers, benign and malignant tumors, it is important that this population is aware of the care required to prevent skin diseases[6] such as melanomas, carcinomas and senile keratosis.

The aim of the present study was to identify and assess the prevalence of skin disorders in the older adults surveyed, as well as to detect skin phototype according to the Fitzpatrick classification and to assess whether there was an association between the disorders exhibited and predisposing factors (smoking, diabetes *mellitus* and arterial hypertension). The level of knowledge of the older adults in relation to skin care was also assessed.

METHOD

An observational, cross-sectional, descriptive and analytical study was carried out. Cross-sectional studies are useful to describe variables and their distribution patterns and allow the prevalence of a phenomenon of interest to be identified, complying with the objectives of this research.

The study was carried out from April to June 2018 in a clinic located in the west of Greater São Paulo, Brazil, a region with a subtropical climate. The clinic is multi-specialty in nature and serves health plan users. The population attending the clinic is heterogeneous, taken from all socioeconomic levels, with dermatology care carried out under authorization from the patient's medical insurance provider.

The sample consisted of 80 older adults attending the clinic. This number was reached in the proposed period of data collection (April to June 2018).

To calculate the sample size, the public domain program OpenEpi, version 3.01[7] was used. The calculation was based on a study involving 75 institutionalized older adults, where a high prevalence (98%) of injuries related to cutaneous senescence was observed[8]. Since almost half of the patients (48%) in the aforementioned study were aged 80 years or older, a prevalence of 32% for the present study was estimated.

The older adults were recruited and preliminary detailed information regarding the protocol was given to the participants before the beginning of the study. All signed an Informed Consent Form in accordance with Resolution No. 466/2012 and Resolution No. 510/2016, under ethics committee opinion number 2,583,019.

The inclusion criteria were older adults over 60 years old. The exclusion criteria adopted were illiteracy and dementia and psychiatric conditions, due to the difficulty of responding to the study by clinical diagnosis.

A semi-structured questionnaire was used to outline the profile and knowledge of the older adults in relation to skin aging.

A patient care form was also filled out, consisting of two multiple-choice items, one to define the patient's skin phototype and the other with the skin disorders found[9]. The skin diseases found were properly handled and the older adults were

also instructed on their clinical condition and care. The older adults were assessed using the Fitzpatrick classification, according to the reaction of the skin to sun exposure[9]. This classification was created by a dermatologist to classify skin types according to their behavior in relation to sun exposure, with the higher the phototype (4 and 5) the more tanned the skin when it is exposed to the sun.

The data collected were socio-demographic in nature, namely: age, sex, city of birth, city in which older adult resides, income, type of income (salaried or pension) and level of education. Data regarding previous health were also obtained, namely: current diseases and current or previous smoker (one of the main factors of extrinsic skin aging).

The categorical variables were summarized by means of absolute and relative frequencies and the continuous variables through medians and interquartile range (IQR), after verifying the absence of normal distribution by the Shapiro-Wilk test, which makes it impossible to use means due to the asymmetry of the data.

The Chi-square test or Fisher's exact test were used to assess the existence of statistical differences between the categorical variables and the prevalence ratio (PR) was used as a measure of the strength of this association. To determine the independent effect of the exploratory variables on the response variable, Poisson regression with robust variance was used to adjust the covariates. The variables selected for this model had a value of $p<0.20$ in the bivariate analysis or biological plausibility.

For Poisson regression, the amount of skin disorders identified in the older adults evaluated was dichotomized in *up to two* and *three or more* and was considered as an outcome in the bivariate and multivariate analyzes. The variable *sun exposure* was dichotomized as *yes/no*. Those who answered *yes* were asked about the time of exposure, with the answer options being *in the morning before 10am*, *after 10am and before noon*, *between 1pm and 4pm* and *after 4pm* and *no* when the option selected was *I don't expose myself to the sun*. The question *use of sunscreen* was dichotomized as *yes/no*. Those who answered yes were asked about frequency, with the options being *always use* and *sometimes use* and *no* when the answer was *don't use*. The skin hydration variable was dichotomized as *yes/no*. Those who answered *yes* were asked about frequency, with the options being *daily* and *rarely/sometimes* and *no* when the answer was *I don't usually use it*. The variable *given information on skin cancer in the last 6 months* was dichotomized as *yes/no*. Those who answered *yes* were asked from which source, with the options being *television, newspapers and magazines, medical consultation, family* or *health clinic campaign* and *no* when the answer was *I did not have access to information*.

RESULTS

The most prevalent comorbidity was systemic arterial hypertension which affected 57 older adults (71.25%). Only 11 individuals had diabetes (13.75%).

Only two (3%) older adults admitted that they smoked, while 13 (15%) said they were ex-smokers and 65 (82%) reported that they had never smoked.

Regarding guidelines on skin care, 42 (52.5%) older adults reported having received such guidance, while 38 (47.5%) reported not having received such instructions. It was observed that 58 (72.5%) study participants were aware of the dangers of being exposed to solar radiation and only 22 (27.5%) were unaware. It was also observed that just over half of the studied population, 43 older adults (53.8%), had been exposed to the sun, while 37 (46.2%) had not been exposed. Regarding the use of sunscreen, 43 (53.75%) used it, while 37 (46.25%) reported not using it. In the sample, 59 (73.75%) of the older adults reported knowing what skin cancer was and, 21 (26.25%) said they did not know. Regarding the Fitzpatrick classification, 56 (70%) of the study participants had skin phototype 4. Regarding skin hydration, in the total sample, 46 (47.5%) reported using some type of moisturizer while 34 (42.5%) did not use one.

After physical examination of the skin, the main skin pathologies found in the sample were also assessed, as shown in Table 1.

The factors associated with the number of skin disorders in the older adults were assessed by bivariate analysis as shown in table 2.

Table 1. Main skin pathologies in older adults (N=80). Jandira, Sao Paulo, 2018.

Disease/Disorder	Male N (%)	Female N (%)	*p value	Total N (%)
Xerosis	28 (70)	19 (47.5)	0.07	47 (58.75)
Melanosis	39 (97.5)	33 (82.5)	0.06	72 (90)
Spinocellular carcinoma	01 (2.5)	0 (0)	1	01 (1.25)
Purpura	07 (17.5)	09 (22.5)	0.78	16 (20)
Actinic keratosis	03 (7.5)	07 (17.5)	0.31	10 (12.5)
Seborrheic keratosis	03 (7.5)	07 (17.5)	0.31	10 (12.5)
Onychomycosis	11 (27.5)	07 (17.5)	0.42	18 (22.5)
Tinea	05 (12.5)	01 (2.5)	0.2	06 (7.5)
Acrochordon	03 (7.5)	01 (2.5)	0.62	04 (5)
Common Wart	01 (2.5)	0 (0)	1	01 (1.25)
Bowenoid papulosis	0 (0)	03 (7.5)	0.24	03 (3.75)

* Fisher's Exact Test, $p<0.05$.

Table 2. Bivariate analysis of factors associated with the number of skin disorders in older adults with dermatoses treated in Jandira, Sao Paulo.

Characteristics	Skin disorders N(%)	Crude-PR (CI95%)	*p-value
Sex			
Male	40 (50)	1.93 (1.20-3.09)	0.004
Female	40 (50)	1.00	
Family income (minimum wage)			
Up to 2	79 (98.75)	1.00	
3 to 5	1 (1.25)	-	-
Education (years of study)			
1 to 4	74 (92.5)	1.00	
5 to 8	6 (7.5)	0.63 (0.20-2.00)	0.36
Received skin care guidance from a health professional			
Yes	42 (52.5)	0.86 (0.56-1.32)	0.49
No	38 (27.5)	1.00	
Health professional who provided guidance			
Doctor	41 (51.25)	-	-
Nurse	1 (1.25)	1.00	
Knows the dangers of exposing oneself to the sun			
Yes	58 (72.5)	0.66 (0.44-0.98)	0.06
No	22 (27.5)	1.00	

to be continued

Continuation of Table 2

Characteristics	Skin disorders N(%)	Crude-PR (CI95%)	*p-value
Exposure to the sun			
Yes	43 (53.75)	0.90 (0.59-1.38)	0.64
Before 10h	40 (50)		
Between 10h and 12h	1 (1.25)		
Between 13h and 16h	2 (2.5)		
After 16h	0 (0)		
No	37 (46.25)	1.00	
Uses sunscreen			
Yes	44 (55)	0.86 (0.56-1.31)	0.48
No	36 (45)	1.00	
Uses skin moisturizer			
Yes	46 (57.5)	0.70 (0.46-1.07)	0.10
No	34 (42.5)	1.00	
Used ointment, lotion or skin product without medical advice			
Yes	80 (100)	-	-
No	0 (0)	1.00	
Knows what skin cancer is			
Yes	59 (73.75)	0.86 (0.54-1.35)	0.53
No	21 (26.25)	1.00	
Had access to information about cancer in the last 6 months			
Yes	24 (30)	1.35 (0.88-2.04)	0.19
No	56 (70)	1.00	
Total number of comorbidities			
One	60 (75)	1.00	
Two or more	2 (2.5)	1.24 (0.79-1.93)	0.37
Systemic arterial hypertension			
Yes	55 (68.75)	1.10 (0.68-1.78)	0.69
No	25 (31.25)	1.00	
Diabetes *mellitus*			
Yes	11 (13.75)	1.76 (1.21-2.57)	0.03
No	69 (86.25)	1.00	
Thyroid disease			
Yes	8 (10)	0.71 (0.28-1.78)	0.41
No	72 (90)	1.00	
Phototype			
1-3	10 (12.5)	1.00	
4-5	70 (87.5)	1.02 (0.53-1.99)	0.93

* Chi-squared test. $p<0.05$.

There was no statistical association between diabetes and xerosis (p=0.18), melanosis (p=0.23), carcinoma (p=0.57), senile purpura (p=0.51), onychomycosis (p=0.28), tinea (p=0.82) or acrochordon (p=0.50), but there was an association with keratosis (PR, 2.21; 95% CI, 1.12-4.36; p=0.04).

There was no statistical association between smoking and xerosis (p=0.14), melanosis (p=0.63), carcinoma (p=0.75), senile purpura (p=0.47), keratosis (p=0, 66), onychomycosis (p=0.12), tinea (p=0.89) or acrochordon (p=0.10).

There was no statistical association between systemic arterial hypertension and xerosis (p=0.14), melanosis (p=0.22), carcinoma (p=0.56), senile purpura (p=0.54), keratosis (p=0.66), onychomycosis (p=0.11), tinea (p=0.89) or acrochordon (p=0.40).

DISCUSSION

Approximately half of the older population evaluated reported that they had never received guidance in relation to care methods for the prevention of skin diseases. Considering that everyone has had a medical appointment at least once in their lives, it is worrying that almost half of these older adults had not been educated about skin care, especially since most had some comorbidity that caused disorders in their skin.

According to the Fitzpatrick[10] classification, the older people evaluated in the present study had skin phototype 4, which represents a lower incidence of sunburn, injuries and skin cancer, as the darker the skin (the greater melanosome activity), the less sensitive it is, and the lower the risk of developing injuries.

The prevalence of smokers, whether current or previous, was low among the older adults in the present study. There is a consensus that smoking is one of the main extrinsic skin aging agents, with deteriorating elasticity, loss of collagen and the formation of free radicals[11].

Regarding exposure to the sun, most of the older adults said they were aware of the dangers arising from this exposure and of the skin care required. However, it is still worrying that 22% of the older adults in the sample were not aware of the dangers of being exposed to the sun, since solar radiation can cause burns, aging and predispose to skin cancer[12,13] which is common in this age group.

Among cancers, there is a greater predisposition for the development of basal cell carcinoma and squamous cell carcinoma in aging. These do not cause mortality, but alter quality of life, as the treatment of these lesions can be invasive and change the appearance of older adults[14-16]. Melanoma can cause higher mortality and although it can occur at any time in life, studies indicate that sun exposure at any time can increase its likelihood[14-17].

In addition, 46.25% of the older adults said they did not use sunscreen, one of the ways to care for the skin and protect from exposure. The fact that 26.25% of the older adults did not know what skin cancer is can justify the lack of care in relation to protection from the sun, because, in general, people are more engaged in preventive attitudes if they know about the damage and/or risks[18]. Sun exposure also causes other changes such as, for example, solar elastosis[3] which translates into increased fragmentation and porosity of the elastic fibers in the dermis[19,20].

In relation to skin hydration, it was observed that almost half of the evaluated population (42.5%) did not use any type of moisturizer, which is worrying, as hydration is an important form of skin care for older adults, who may be more xerotic[21].

The presence of melanosis was relatively prevalent in both sexes. Dermatological literature points to the high prevalence of this disorder in older adults, as it represents the translation of the accumulation of sun exposure throughout life[5,10,22-28]. It is not a malignant or pre-malignant lesion, but causes aesthetic discomfort for many older people.

The presence of xerosis was observed in almost 60% of the older adults, and was higher in males, which goes against previous studies that found an incidence of 39.8%[4] and 58.6%[29]. The study by Jindal et al.[28] in India points to a lower prevalence of age-related skin disorders when considering xerosis, senile purpura and solar melanosis in older adults, probably due to the higher prevalent phototype of the specific population studied.

Most older people had only one comorbidity, with hypertension being the most frequent, corroborating previous studies[4,29-31], followed by diabetes, thyroid disease and smoking. The most prevalent phototype was type 4 and the majority had three or more skin disorders, the most prevalent being melanosis, followed by xerosis, keratosis, onychomycosis, senile purpura, tinea, acrochordon and carcinomas.

Medical literature describes how diabetes can worsen skin quality and predispose the individual to the appearance of ulcers and other lesions[4]. In the present study, an association was observed between diabetes and keratosis.

Arterial hypertension was the most prevalent comorbidity, with 29 older men and 26 older women presenting the disease. In relation to other comorbidities, women suffer from this condition more. Studies show that hypertension may be related to skin disorders[24]. However, in the present study, no association was found between this comorbidity and skin diseases. An association was observed between diabetes and keratosis. Medical literature describes how diabetes can worsen skin quality and predispose the individual to the appearance of ulcers and other lesions.

In the present study, the prevalence of skin disorders relating to the natural aging process (xerosis, purple and melanosis) was higher than the prevalence of comorbidities, despite the exposure of the older adults to the sun until 10 am. However, sun exposure throughout life was not evaluated, which may corroborate the prevalence of benign skin changes also associated with the use of moisturizers.

Furthermore, the results of the present study suggest the need for better guidance in relation to skin care by health professionals, as a considerable portion of the older adults in the sample were not provided with this type of information and, when they were received it from a dermatologist, or in other words, the focal specialist. Thus, further studies are needed that relate comorbidities to skin disorders in older adults so that a preventive plan can be implemented to minimize possible damage caused by excessive exposure to the sun and improve the quality of life of this population.

The limitations of the present study refer mainly to the absence of a history of sun exposure and skin care throughout the life of the studied population, since skin continuously exposed to ultraviolet radiation can exhibit cumulative damage that leads to the appearance of benign skin disorders.

CONCLUSION

Assessing the skin care of the older adults in the sample, it was concluded that, in general, both men and women were unaware of the dangers of exposing themselves to the sun and did not use sunscreen or moisturizers, habits that are part of the basic skin care in this age group.

The study population is in general low income and has low levels of education, living mostly in the municipality where the clinic is located, and the most prevalent skin phototype was type 4.

The most prevalent dermatoses in the sample were melanosis, xerosis, purpura, keratosis and onychomycosis. These are common, benign dermatoses associated with the natural aging process, although solar melanosis can be avoided with proper use of sun protection.

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