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ABEC

Sumário / Contents

EDITORIAL

ORIGINAL ARTICLES

Sumário / Contents

The regular performance of physical activity and the social involvement of elderly persons

Population aging is the most visible sign of the overall improvement in quality of life and is a phenomenon that should be both celebrated and accompanied by interventions that ensure the integration of the elderly into society. Initiatives that seek to preserve the quality, meaning and right to life of individuals at advanced ages are needed to ensure that the increase in life expectancy concomitantly results in efforts to fill these extra years with a sense of self-fulfillment and purpose. Considering population aging as an opportunity to be grasped rather than a problem to be solved, there is a degree of consensus that policies and initiatives focused on the material and spiritual development of this age group should be encouraged.

Based on this premise, in the 1980s the United Nations introduced the International Plan of Action On Aging, a broad set of principles and strategies that emphasize the need to promote successful aging. The recommendations contained in the plan were subsequently confirmed with the publication of the UN Principles for Older Persons. The 18 principles proposed are grouped around five key guidelines for the status of the elderly in society: a) independence; b) participation; c) care; d) self-realization; e) dignity. They aim to improve old age as the result of a continuous process, or in other words, by viewing it as a continuation of life rather than an end, and emphasizing the social dimension of aging.

The UN International Plan made it clear that one of the main methods of achieving these aims is by allowing older persons to maintain their ability to participate in society, increasing their potential to satisfy their personal ambitions. Concepts such as 'hope for an active lifestyle' or 'successful aging' illustrate the need to allocate elderly people an important role in the heart of their communities. The integration of the elderly person is, in turn, closely linked to their ability to accomplish their objectives and personal aspirations. Considering the multidisciplinary nature of these issues, it is no surprise that they have attracted attention in several areas of knowledge.

One proposed strategy that has undergone rapid growth is the study of the alterations to physical and cognitive performance capacity that come with age, as these are viewed as important components of maintaining autonomy. In addition, there are an increasing number of investigations on how such skills can be preserved by adopting active lifestyles in general, and the practice of physical exercise in particular. There is considerable evidence that a physically active life can contribute to an improvement in physical, mental and social functioning during aging.

It is believed that the major challenge with regard to the future of programs aimed at promoting the health of the elderly population is not to continue to increase life expectancy, but to improve quality of life. This assumes the preservation of the ability to perform daily activities over the years; and therefore maintain the social involvement of the elderly, something to which physical activity can obviously contribute.

Despite the widespread acceptance of this opinion, however, it must be recognized that the access of elderly persons to physical activities remains limited. Simple consensus on the beneficial effects of physical activity is not enough to increase the participation of older people in such activities, and the prevalence of physical inactivity among individuals over 60 years of age is both evident and disturbing. Investment to identify, analyze and tackle the obstacles that prevent the involvement of the elderly in physical activity is therefore required. A greater understanding of these issues will enable the development of effective public policies aimed at continuing education, social support, information and marketing strategies and, of course, increase opportunities of access and social involvement for elderly persons through physical activity.

Little information is available in Brazil about the involvement of the elderly in regular physical activities, whether targeted or spontaneous. A cursory examination of available studies also reveals that such information is localized in small areas of the country, and presents conflicting results regarding the possible prevalence of physical activities for the elderly. However, the few studies that exist put the physical inactivity levels of the Brazilian elderly population at an alarming 80-90%.

In addition, it appears that information in literature regarding the effectiveness of national strategies to provide opportunities of spontaneous or supervised physical activities for the elderly is lacking. The data regarding the modalities of activities and the characteristics of physical activity programs in different regions of the country are, frankly, insufficient for the rational planning of what can be described as policies for the promotion of physical activity among this population. Studies focusing on the theme are therefore welcome and necessary.

In summary, there is much to be done in terms of public policies that allow, in the medium and long term, the involvement of Brazilian elderly persons in regular physical activity. Researchers who approach this theme can contribute to this task by producing studies that lead to a better understanding of the current status of the problem, and the development of strategies that are effective in terms of adhesion to physical activities and the impact on the functionality and quality of life of elderly persons with diverse clinical, social, economic and cultural characteristics.

Let's get to work!

Paulo Farinatti, Vice-Director
UnATi-UERJ

Comparative Study of the Oral Health Profile of Institutionalized Elderly Persons in Brazil and Barcelona, Spain

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Abstract

Objective: To compare the oral health profile of institutionalized elderly persons in Brazil and in Barcelona, Spain, by gender and country of residence. *Methods:* A cross-sectional study was performed of individuals aged 65 years and above (n=1,440), resident in the health region of Barcelona and in Brazil. Two surveys and exams relating to the oral health status of institutionalized elderly persons in Brazil (in 2008) and in Barcelona, Spain (in 2009) were carried out. Periodontal disease, tooth loss and dental caries were analyzed, considering age and cognitive ability. The sample was stratified by gender and country. Bivariate and multivariate Robust Poisson Regression models were used to obtain adjusted Prevalence Ratios (aPR), and a 95% confidence interval (95%CI) was employed. *Results:* In Barcelona, men and women had a higher prevalence of periodontal illness: Men - calculus (aPR:1.5; CI:1.08-2.19) and pocket (aPR:2.05; CI:1.43-2.93) results. Women - calculus (aPR:2.4; CI:1.77-3.24) and pocket (aPR:3.2; CI:2.29-4.53) results. In Barcelona there was a lower prevalence of edentulism (aPR:0.49; CI:0.37-0.65) and functional edentulism (aPR:0.49; CI:0.40-0.60) among men. The same results were found among women with a lower prevalence of edentulism (aPR:0.49; CI: 0.41-0.58) and functional edentulism (aPR:0.42; CI: 0.30-0.49). *Conclusions:* A poor state of oral health of men and women was observed in both countries, with the elderly from Barcelona having worse periodontal health and the elderly from Brazil having greater tooth loss.

Keywords: Older People. Oral Health. Health of Institutionalized Elderly.

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INTRODUCTION

The global population of elderly people will grow in coming years, particularly in developing countries. In Brazil, the population aged 65% and over will reach forty eight million by 2050, representing 22.7% of the population.[1] In Europe, the growth of the population of older people has occurred gradually. Some population projections show that the elderly population in Spain will reach 28% of the population by 2040.[2]

Due to the aging population, health authorities throughout the world are facing growing demand for improved health care, including with regard to health problems caused by oral disease.[3] Therefore, improvement of the oral health of older people has become a priority for the Global Oral Health Program of the WHO (World Health Organization).[4]

Both oral health and oral healthcare vary between countries and between regions of the same country.[5] In Spain, where the National Health Service provides universal healthcare, dental services exclude restoration and focus on extraction and revision.[6] In the Autonomous Region of Catalonia, whose capital is the city of Barcelona, dental programs emphasize the child population and people with disabilities (only groups to have access to restorative procedures) and the actions of fluoridated mouthwashes are reduced to primary schools.[7] In this context, the elderly population is jettisoned public dental care.

The Brazilian National Health Service provides basic level, specialized, universal health care to the population. However, only 37% of the population has access to this service.[8] Regarding elderly Brazilians, it was observed that among the dentate, the use of dental services was 26.6% and among edentulous, 10.4%, indicating that the use of dental services was lower among those who needed them most.[9] In order to broaden the inclusion of oral health in the SUS, was launched in 2004, the National Oral Health Policy (PNSB) - "Smiling Brazil".[10] Although among its assumptions are the qualification of primary health care and ensuring the integrity of the shares, the same as in Spain, the political "Smiling Brazil", also not intended oral health practices specific to the elderly. These facts bring consequences for oral health of this population group.

The physical and social effects of poor oral health in older people has been observed, such as decreased chewing performance, limited food choice, weight loss, malnutrition, communication problems, low self-esteem and well-being, and a negative manner of interacting with ordinary life.[3,11] Aesthetics dissatisfaction is directly linked to the absence of teeth and is essential to trigger negative feelings of self-esteem among individuals, taking effect on social relations.[12]

With respect to institutionalized older people, literature shows that geriatric syndromes are associated with the risk of admission to long-stay institutions.[13] Therefore, institutionalized older people represent the most vulnerable group due to their increased frailty, having a worse state of health than non-institutionalized older people. This situation is made worse by the lack of health care in the institutions.[14] A number of health studies have shown how the oral health of institutionalized older people is characterized by high tooth loss, lack of regular preventative care for specific oral problems, and lack of dental treatment.[15-17] In this context, the availability of data regarding the oral health status of institutionalized older people from different countries is essential for monitoring oral health,[4] in addition to indicating specific actions aimed at improving the quality of life of these people. Therefore, the aim of this study was to compare the oral health profile of elderly people aged 65 and older, living in long-stay institutions in Brazil and Barcelona, Spain, in 2008 and 2009, respectively, according to gender and country residence with the purpose of understanding the different realities.

METHODS

They were followed the criteria established by Strobe in the preparation of this manuscript. This study does not intend to compare the data on a national basis but compare the realities within the long-stay institutions for the elderly in both countries.

A cross-sectional study of institutionalized older people aged 65 years and above in the health regions of Barcelona, Spain and Brazil in 2009 and 2008, respectively, was performed. Data was taken from two surveys and a clinical examination of the oral health conditions of the individuals. The design of these surveys has been previously described[18-20] however, a summary is provided below.

The selection of sample survey of seniors from Brazilian long-stay institution, in 2008, was based on the population of elderly people living in public and private institutions of eleven municipalities of medium and large population size, chosen randomly and belonging to each of the five geographical regions. The cities of each region were randomly selected from the following criteria: 1) municipalities with more than 100,000 inhabitants with a population greater than or equal the median age found in each geographical region; 2) institutions legally registered. A total of 1,412 individuals were selected of which 1,192 (84.4%) participated in the survey. Individuals younger than 65 years were excluded from the present study. The total number of Brazilian older people included was 1,018.

In 2009, in the Barcelona health region in Spain, there were 1,300 people aged 65 or more with a residential profile (i.e. waiting to be moved to one of the 46 public or subsidized long-stay centers). Of these, two centers declined to participate in the study. The convenience sample included people aged 65 and over in 25 long-stay centers which could be accessed during fieldwork. A total of 422 people were included.[20]

Finally, the population included in the study was 1,440 people aged 65 years or above.

The study undertaken in Brazil was approved by the Ethics Research Committee of the Federal University of Rio Grande do Norte (protocol no. 0033.0.051.000-06). The study performed in Barcelona, Spain, was approved by the Clinical Ethics Committee of the Instituto Municipal d'Assistència Sanitària (Barcelona, Spain) (IMAS) (protocol no. 2008/3666/I).

The oral examinations of the individuals included in the study were performed in accordance with WHO methodology.[21]

In Brazil, data collection was performed by five calibrated dentists with Kappa values of between 0.71 and 0.89. In Barcelona, Spain, a single dentist performed data collection with intra-examiner Kappa values between 0.85 and 1.00.

The dependent variables were: 1) Use of upper denture (use of some form of denture in the upper arch - yes/no); 2) use of lower denture (use of some form of denture in the lower arch - yes/no); 3) necessity of upper denture (necessity of some form of denture in the upper arch - yes/no); 4), necessity of lower denture (necessity of some type of denture in the lower arch -yes/no); 5) edentulism (total absence of natural teeth - yes/no): 6) functional edentulism (existence of less than twenty teeth - yes/no); 7) Community Periodontal Index (CPI) categorized as: CPI calculus (sextant of the mouth whose worst condition was the presence of calculus for each individual -yes/no), CPI pocket (sextant of mouth whose worst periodontal condition was the presence of surface or deep pockets for each individual –yes/no), CPI Excluded Sextant (older people with all sextants excluded).[18] The CPI was not characterized as a bleeding on probing CPI because of the low number for this category.

The independent variables were: 1) age: as a continuous variable in years, 2) cognitive capacity: appropriate cognitive conditions, according to medical diagnosis - yes/no.[19,20]

Descriptive analysis of all variables was performed. Bivariate and multivariate Poisson Robust Regression models were used to obtain crude Prevalence Ratios (cPR) and adjusted Prevalence Ratios (aPR) and their respective 95% Confidence Intervals (95%CI). In the multivariate model, all the variables with $p<0.05$ in bivariate analysis were included in the regression model, like other conceptually plausible variables.[20] Therefore the adjustment variables were age and cognitive capacity.

RESULTS

There were more women than men in the surveys from both countries 57.3% in Brazil and 68% in Barcelona, Spain. The mean age of older people in Barcelona was older than that in Brazil (Table 2). In terms of oral health, there was more damage caused by caries among participants in Brazil, where median values for DMFT, number of teeth lost, edentulism and functional edentulism were significantly higher than Spain. With respect to oral health rehabilitation, elderly individuals in Brazil used more upper dentures and had more necessity for lower dentures than elderly individuals in Barcelona, Spain. Periodontal disease was more prevalent among elderly individuals in Barcelona, Spain (Table 1).

In the multivariate model (Table 3), it was observed that men from Barcelona, Spain had a higher prevalence of dental calculus and periodontal pockets and lower prevalence of partial and total tooth loss than men in Brazil. Women in Barcelona, Spain had a higher prevalence of necessity for upper dentures, presence of dental calculus and periodontal pockets and lower prevalence of use of upper, partial tooth loss and total tooth loss than women in Brazil.

Table 1. Description of the oral health characteristics by categorical variables of institutionalized individuals aged 65 years or older stratified for sex and country of residence. Brazil, 2008; Barcelona, Spain, 2009.

		Sex									
		Men					Women				
		Country					Country				
Categorical Variables		Brazil		Barcelona			Brazil		Barcelona		
		n	%	n	%	p*	N	%	n	%	p*
Use of Upper Dentures	no	315	71.8	102	76.7	0.262	305	51.8	177	64.6	<0.001
	yes	124	28.2	31	23.3		284	48.2	97	35.4	
Use of Lower Dentures	no	371	84.5	109	82.0	0.482	427	72.5	208	75.9	0.289
	yes	68	15.5	24	18.0		162	27.5	66	24.1	
Necessity of Upper Dentures	no	124	28.2	36	27.5	0.864	279	47.4	98	36.6	0.003
	yes	315	71.8	95	72.5		310	52.6	170	63.4	
Necessity of Lower Dentures	no	73	16.6	32	24.6	0.039	159	27.0	80	29.9	0.387
	yes	366	83.4	98	75.4		430	73.0	188	70.1	
Edentulism	no	202	46.0	96	72.2	<0.001	41	7.0	173	62.0	<0.001
	yes	237	54.0	37	27.8		548	66.2	106	33.3	
Functional Edentulism	no	69	15.7	78	58.6	<0.001	41	7.0	173	62.0	<0.001
	yes	370	84.3	55	41.4		548	93.0	106	38.0	
Calculus CPI	no	362	82.5	98	73.7	0.025	519	88.1	206	73.8	<0.001
	yes	77	17.5	35	26.3		70	11.9	73	26.2	
Pocket CPI	no	376	85.6	97	72.9	0.001	540	91.7	205	73.5	<0.001
	yes	63	14.4	36	27.1		49	8.3	74	26.5	
Excluded Sextant CPI	no	161	36.7	76	57.1	<0.001	138	23.4	158	56.6	<0.001
	yes	278	63.3	57	42.9		451	76.6	121	43.4	
Cognitive Capacity	no	210	47.8	76	57.1	0.060	325	55.2	145	51.2	0.274
	yes	229	52.2	57	42.9		264	44.8	138	48.8	<0.001

*Chi-square test with 95% level of significance

Table 2. Description of the oral health characteristics and age by quantitative variables of institutionalized individuals aged 65 years or older stratified for sex and country of residence. Brazil, 2008; Barcelona, Spain, 2009.

	Men						
	Brazil			Barcelona			
Quantitative Variables	n	Median	P 25-P75	n	Median	P 25-P75	p*
DMFT Index	439	32	27-32	133	24	11-32	<0.001
Number of teeth with caries	439	0	0-2	133	1	0-4	0.001
Number of filled teeth	439	0	0-0	133	0	0-0	0.423
Number of missing teeth	439	32	24-32	133	27	20-32	0.001
Number of teeth present	439	0	0-8	133	8	0-20	<0.001
Age of Individual	439	77	71-83	132	81	73-82	0.006
	Women						
	Brazil			Barcelona			
Quantitative Variables	n	Median	P 25-P75	n	Median	P 25-P75	p*
DMFT Index	589	32	31-32	279	25	12-32	<0.001
Number of teeth with caries	589	0	0-0	279	0	0-4	<0.001
Number of filled teeth	589	0	0-0	279	0	0-0	0.569
Number of missing teeth	589	32	29-32	279	29	19-32	<0.001
Number of teeth present	589	0	0-3	279	7	0-20	<0.001
Age of Individual	589	79	73-85	278	83	76-87	<0.001

*Mann-Whitney test with 95% level of significance

Table 3. Prevalence Ratios of oral health conditions of institutionalized individuals aged 65 years or older according to sex in Brazil (2008) and Barcelona, Spain (2009).

	Men						
				Country (Reference Brazil)			
Variable Dependents	n	cPR*	95%CI	p	aPR†	95%CI	p
Use of Upper Dentures	571	0.825	0.586-1.162	0.271	0.860	0.615-1.202	0.377
Use of Lower Dentures	571	1.165	0.763-1.778	0.479	1.211	0.793-1.851	0.376
Necessity of Upper Dentures	569	1.011	0.896-1.140	0.863	0.996	0.883-1.124	0.952
Necessity of Lower Dentures	568	0.904	0.813-1.006	0.064	0.898	0.806-1.001	0.052
Edentulism	571	0.515	0.387-0.687	<0.001	0.490	0.366-0.655	<0.001
Functional Edentulism	571	0.491	0.399-0.603	<0.001	0.490	0.399-0.603	<0.001
Calculus CPI	571	1.500	1.058-2.128	0.023	1.541	1.084-2.191	0.016
Pocket CPI	571	1.886	1.315-2.705	0.001	2.050	1.435-2.930	<0.001
Excluded Sextant CPI	571	0.677	0.549-0.834	<0.001	0.653	0.530-0.805	<0.001
	Women						
				Country (Reference Brazil)			
Variable Dependents	n	cPR*	95%CI	*p*	aPR†	95%CI	*p*
Use of Upper Dentures	863	0.734	0.613-0.879	0.001	0.699	0.586-0.835	<0.001
Use of Lower Dentures	863	0.876	0.684-1.122	0.294	0.793	0.620-1.014	0.065
Necessity of Upper Dentures	857	1.025	1.070-1.357	0.002	1.237	1.101-1.390	<0.001
Necessity of Lower Dentures	857	0.961	0.876-1.054	0.397	0.989	0.903-1.084	0.814
Edentulism	868	0.503	0.422-0.600	<0.001	0.490	0.411-0.583	<0.001
Functional Edentulism	868	0.408	0.351-0.475	<0.001	0.419	0.300-0.487	<0.001
Calculus CPI	868	2.202	1.639-2.958	<0.001	2.396	1.774-3.236	<0.001
Pocket CPI	868	3.188	2.288-4.442	<0.001	3.220	2.288-4.531	<0.001
Excluded Sextant CPI	868	0.566	0.492-0.652	<0.001	0.554	0.482-0.638	<0.001

*Crude Prevalence Ratio †Prevalence Ration adjusted for age and cognitive capacity

DISCUSSION

The present study was the first to compare the oral health conditions of institutionalized individuals aged 65 years or older from Brazil and Barcelona, Spain. Brazil and Spain are countries with distinctly different aging patterns and dental care. In general, both male and female institutionalized older people in both countries have poor oral health conditions.

In both countries older men and older women had high levels of tooth loss. Institutionalization of older people is itself considered a risk factor for tooth loss,[17] however it should be noted that the oral health of this population is a consequence of damage accumulated throughout life[20] and reflects the model of dental health care adopted in both countries, which is characterized by limited access to dental care services and a fundamentally mutilative approach to dental care.[20,22]

Thus, it was verified that even tooth loss is a major public health problem in the countries investigated. This implies increased demand for oral health rehabilitation services for this population group. It was also observed that the highest prevalence of necessity of upper dentures is among women from Barcelona, Spain. This reveals the lack of rehabilitation among older women, which is also caused by the lack of public health policies aimed at the institutionalized population.

In the case of Brazil, the provision of dental health care is historically characterized by low complexity, mostly curative and mutilating, solutions of restricted access to the population. In the majority of municipalities, programs were conducted for school age children aged between 6-12 years, and pregnant women. Adults and the elderly only had access to emergency care units and mutilative treatment (23-26). This exclusive oral health care model existed in Brazil until 2004, when the country implemented the National Oral Health Policy entitled "Brazil Smiling" whereby individual and collective actions were implemented, aimed at the promotion, prevention, diagnosis, treatment and rehabilitation in primary and secondary levels of oral health care. [27]

Although there has been a gradual expansion of interventions in oral health policy, hegemonic models or private dentistry models focused on disease still prevail in Brazil.[24] In a case study on the implementation process of the National Oral Health Policy - "Smiling Brazil" - in the municipalities of the Regional Health Department of Araraquara, São Paulo, Brazil, it was observed that the municipalities still find it difficult to deploy assumptions of "Smiling Brazil" because it was observed the tendency of maintaining the model centered on disease due to large pent-up demand, the charges with the production of procedures and training technicalities and clinical.[25] It can therefore be stated that this new health policy has not had an effect on the older people in the present study, indicating the need for future studies to evaluate the impact of "Brazil Smiling" on this group.

In Spain, schoolchildren have the right to basic public dental care which is both preventative and restorative of permanent dentition, with restrictions. Each one of the 17 regions (Autonomous Communities) into which the country is divided, can provide these services in a different way, with public financing, and public and private delivery of the service.[28] This model of provision of dental care is focused on promotion and prevention of oral disease in infant population, and centered on oral disease, instead of prevention and promotion of oral health among other age groups, which can also lead to inequalities, as the provision of such services is privately financed and only available to those who can afford it. Thus, oral health in Spain is the only area that does not have full coverage by the National Health System. The dental care for adults remains only palliative and rehabilitation of lost teeth due to oral disease is not covered, even partially subsidized, the health system.[7]

According to the present study, institutionalized older people from Barcelona, Spain have a higher prevalence of periodontal disease than those in Brazil. Among women, the prevalence of presence of calculus is double, and the prevalence of periodontal pocket is triple, the prevalence of the same in Brazil. This is caused by a greater presence of permanent teeth in older individuals in Barcelona, Spain, as there is a higher prevalence

of edentulism and functional edentulism in Brazil. The presence of periodontal pockets can lead to infections, tooth mobility, cervical sensitivity and aesthetic changes, revealing the need for dental treatment for institutionalized older people and indicate a lack of oral care in long stay institutions for older people. Literature shows that carers do not provide adequate oral hygiene care for older residents, due to an absence of procedures, lack of knowledge of oral hygiene practices, and proper training.[14]

The present study has a number of limitations. It should be noted that the cross-sectional design does not allow analysis of the cause-effect relationship between the variables studied. Additionally, the limited number of explanatory variables common to both questionnaires justifies the absence of socioeconomic variables in the study. However, the dependent variables analyzed can explain the objective conditions of the oral health status of institutionalized older people in both countries. Other strength of the study is the comparison of the oral health status of institutionalized older people in two different social and economic environments, as well as of different dental care health systems.

CONCLUSION

The present study concludes that institutionalized older individuals aged 65 years and above resident in Brazil and Barcelona, Spain, had poor oral health, caused by a high prevalence of partial and total tooth loss in Brazil and periodontal disease in Barcelona. The results indicate that irrespective of the country studied, the oral health of institutionalized older people is vulnerable. Knowledge of this situation may assist with the reorientation of health policies aimed at this population, focused on the maintenance of oral health and improvements to quality of life.

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HIV/AIDS among the elderly: stigmas in healthcare work and training

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Abstract

The number of HIV/AIDs diagnoses among the elderly is currently increasing both in Brazil and on a global level. The present article describes the results of a qualitative study which aimed to assess the role of health professionals on elderly patients diagnosed with HIV/AIDS receiving treatment via the public health service. Nine professionals who made up a specialized HIV/AIDS service in a medium-sized city in the state of Minas Gerais were interviewed. Their statements were subjected to content analysis, and the results suggested that according to the perceptions of the health professionals, the main impacts of the diagnosis of HIV/AIDS are linked to isolation, loneliness, prejudice, fear of revealing the diagnosis and the decrease or interruption of sexual practices. The professionals reported being overburdened both psychologically and in terms of workload, having difficulty addressing aspects of sexuality and sexual practices with the elderly, and admitted to possessing certain stereotypes and prejudices related to HIV/AIDS and the sexuality of the elderly. Through results analysis, it was concluded that the stigma and prejudice related to HIV and the sexuality of the elderly are intimately present in the work processes of the professionals interviewed, impacting on the treatment of such individuals and interfering with their health and illness processes. The discussion of these aspects should be included in health training strategies.

Keywords: Aging. HIV. Social Stigma. Professional Training.

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INTRODUCTION

We live at a time when Human Immunodeficiency Virus (HIV) infections are increasing in Brazil[1] and around the world. According to an epidemiological study conducted by ATHENA, Holland will experience an increase in mean age from 43.9 to 56.6 years. It is estimated that the number of patients aged 50 years or more who are infected with HIV will increase from 28% in 2010 to 73% in 2030.[2] The number of AIDS cases among the elderly population in Brazil has skyrocketed in recent years. Between 1980 and 2001, the number of people aged 60 years or more who were diagnosed with AIDS was 5,410. Between 2002 and 2014, this figure was 17,861. These figures suggest that in a period of 21 years, there was a mean variation of 257.61 cases per year, whereas in the subsequent 12 years, this variation increased to 1488.41 cases per year (a variation of 577.77%).[3]

Brazil is a notable case in relation to population aging. Between 1950 and 2025, the number of elderly individuals is expected to have increased fifteen fold, when compared with data from the 1950s.[4] These alterations to the composition of the population represent a challenge for society in general, particularly for health professionals who deal with elderly individuals on a daily basis. These professionals seek to associate longevity with quality of life, while considering changes to economic, sanitary and social conditions, including sexuality as a right of the elderly. [5,6]

Throughout the history of humanity, sexuality and prejudice have been interconnected. The prejudice related to the sexuality of the elderly dates back to the repression that existed for centuries in society, at a time when sexual activity was only associated with reproduction.[7-9] Although the sexual performance of the elderly has benefited from scientific and technological advances, increased life expectancy and an improved quality of life, there is a growing concern about sexually transmitted infections (STIs) in this section of the population.[10,11] At the same time, stereotypes and prejudice linked to the myth of the asexuality of the elderly refuse to disappear. [5,7,8]

Among the stereotypes and transformations that accompany the aging process, there is now the possibility of a seropositive diagnosis for HIV. This virus must also be analyzed in terms of its potential for stigmatization[12], its effects on the identity of individuals, groups and social relationships, and the relevant repercussions that are specific to health-disease processes. The stigma is a social construct, born of the relationship between individuals and the social stereotypes that define (in a symbolic or concrete fashion) the boundaries of normality.[13] Going beyond the limits defined for what is considered socially normal can lead to discrimination, accompanied by accusations, isolation, rejection and the adoption of punitive and corrective measures, both on behalf of the so-called "normal" subjects and those who are being stigmatized. This stigma attributes an individual or group with a certain character that guides their entire network of personal relationships and when internalized, dominates their references to the self, their feelings and even their attitudes, generating guilt, shame, anger, confusion and a disorganized identity.[14,15]

Concerning HIV infection, a seropositive individual can be included in the stereotype of "AIDS-ridden" and may be classified in a wrongly-named risk group[14,15], with all the moral weight of this classification. In addition, when an elderly individual is diagnosed with HIV/AIDS, it is often very surprising, unexpected and difficult to accept, since it is contrary to certain stereotypes that are specifically linked to the elderly, particularly the notion of asexuality in this stage of life.

In terms of the specificities of health professionals who work with patients living with HIV/AIDS, literature suggests that these patients deal with the following issues: fear; uncertainty related to dealing with news that causes suffering and is irreversible; stigmas and prejudice related to HIV/AIDS that link the disease to drug addiction and socially questionable sexual habits; issues

related to suffering and social exclusion; and concerns about the finiteness of life.[16,17]

This situation challenges health professionals to undertake critical and reflective thinking about their patients on a daily basis. Thus, the present study could help clarify the complexity of providing health care services and the different aspects that affect the daily lives of these health workers, including the relationship between health practices and stereotypes about the disease and the sexuality of elderly individuals who live with HIV/AIDS. It is extremely important that these aspects are considered, both in terms of planning public policies that promote the health of the elderly, and in relation to permanent training and education strategies for the health sector.[18,19]

Therefore, the aim of the present study was to analyze (in general terms) the activity of health professionals who work with HIV-positive elderly individuals in the public health sector. More specifically, we sought to identify the perceptions of these professionals in relation to the impacts of this diagnosis, the specificities of their work, as well as the difficulties and challenges they face.

METHOD

Given the complexity, specificities and multi-disciplinary nature of the health sector, this was a qualitative, exploratory study.[20] All health professionals who were directly involved in dealing with elderly individuals at a public health unit that specialized in STIs in a medium-sized city in the Brazilian state of Minas Gerais were considered for this research. The municipality in question was the reference point for the 55 municipalities in the region. According to DATASUS records, the service monitored 726 patients with HIV/AIDS in 2012, of whom 40 patients were over 60 years of age (8.26% of the patients monitored).[21]

The present study focused on health professionals who make up the Serviço de Assistência Especializada (Specialized Care Service) (SEC) in the municipality, all of whom accepted the invitation to participate. Semi-structured interviews were conducted with all nine individuals (three men and six women), who worked in areas such as medicine, nursing, pharmacy, psychology and social care. Seven of these professionals were in a high-level position and the remaining two were in mid-level positions. Between February and October of 2012, individual semi-structured interviews were conducted and recorded. These were later transcribed and submitted to content analysis, following the thematic or categorical analysis protocols defined by Bardin.[22] During the analysis, the content was grouped based on prevalence in the comments made by the interviewees and the thematic proximity of the core feelings that emerged. The content of the comments analyzed was organized into three categories: 1) the perception of the health professionals about the impacts of a diagnosis of HIV/aids on the elderly individual; 2) care for seroconverted elderly individuals; 3) daily difficulties faced by health professionals in their work. The work of Goffman was adopted as the main theoretical analysis reference for the process of stigmatization and its impacts on the identity and socialization of the individuals in question. Other discussions that considered this reference when analyzing the impacts of the HIV/AIDS epidemic were also used.[13-15,19]

The present study was approved by the Research Ethics Committee of the Universidade Federal de (São João Del Rei Federal University) (Campus Centro-Oeste) under protocol number CEP-UFSJCCO 006/2011. All ethical issues were respected and the health professionals interviewed confirmed their willingness to participate by signing a free and informed consent form.

RESULT AND DISCUSSION

Before presenting and discussing each of the analysis categories, it is important to stress that the themes of stigmas and prejudice run through all of these. These themes were present in the perspective of socially-constructed stereotypes

about disease and the sexuality of the elderly. This often reflected prejudice on behalf of the elderly individuals about themselves and their new health condition, as well as the stigma and prejudice applied by health professionals in relation to HIV/AIDS and the sexuality of the elderly. Thus, it is possible to state that the link between aging and HIV/AIDS is a category that has shown its stigmatizing potential in two associated areas: the attributes that produce a discrediting effect in the subject and are linked to the illness; [19,23,24] and the incongruities that the diagnosis of HIV/AIDS presents in relation to the stereotypes linked to elderly individuals, particularly the notion that they are in a sexless phase of life.[7,8]

The results and discussions presented below follow the above mentioned analysis categories and address the specificities of the issue of stigmas and prejudice linked to aging with a diagnosis of HIV/aids.

The perception of health professionals about the impacts of a diagnosis of HIV/AIDS on the elderly individual

This category presents and discusses the perceptions of health professionals about the impacts of a diagnosis of HIV/AIDS on the elderly individuals, and is split into the following sub-categories: 1) changes in affective relationships with family members, friends and partners; 2) changes to their social life and sexual practices; 3) prejudice and its implications in terms of treatment.

In general, all of the health professionals interviewed claimed to notice some form of impact in relation to a diagnosis of HIV/AIDS on elderly individuals who kept in touch with the health service unit. The most commonly-mentioned impacts were: sadness; denial; loneliness; social isolation; distancing themselves from people, groups and daily activities; surprise, shame and embarrassment related to acquiring the virus at this stage of life; disbelief (about the diagnosis); and concern about possible prejudice they might face if people discovered the fact that they had been infected.

Health professionals from the fields of medicine, nursing, social services and psychology who treat elderly patients with HIV/AIDS requested that more attention be paid to the impact of the diagnosis on the patient and highlighted the need for multi-professional support, as highlighted in the following comments:

> *"It starts with sadness. Lots of them cry. Many others become introspective. Sometimes we have to (...) interrupt the appointment and ask for a psychologist to help, before starting the appointment again. Its sadness, and surprise. They are surprised as they never expected to get a positive result". Med. 2*

> *"They sit down, like this, and they feel worthless, like a piece of dirt. They feel like the world has ended and say that they will not live anymore". Serv. Social*

Therefore, they distance themselves from friends, neighbors and workmates in order to maintain the confidentiality of their health condition They are extremely frightened of being exposed to discrimination and prejudice.

Often, family members of patients will not accept the fact that the elderly individual is sexually active, which is confirmed by the diagnosis with HIV/AIDS. Many family members are surprised by the diagnosis or doubt its accuracy as they find it impossible to imagine the sexual transmission of the virus in this stage of life.

With the exception of one of the health professionals, who did not develop any strong bonds with patients and maintained a quite restricted and purely technical relationship with them, the remainder noticed the following negative effects in the social lives of seropositive elderly individuals: isolation; distancing themselves from work, religion and leisure activities. The professionals found that all of the patients were extremely afraid of suffering prejudice and discrimination. They also noted that many elderly individuals were impacted financially by the transport costs involved in travelling to the health center and attempts to improve their diet. These impacts can be exemplified by the following comments:

> *"Many of them do not tell their social groups. Some of them even say that it has distanced them from their social groups. This is worrying for us. Sometimes they say "I used to go to (...) church (...), the dancehall at the weekend, but I don't go anymore." "Why don't you go anymore?", "I'm worried that somebody might say something, and a friend of mine might find out what I have" Med. 2*

It is also worth highlighting the perception of a psychologist who felt that elderly individuals who were diagnosed with HIV/AIDS believe that they are judged by other individuals by sight, even when these others do not know about the diagnosis:

> *"It is normal for them to distance themselves a bit from their sports and social activities, if they have them. Some of them seem to think that people will be able to tell just by looking at them that they have caught something. Obviously, this must be linked to how they see themselves now that they have HIV. We say that society shows prejudice against these patients, but the patients show prejudice against themselves too. It's almost like magic. They think that others will know "I have a sex life, or worse, that I am promiscuous". Psy. 1*

The health professional who claimed not to have developed any bond with the patients did not notice any differences in their social lives and believed that they are in a "stagnant" phase of life, given that they were retired from the workforce and they did little physical activity. This perspective demonstrated that this particular health professional had a generalized and stereotypical view of the elderly and old age, with strong links to inactivity and decadence. [5,8]

Of the nine professionals interviewed, eight spoke of the negative effects on the sexuality and sexual practices of the elderly individuals after they had been diagnosed with HIV/AIDS. Usually, these effects involved the interruption or cessation of sexual activity. They noted that the greatest difficulties were linked to the use of preservatives, the fear of infecting somebody and the fear that new partners would be afraid of their condition as a seropositive individual. Some of the professionals believed that the diagnosis led to the decrease of sexual activity among men and the cessation of sexual activity among women.

The changes noticed by the health professionals in the social life, sex life and sexual practices of seroconverted elderly individuals are addressed in the comments below:

> *"I have had the opportunity, during my guidance sessions, to talk to these individuals and one male patient made it clear that he simply preferred to stay at home. He is alone... I don't know if he is separated, he doesn't have a partner. So he says that his life is very sad, as it will be impossible for him to find somebody at this stage in life, with this diagnosis. So he prefers to stay home watching television and.....he put it like this: "how am I going to stay at home without drinking and smoking? That's all I have left". So it's difficult for us to push them on this matter. They feel so alone". Pharm. 1*

One of the health professionals interviewed did not notice any alterations in the sexual practices of the seroconverted elderly individuals, as he or she did not ask the patients this type of question, despite the fact that it was his or her responsibility to instruct them in the use of condoms. In addition, two other health professionals reported that they did not directly address this subject with elderly patients, as they found it difficult to bring up or felt that it was not relevant to their professional activity. They also said that when this topic arose, it was brought up by the elderly patient.

Despite the different levels of involvement on behalf of the health professionals with the elderly individuals they treated, all of the interviewees noticed that the patients had experienced discrimination due to the fact that they were seroconverted and did their utmost to ensure that nobody would know about their diagnosis (for fear of suffering prejudice). They also stressed that the prejudice related to HIV/AIDS began with the patient themselves, but was also common from other members of their social groups and even their own family, as can be seen in the following comments:

> *"In the beginning, when the patient arrives, it is very important to welcome the family as well, because sometimes*

the prejudice begins at home, due to ignorance, and the discriminating nature of people. It is not a question of age, sometimes the children know a lot more about it. They are younger and can be even more prejudiced. So we have to advise them. They think that they need to separate the things that belong to the patient in the home. This is a very common issue. They separate bedclothes, cutlery, soap...they completely change the person's routine in the home. We have to make continuous clarifications, such as "the virus cannot be passed on in that way", so that they suffer less. If it starts in the family, it is even worse. This prejudice is still very common...they suffer a lot because of this". Psy. 2

It is important to highlight the observations made by professionals from the areas of nursing, medicine and psychology in relation to the association between the diagnosis, prejudice linked to the illness, treatment issues and the intensification of suffering. Since treatment is designed to combat the illness, it also confirms its presence, and may generate reminders about the prejudices suffered, while also possibly leading to situations that prevent the individual from keeping their diagnosis a secret, such as the storage and handling of medication. These issues are quite often interconnected and were discussed by the professionals in terms of the repercussions in the adherence to treatment:

"In my experience, prejudice is one of the most significant difficulties. The treatment in itself has brought about results and has been shown to be effective when patients accept that they have HIV and accept the treatment, regardless of whether they need to take drugs at that stage or not. However, sometimes, as a result of prejudice, from themselves and their social circles, the patients create situations of avoidance, and the treatment plan brings this to the fore. So, sometimes they prefer not to come (to the clinic). They think they can magically ignore the prejudice, and not be affected by it. They think they will not be bothered by it, so it's better not to go ahead with the treatment, or something like that. Therefore, prejudice is a great hindrance to the treatment in itself. People hide and stop coming for treatment because the treatment forces them to face their situation head on. This is related to the prejudice they have against themselves as well. Of course, there is this issue of accepting the situation, admitting it, and upon admitting it saying "I will be responsible for my treatment". I think prejudice can interfere somewhat in this process and prevent it from flowing smoothly. Psy. 1

Studies have reported that seroconverted individuals experience depression, guilt, shame, anger, fear, rejection, isolation and a drastic reduction (or even a cessation) of sexual intercourse.[25] These aspects have been addressed in both scientific literature and in the reflections of the health professionals interviewed in the present study, and help to clarify the complexity of health promotion, the specificities of health care services and the current challenges facing professionals who work with HIV patients.

These aspects are closely associated with the processes of stigmatization, social stereotypes, prejudice and the repercussions for the health of the individual. The process of stigmatization is reflected in the manner in which the subject perceives themselves, as well as the interpersonal relationships they establish. For people who live in a stigmatizing condition, contact with people who live within the boundaries of normality can generate many difficulties, so they tend to make an effort to avoid contact and keep their stigmatizing condition a secret.[14] Thus, it is possible to infer that an understanding of this process of stigmatization and its repercussions is essential for the adequate management of HIV-positive elderly individuals and their families.

Caring for seroconverted elderly patients

This category addresses the perceptions of the health professionals in relation to caring for elderly individuals with HIV/AIDS, including their first experiences with these patients, the specificities involved in caring for these patients and the challenges faced while providing this care.

Five health professionals stated that when they first started to receive patients with STIs/AIDS, they expected to have elderly patients, as they believed that the transmission of the virus can occur in several situations and that sexual practices are commonplace among the elderly. The remaining four interviewees (who had either a high school or higher level education) stated that they did not expect to receive elderly patients as they did not think that people of that age were so

sexually active, or because they associated HIV/AIDS with previously established "risk groups", which do not include the elderly. However, when they discussed their first experiences with HIV-positive elderly patients, six health professionals (who had either a high school or higher level education), including some of those who had said that they expected to work with elderly patients, were surprised and found it difficult to believe the HIV/AIDS diagnosis for the elderly patient, mainly due to prejudice, cultural ideas and notions about risk groups. The following comments demonstrate these different reactions:

> *"Yes, I expected it [receiving HIV-positive elderly patients] because I don't believe that sexuality ends when you get old. There is no start date and end date for sexuality. It has improved really for the elderly hasn't it? Now, they have Viagra, they have information, they have a better quality of life. All of this favors a prolonged sex life. And if we conduct a review of out predecessors, they had sex lives at eighty, seventy years of age". Nur. 1*

> *"But when I started to see people of 70 or 80 years of age, I was a bit shocked. I was not aware of the extent of their sexual activity. I didn't realize that these meetings for the elderly led to so many contacts. They are sexually active and many are promiscuous. Promiscuity also exists among the elderly. So these group meetings, these dances for the elderly, often lead to a significant frequency of sexual relations. I hadn't really imagined the level of sexual activity among people of this age". Med. 1*

> *"I really changed how I looked at people after coming here. It is a form of prejudice, but we had an "image" of who would have these diseases. So I was very surprised to see people like this.... I would never have thought that this type of person would be infected. Nowadays, I tell my children all the time that appearances are deceiving. They don't mean anything anymore. You might have thought that somebody with this virus would already show signs of sickness, they would be weak, or they would be homosexual, or a transsexual, wouldn't you? You had that old-fashioned concept that only those who had same-sex relationships ran the risk of catching the virus. Well, you are wrong. I have seen old married women who have become widows, young married women whose husbands are truck drivers. I have seen beautiful young girls who have the virus, they don't have AIDS, they just have the virus. And if you see them in the street, you would never in a million years imagine that they have a contagious virus that could contaminate thousands of people". Nur. 2*

Two of the interviewees claimed not to remember their first experiences and refused to participate in this discussion. It is important to stress that the comments presented demonstrate how much these stereotypes and prejudices related to the sexuality of the elderly can be rooted in the perceptions of health professionals. They may even comprehensively associate it with promiscuous behavior, which was not confirmed in the contamination history of the elderly patients who attended the health clinic in question. Perhaps their refusal to discuss this subject was due to their embarrassment related to their own prejudices.

Based on their experiences, the professionals analyzed different specificities involved in caring for the elderly: 1) health professionals must pay close attention to the elderly patient, to identify if they see the patient as a sort of grandfather figure, and to heed their greater vulnerability; 2) health professionals need to pay closer attention to difficulties related to aging, such as poor sight, impaired hearing or a poor understanding of complicated prescriptions; 3) health professionals must use simple language, due to the lower level of education or illiteracy that is common in the elderly population; 4) health professionals must be able to talk with elderly individuals about the prevention of sexually transmitted diseases, regardless of the difficulty of the health professional or the patient in broaching the subject; 5) the technical ability of the professional is paramount, since managing HIV/AIDS in elderly patients is more complex due to the comorbidities and medical complications that are commonplace in this age group.

Converging with the above mentioned specificities, the challenges indicated by the health professionals when discussing care for HIV-positive elderly individuals were: 1) from the point of view of the organization of health services, the interviewees mentioned that their extensive workload led to a lack of time to provide more appropriate care for elderly patients and their specific requirements; 2) from the point of view of health education and preventive actions, they stressed the need for greater adherence to the use of condoms and medicine among the elderly population; 3) they felt that strategies must be developed to adequately deal with the difficulties

linked to addressing sexual habits with elderly patients, as a result of the lack of debate on the subject, or the level of misinformation about the subject, or their own difficulties in how to discuss these issues with elderly patients; 4) more patience is required with elderly patients in order to clearly explain their diagnosis, treatment and prevention methods, considering both their limited education levels and the possibility that the HIV may already have accelerated neuropsychic disorders; 5) from the point of view of the training of the health professionals, it is necessary to provide constant updates concerning the technical management of HIV/AIDS and its comorbidities among the elderly.

The comments of all of the health professionals, to a greater or lesser degree, demonstrated the perception of the daily presence of stereotypes, stigmas and prejudice related to HIV/AIDS in the lives of the elderly and their impact on health-disease processes. However, the perception of the impact of these stereotypes, stigmas and prejudice on the reactions of the professionals themselves when faced with a diagnosis of HIV/AIDS, as well as the impact of these issues on their professional practice, vary from person to person.

This variation does not seem to be linked to the level of education or indeed the area of expertise, but rather the bond that has been established with the patient, as well as the interest and understanding of the professional in a more extensive health approach and concrete opportunities to analyze and critically assess their professional practice in relation to the prejudices found in society, thereby creating subjectivity. Concerning professional training, permanent educational activities and health promotion strategies, it is important to stress the significance of including the issue of stereotypes, stigmas and prejudice related to health-disease processes. Furthermore, it is essential to provide health training that is more focused on critical thought and reflection on daily health practices.[26]

Studies have reported that campaigns planned by public policies and health professionals themselves include (to a certain extent) the notion that only drug addicts and individuals who engage in certain sexual practices are at risk of contracting STIs/AIDS, with the clear suggestion that the elderly are not at risk. This perspective affects the request of HIV tests, thereby compounding the difficulty of professionals when addressing issues related to sexuality, as well as their adherence to social stereotypes and stigmas, and the repercussions for treatment, prevention and health promotion possibilities.[25, 27-30]

Challenges faced by health professionals in their daily practices

This category presents the perceptions of health professionals in relation to the personal and professional difficulties involved in their daily work of dealing with seroconverted elderly individuals in the public health sector.

With the exception of two health professionals (one mid-level and one higher level), all of the interviewees cited an excessive workload as their main problem on a daily basis, due to the insufficient number of doctors available to deal with the demand. They also referred to the psychic burden involved in their work. Three professionals (medicine and psychology) stressed the issue of psychic burden when treating elderly individuals with HIV/AIDS, as they listen to heart-wrenching storied on a daily basis about suffering, stigmas, prejudice and discrimination. They also stated that another element of the psychic burden of the work was the difficulties they experienced when trying to address the issues of sexuality and sexual activity with elderly patients, as can be seen in the following comment:

> *"HIV patients need us to provide a great amount of energy. So if we are not very well-balanced psychologically, or we don't have a great personal acquaintance, energy is like invisible radiation that destroys us on the inside, do you understand? The patients' stories are very upsetting, very sad. Often, we are one of the few people to whom they can say certain things. Therefore, the mental health of the staff who deal with AIDS patients must be given special attention". Med. 1*

The work of health professionals who care for HIV/AIDS patients should be structured by considering the need to offer support, solidarity, health education and information about how to prevent discrimination. In addition, feelings such as impotence, frustration, incompetence and frailty are common and the health professional must overcome their own taboos and prejudices in order to help patients face the crisis that began at the moment of diagnosis.[16,17] These aspects help the overall understanding of the extent of the psychic burden mentioned in the interviews.

Together with this excessive workload, several other professional problems were mentioned by seven of the interviewees: 1) the need to create a transfer system for referral to specialized divisions within the public health service; 2) the multiple roles involved in certain professional categories; 3) the difficulty of actively searching for patients who do not adhere to their treatment; 4) the need to shed their prejudices on a daily basis and provide the best possible care for their patients; 5) the lack of weekly team meetings to discuss cases and work procedures; 6) the need for reflection with patients about quality of life rather than quantity of life.

Clearly, the difficulties reported by these health professionals demonstrate the precarious nature of the care provided, whether it be due to the insufficient number of doctors to meet the demand, the need for better patient flow and transfers, or the lack of support strategies for health professionals and service teams who deal with this complex issue.[16, 17, 29, 30] Furthermore, it is important to note that AIDS cases involve many demands that extrapolate the biomedical model of health care, requiring new training and professional activity parameters, focused on technical demands, psychosocial aspects and the need to coordinate multi-disciplinary teams for this type of work.[16,17]

The present study was developed with a restricted group of professionals. Thus, the results generated should not be generalized to other services. The aims of this research were the elucidation of the specificities of a specialized health care service. The relevance of this research is linked to its potential to contribute to the development of other studies that analyze this issue in greater detail, as well as to contribute to the analysis of convergence and divergence points of other scenarios that have been assessed. Considering the fact that qualitative and quantitative studies are complementary, the analysis generated could serve as a basis for the development of new and more extensive research projects.

CONCLUSION

Since social stereotypes and prejudice are elements of culture, and thus contribute to the formation of individuals and social relationships, it is essential that these discussions should be included throughout the health training process, both in terms of graduation and the permanent health training of health professionals, who need to be aware of the importance of these elements in health-disease processes and in health promotion strategies. The image of old age and the aging process, as well as the issues of sexuality and sexual activity among the elderly, remains a challenge for the health service and the promotion of healthy aging.

According to the perceptions of the health professionals, a diagnosis of HIV leads to the disorganization of how the subject views themselves, their lives and their personal relationships with other people. Consequently, they feel the need to reformulate these aspects of their lives.

In addition, the professionals noticed how a diagnosis of HIV for an elderly individual has great potential for stigmatization and causes great suffering. This pain is related to how they see themselves and how they feel they will be seen and judged by others. These experiences are also linked to the possibilities of treatment and health promotion.

In order to promote healthy aging, investment is required in health training and working conditions must be improved in public health care service units.

Finally, due to the specific characteristics of qualitative surveys, the analysis used did not seek to establish generalizations related to the complexity of the situation analyzed, nor did it intend to exhaust the debate about the issues addressed. The results of the present study could contribute to the reformulation of health care processes and subsidize public policies related to health promotion strategies for the elderly, while also bringing more attention to the problems faced. Further studies should be developed in an attempt to gain a better understanding of the stereotypes, stigmas and prejudice involved in health practices.

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Palliative Care for Institutionalized Elderly Persons: Experience of Caregivers

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Abstract

The number of elderly persons institutionalized in residential facilities that provide various types of care is increasing all the time. Care is provided by caregivers who, often unknowingly, are delivering palliative care, and in doing so, are accompanying the elderly persons to their death. The aim of the present study was to investigate how terminal illness and death are experienced by caregivers. A qualitative explorative-descriptive study was carried out, featuring a phenomenological approach, in accordance with Giorgi. The sample was comprised of nine individuals who worked in residential facilities, with data collected through a semi-structured interview. Following data analysis, eight categories were defined: relationship with the elderly person; positive experiences, positive feelings, negative experiences, negative feelings, strategies, consequences and training. These categories were then divided into subcategories. It can be concluded that the caregivers experienced great difficulty when dealing with suffering at the end of life. This did not prevent them from enjoying their work, and a number of positive aspects of their relationships with the elderly were mentioned. The need to provide more support for these professionals, whether through further training or the level of psychological support provided, is also fundamental in this area of palliative care, as only in this way will individuals feel more able and confident about performing their tasks, brining greater benefit for the elderly persons.

Keywords: Caregivers. Homes for the Aged. Elderly. Palliative Care.

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INTRODUCTION

While in 2001 the population in Portugal aged over 65 years represented around 16.5% of the total population, by 2013 it had reached 19.9%. This growth means Portugal has the fourth highest proportion of elderly persons in the European Union. In 2013, there were 136 elderly persons for every 100 young people, while it is estimated there will be 296 elderly persons for every 100 young people by 2053.[1]

The longevity of populations, accompanied by various social and family changes, raises concerns about the end of life care of elderly people living in institutions.

"Aging is (...) a positive phenomenon, both for individuals and for societies, and demonstrates the progress made by mankind in economic, social and biomedical terms, based on which public policies ensuring the universal access of the population to health care have been created".[2]

Aging inevitably results in a functional, progressive and irreversible decline, as functionality in several areas is lost and will not return to earlier levels. The main consequence associated with such loss is frailty, a condition of risk for the body. Elderly people may not suffer from an explicit disease, but the risk of such diseases arising is greater than among younger people.[3]

Many elderly persons are autonomous and independent, but the risk of disease increases with age. As age advances, an increasing number of elderly persons will be faced with growing problems of autonomy and will depend increasingly on others.[2]

When independence is compromised, a social network, which can be formed from an informal network consisting of friends, family or neighbors, or a formal network, is required. The formal network will provide services which the informal network cannot, and may be provided by government institutions, welfare and charitable institutions and even private institutions.

Institutions that accommodate the elderly are known as residential facilities (RF), and are considered to be "residential facilities for older people, establishments for collective housing, for temporary or permanent use, which provide social support activities and nursing care."[4]

When an elderly person is institutionalized, it is the *ajudantes de ação direta* (direct action assistants or professional caregivers), a term used in Portugal to refer to those who care for the elderly in residential facilities, who often spend more time than anyone else with the elderly persons, replacing the absent family and resulting, inevitably, in a bond being formed between the two. The main task of such professional caregivers is to accompany the elderly person to ensure that all his or her basic needs are met, including the provision of care in hygiene, food, company, and dressing, and ensuring that the prescribed medication is taken.

During their stay in these institutions, the elderly often go from a state of independence to a state of total dependence, their frailty increases and some end up in a terminal situation. Professional caregivers must therefore provide palliative care (PC) for the elderly, whether or not they are prepared for this reality.

Professional caregivers should have training in their work area, be able to maintain their physical integrity, stability and emotional balance, and possess technical, ethical and moral skills. They undertake to establish relations of trust and dignity and to assume responsibility, and should be motivated and show empathy for the elderly.[5]

As these professionals are at the forefront of care for the elderly, it is important to understand how they deal with their growing closeness to the elderly during care and later the death of these individuals. Understanding the experiences of professional caregivers, their experiences and contributions can help to improve the responses provided to elderly persons. Studies that include informal caregivers, elderly or nurses are common in literature, but those relating to professional caregivers are scarce. The guiding question for

this study was: how do professional caregivers experience terminal illness and death in residential care facilities for the elderly?

METHOD

A qualitative exploratory and descriptive study with a phenomenological approach was performed. To carry out the phenomenological approach the seven-step interpretive process described by Giorgi was used: 1. Read the entire depiction of the experience for a sense of the whole; 2. Reread the depiction; 3. Identify the transition units of the experience; 4. Clarify and elaborate the meaning that relates the constituents to each other and to the whole; 5. Reflect on the constituents according to the specific language of each participant; 6 Make the language specific in a linguistic sense or in terms of scientific concepts; 7. Integrate and synthesize comprehension in a descriptive structure based on the meaning of the experience.[6] This interpretive process expresses the possibility that the phenomenological method has access to the living world. It is an appropriate model for human, social and health sciences when the context of the experience of the subject and man as a protagonist is important.[7]

The study was conducted with caregivers in three RFs in the north of Portugal, in order to obtain rich, dense experiences of the phenomenon. The facilities had similar numbers of caregivers and elderly persons, and all three were private welfare or charitable institutions. While there was a list of RFs to whom the research request could be directed, the saturation point was reached by the third such institution with the participation of the ninth individual.

The sample was intentional, with individuals selected based on knowledge of the phenomenon under study and whether they had experienced and were able to share their understanding of the subject.[6] The nine individuals who took part in the study met the inclusion criteria, which were age (being at least 18), have worked in this area for more than two years, worked in an institution with more than 20 residents, and were freely able to participate in the study. The exclusion criteria were considered participants who did not meet all the parameters of the inclusion criteria. The selection was random, and on the day of data collection the management of the facility was requested to allow the collaboration of three professional caregivers, with the researcher not intervening in their selection.

An open interview with a semi-structured script was used. The questions were of open response type, allowing the participant to be free to respond as he or she saw fit, without having to choose predetermined responses.[8]

The script had only one guiding question: "During the time that you have worked here and have taken care of elderly persons in a terminal situation...how would you describe your experience?" The guiding question was posed only to guide the interview, rather than limit the response of the professional caregiver. [9] It was hoped that a number of topics would be addressed: the importance the professional caregiver attached to palliative care (PC); their relationship with elderly persons who they know are terminally ill and whether the caregiver talks to the elderly person about the subject or keeps his or her distance; feelings associated with caring for elderly persons in a terminal situation; involvement of the family members of the professional caregiver; the emotional support the residential facility provides following the death of an elderly person. The interview structure was validated by an experienced investigator and a pretest was conducted with one participant. As no doubts arose during this process, this interview was included in the study.

The interviews took place in January and February 2013. The interviews were scheduled based on the availability of the RFs and their staff. Before starting the interview, participants were informed about the nature of the study and the need to record the audio of the interview, the voluntary nature of participation and the guarantee of secrecy and the anonymity of the information gathered. Consent was obtained in writing.

Recording was carried out using the *Cool Edit Pro 2.1 Portable* program. Following recording the interviews were transcribed using *Microsoft Office Word* without mention of the institution to which each participant belonged.

The participants were all female, as there were no male professional caregivers in the RFs visited. Ages ranged from 32 to 55 years, with the majority of participants (five) aged between 30 and 40 years. Five participants were married, two were single, and there was one divorcee and one widow. The time spent working in the area and the time spent at the institution coincided and varied from 4 to 32 years. Most of the participants (four) had worked in the residential facility for 11 years, and the rest 4, 13, 17 and 32 years.

To obtain the results, in accordance with the Giorgi method, it was necessary to read the entire depiction provided in order to obtain a feeling of the complete interview.

It was then necessary to re-read the interviews several times, to try to understand and identify what were the transition units of the experiences reported by the participants. After reviewing the transcripts similar data was agglomerated. This conglomeration of ideas was organized into different categories, with each of these categories being considered a transition unit of the experience. This grouping of information allows researchers to find meaning according to what has been observed and recorded.[6]

The study was approved by the Ethics Committee of the Escola Superior de Enfermagem de Coimbra (the Coimbra Higher Nursing School), (Approval Nº 123-11-2012) and was later authorized by the directors of the RFs involved.

DISCUSSION

Data analysis was conducted according to the Giorgi method, where a reading was carried out of all the descriptions and interviews to achieve a sense of the whole. As such it was necessary to understand the language of all the respondents. It was then necessary to re-read several times to identify the meaning units. As these units are constitutive and not just isolated elements, an interpretation is made by the researcher, and several researchers can analyze the same set of data differently. After this phase, it was necessary to make the language of the professional caregivers appropriate for the phenomenon being studied. This step allows the categories described in the findings to be identified.[7]

From this analysis a central category emerged: the relationship with the terminally ill elderly person, in other words, how the relationship between the professional caregiver and the terminally ill elderly person can be characterized. Implicit to this category, five categories emerged, positive experiences and feelings, negative experiences and feelings, strategies, consequences and training.

In order to present an overview of the findings of the investigation, Figure 1 shows the various categories that emerged from the analysis of experiences in order to better understand the essence of the phenomenon.

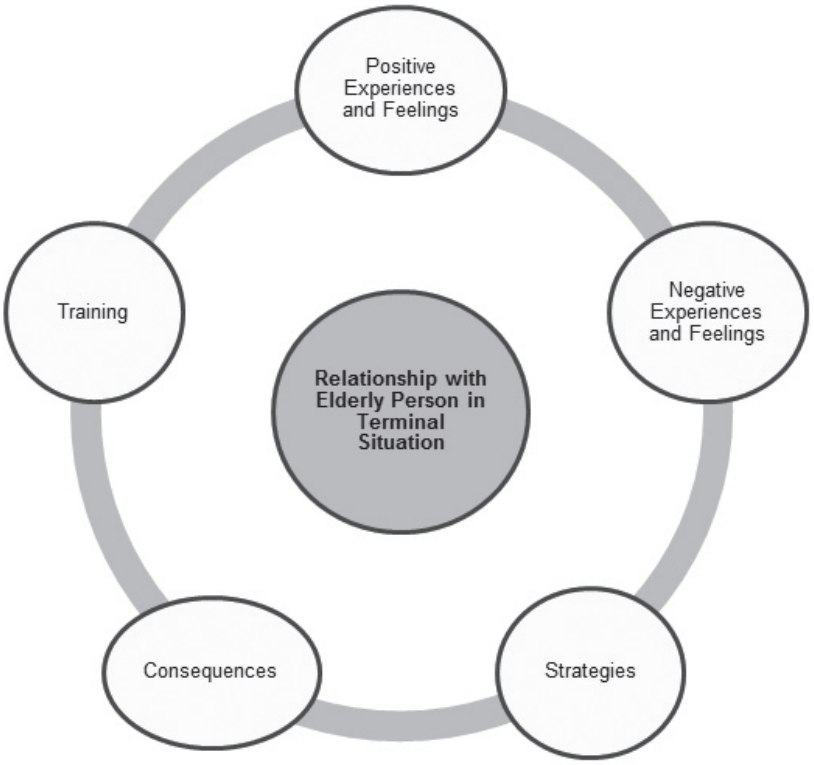

Figure 1. Analysis of phenomenon: experiences of professional caregivers in relation to the illness and death of elderly persons in residential facilities.

Having presented the overall structure of the phenomenon, the description and discussion of each category will now be provided.

Relationship with terminally ill elderly person

The professional caregivers considered their relationship with the terminally ill elderly person to be very intense, yet also something that provides great satisfaction. From this category, 14 subcategories emerged: the vulnerable other, assistance, attention, comfort, care, respect for the individual, equality, personalization, presence, meeting needs, touch, subjectivity, protection and motivation.

Vulnerable other: The resource of institutionalization is normally employed in situations where the elderly person requires great support, and, while not necessarily terminally ill, suffers from multiple morbidities, *"(...) she had every disease you could imagine and others besides (...)*" E6, "*(...) they are so debilitated (...)*," and so they seek an institution that can support their vulnerability.

In caring for another, one should be aware of the real vulnerability of the individual. There must be a relationship between the caregiver and the person who requires care, in which the protagonist is the vulnerable person that requires help, and not the caregiver.[5] When the individual becomes ill he or she experiences a set of feelings that are complex and difficult to understand in everyday life. With disease, the frailty and vulnerability of the human condition emerge, as certain issues, such as maintaining health, independence and autonomy, are no longer within our control. Life ceases to be free and assumes limitations.[10]

In providing care, professionals should be promoters of a dignified death and carry out

multidimensional monitoring of the elderly person and his or her family, expressing concern and specificity when caring for frail and vulnerable elderly persons.[11]

In learning about the debilitation of the elderly person the professional caregiver needs to adapt his or her posture to help in the best way possible.

The help given by these professionals is translated into everything they do to help the elderly, with the relief of suffering, whether physical, psychological or spiritual, being central: *"(...) ease his suffering a little (...)"* E4, even though they are aware that sometimes they cannot make it go away.

When it comes to patients in the terminal phase, the provision of assistance helps the patient to live as serenely as possible up to the time of his or her death. Assistance implies an attentive, rather than a constant presence, where the caregiver must have a listening approach and an attitude of empathy and congruence[12]: *"(…) relieve suffering, even if just a little (…)"* E2.

The attention given to a person in a situation of illness: "besides being a matter of human solidarity is an ethical imperative for all health professions."[13]

The need to provide more care to elderly patients appears to be based on the fact that most elderly persons not only need more care, but also the more frequent presence of care. According to a study by Ramos,[11] professionals pay special attention to the terminally ill and their families, and there is a greater concern for humanization and awareness in actions taken. The need to provide more attention was considered important for the comfort of the elderly patient.

This attention was justified by the participants by the fact that many elderly people can no longer speak clearly and therefore often do not ask for what they need: *"(...) especially those who do not speak and do not express themselves (...)"* E5. It is important to be truly there for the patient: "*(...) a touch, or a little word, a joke or a song, is very important. Singing something, I think, is important."* E7.

As professional caregivers understand that they are often unable to relieve the physical suffering of elderly patients, the provision of comfort itself can also be a potential help. While this comfort can be physical, the participants often referred to the importance of a human presence, with the elderly person feeling that the caregiver is there for him or her: *"(…) the simple fact of being there is a comfort (…)"* E4. *"(…) we try to position them so that they can be as comfortable as possible (…)"* E9.

At this stage, when there is no longer a cure for the disease, care should be aimed at the comfort of the patient, often through simple gestures.[14]

The professional caregivers interviewed mentioned that the care they provide to the elderly persons in this phase includes hydration, nutrition and positioning. Monitoring and encouraging the abilities and individual identity of the elderly person are also part of care.[10] *"(…) we provide the maximum amount of care (…) whether physical or psychological."* E1.

Caring for people at the end of life requires non-standardized humanized care which results from the mutual and continuous learning of the individual providing care and the person receiving it.[15]

The act of caring is seen by the professional caregiver as a technique that aims to meet the needs of elderly people with progressive disabilities and thus hopes to improve health through the act of caring itself. It was also expressed that responsibility, commitment, availability, respect and patience are part of such care.[16]

In a phase where the individual is in such a fragile situation, respect and human dignity should not be forgotten. The elderly person requires not only technical care but also the human and respectful treatment of their dignity as a human being. This was described by the study participants: *"(…) the person is there until his or her last breath (…)"* E1.

Respect for sick individuals was also mentioned in the study by Munn et al.,[17] which noted the importance of recognizing the personality of an individual at the end of life for quality of life during the process of dying in an ER. The professional

caregivers in this study also referred to the importance of looking at the elderly as someone who should have quality of life to the end *"(…) it's an old person, not a rag, we have to give them the best care possible (…)"* E8.

The professional caregivers said they treated all the elderly persons equally, whether they had terminal illnesses or not, and considered elderly persons in a terminal phase as deserving the same attention and consideration as everyone else.

Time and dedication is provided in the same way for all elderly persons: *"(…) we have to treat all the elderly people equally (…)"* E5, *"(…) care and affection have to be equal (…)"* E6.

The importance of getting to know each elderly person was mentioned in the present study, as care may be customized depending on the individual in question: *"(…) it depends on each person (…)"* E3, *"It depends on the person, we have to get to know the type of personality of each person (…)*" E1.

In the study by Ferreira[18], it was found that the uniqueness of each elderly person was taken into account by the respondents. This is an important factor, as many caregivers and even the wider population consider the elderly as a single group, failing to view them as unique and heterogeneous individuals who have their own tastes, desires, aspirations and potentialities.

Fonseca[3] also refers to the importance of personalized care, describing the value of avoiding standardization, providing each elderly person with proper care in relation to the specific problems they exhibit, respecting their personal characteristics and, above all, not imposing a similar approach to all because of their apparently identical needs.

The professional caregivers mentioned that they felt just being present was something positive they could do for the elderly, and that their presence was much more beneficial to the elderly persons than the basic comfort care they could provide: *"(…) they feel that with our presence they're not alone, (…)"* E4, *"(…) to try and be there as much as possible so that they feel they have company (…)* E7.

The presence of the caregivers, along with the ability to listen to or even respect the wish for silence of the patient, can be essential to help a patient in pain to find a new meaning of life.[15] Being present helps lessen the fears of dying alone by guaranteeing a human presence.[19]

One of the major aspects of the care provided to the elderly is meeting their needs. The interviewees expressed this concern when performing their work, considering physiological needs to be very important: *"(…) I think what they really need is to eat and drink well (…)"* E8, *"(…) we're always thinking about whether they need something else (…)"* E6.

In the study by Vieira et al.[16] the participants discussed focusing much of their care on carrying out activities aimed at the basic needs of the elderly persons, seeking to promote their health. They attribute the need for care to the condition of health presented, and carry out tasks based on the medical profile of the individual, imagining that this will satisfy the elderly person.

Touching is described in the study as a way of comforting the elderly person. Taking the individual's hand is seen is an effective therapeutic approach to comfort the elderly: *"(…) sometimes taking someone's hand is a comfort (…)"* E3. *"(…) I'm a touchy feely person … I like physical contact (…)"* E9.

Touching implies entering the personal and immediate space of another, namely the person who is to be cared for. In professional caregiving, as well as in nursing, hands are used a lot, with professional caregivers touching the elderly persons on a daily basis to provide care. The intentional touch comforts and contributes to a warm relationship between the caregiver and the person receiving care. Those in a weakened state feel comforted by the touch of the professional caregiver, who in turn gives some of their attention and time.[20]

The professional caregivers said that the care they provide differs depending on the individual and that they provide subjective care, or in other words they have the same principles of action but, being individual human beings, it is obvious that the way they relate to others will not be the

same and therefore their approach will differ from person to person. Fernandes[10] says that the way in which each caregiver provides care is unique as it reflects the interpersonal relationship established with the elderly person and requires a reflective attitude in which everything must be weighed, taking into account ethical, moral, professional, social and personal conduct. In the study by Vieira et al.[16] the participants also described this subjectivity when providing care. They relied on their feelings of caring, such as love, compassion, pity and affection, which unconsciously influenced their work: *"(…) it also depends, we're not all the same, each one has his or her own approach, his or her way of doing things (…)"* E3.

Protection is intuitive. The professional caregivers said that although the elderly person may be suffering they do not talk about illness and approaching death. They said that they believed talking about the subject would result in greater suffering, and hoped that it would be forgotten, considering this to be one of the best ways of protecting the individual.

To achieve this, they adopt persuasive strategies, seeking upbeat conversation topics and creating them if none exist: *"(…) that it might be nothing, that they'll get better, give them examples of cases where people have gone through the same thing and got better (…)"* E2, *"(…) don't confront them with reality (…)" E1.*

The relatives of patients also describe the importance of protecting the patient from psychological distress, noting that the revelation of prognoses brings them more anguish and can lead to depression.[21]

The professional caregivers said on a number of occasions that they did not talk about death to the elderly persons.

For them, it is important to try and motivate the elderly persons, encouraging them so that they do not become depressed about their state of health: *"(…) our job is to try as much as we can to make sure the person doesn't give up on life (…)"* E1, *"(…) tell them a joke, make them laugh, (…)"* E9. As such, they strive to install enthusiasm, encourage the elderly persons not to let despair take over, and try to meet the needs of esteem and self-actualization of the elderly.

Positive Experiences and Feelings

Of all the benefits that they could identify in their work, the professional caregivers said that they always tried to do their best when providing care to the elderly persons: *"(…) we try, I don't know, to support them in the best way possible (…)"* E5, *"(…) to do the best I can, the best that I know how, (…)"* E4. When doing the best that they can, to the best of their knowledge, the participants felt they had done their duty.

When the professional caregiver believes that he or she has performed the provision of care well, the feeling of job satisfaction can even work as a support strategy for the relief of stress.[22]

The professional caregivers said that when they perceive that the elderly person is in a situation of great frailty, there was a tendency to grow even closer to that person: *"(…) I get even closer because I see that the person is approaching the end, (…)"* E1, *"(…) when I understand that, it often makes us close friends, (…)"* E2.

They considered it to be of the utmost importance to continue or even increase contact, so that the elderly persons do not feel neglected, isolated or alone.

With the passing of time, the professional caregivers considered themselves better prepared to act and perform in a range of situations: *"(…) it's harder to deal with certain situations (…) with years in the job, today I feel that I'm cooler and calmer under pressure (…)"* E5. They consider that their experiences enrich them and help them to improve and grow, making them more confident in the performance of their roles.

Gómez[23] states that to be a caregiver, investment, great preparation and availability are required.

Affection, generally associated with family relationships, also appears in the relationship between the professional caregiver and the elderly person: *"(…) they end up becoming our family (…)."* E1, *"(…) our warmth is really the best."* E7.

The experiences collected here demonstrated a great and genuine satisfaction when taking care of the elderly, leading to the creation of bonds of affection with such individuals. Given that a residential facility is normally an institution where there is not a high turnover of employees or residents, it is normal that these ties are created. A bond can be registered with the elderly person that makes him or her remember family ties.

The affection that arises in these relationships can often be justified by a perception of need among the elderly, which is due to a lack of family attention. This emotional involvement, as a rule, will cause greater suffering among the care professional when the elderly person dies.[24]

Due to the strong bonds created between caregivers and elderly, it is understandable that the professional caregiver nurtures feelings of affection for the elderly person in their care. Often the affection transmitted by care can be seen as a type of reward for the hard lives they have had, and the sense of being abandoned by their families.

In cases where the elderly person is sick, affection is seen as a treatment approach in some situations: *"(…) I think better than medication, better than food, is affection (…)"* E7, *"(…) these people need affection, most of all, affection (…)"* E5.

Affection together with tolerance is seen by health professionals as a pre-requisite for a good caregiver/elderly person relationship. The care and affection that are given to the elderly person are fundamental for creating the feeling that the caregiver has fulfilled his or her duty. Affection is a major factor in a humane relationship, yet caregivers can never forget their role as caregivers in an institutional context.[24]

Negative Experiences and Feelings

The professional caregivers also described the difficulties they experienced. There are a number of such difficulties, but interacting with an elderly person in the terminal stage of life was one of the main problems described: *"(…) dealing with this type of elderly person is very difficult (…)"* E5, *"(…) it has taken a lot out of me, as it happens it's taken a lot out of me."* E9. In a study by Barbosa et al.[25], interaction with the elderly person in a terminal phase was also described as difficult. The same study also described difficulties such as a lack of time, a shortage of human resources, the emotional and physical impact, the difficulties of organization and the planning of activities, interaction with the families of the elderly person, the limited involvement of the family member in the dynamic of the institution, communication with the elderly person, the lack of knowledge about disease, and dealing with behavioral disturbances.

Other difficulties experienced by the professional caregiver registered in literature are: tiredness, stress, worry, anxiety, the appearance of disease/symptoms, alterations to daily life and variations in self-esteem, negatively affecting the care provided and quality of life.[26]

The accumulation of a number of tasks and possible reductions in the number of professional caregivers in institutions can also be an obstacle for the provision of care. Some participants considered that the shortage of time often affects the care they provide, as they are unable to spend as much time with the elderly person as they would like *"(…) we don't have the time to dedicate more time to these people (…)"* E5, *"(…) we don't have much time to spend with them (…)"* E1.

The inexperience at the beginning of a career or even in complicated situations was also described as a negative experience. *"(…) at the start it was hard on me (…) because I had to train, I wasn't trained yet (…)*" E1. In the study by Marshall et al.[27], the team describes how certain members avoid caring

for elderly persons at the end of life, citing a lack of knowledge and experience in the area. For this reason, it may be difficult for them to deal with elderly persons in terminal situations, which was also mentioned by the professional caregivers in the present study.

Caring for elderly persons in a terminal situation brings suffering, as the caregivers can create bonds with the individuals. They describe how difficult it is to watch their suffering while in many cases being unable to help. Much of this suffering is related to the impotence felt when seeing another suffer and not being able to do anything to relieve the pain: *"(…) it's really hard to see other people suffering (…)"* E4. Suffering is a feeling that accompanies the human being and will appear during life in one form or another as a consequence of the frailty of the biological being and the sensitivity of the psychological being.[12]

The professional caregivers in the present study often felt frustration: *"(…) we can't do much (…)"* E6, *"(…) there's nothing we can do, (…)"* E5.

This frustration is also felt with elderly patients with conditions of dementia, due to the impotence that caregivers feel when trying to interact with the elderly persons, or trying to understand their needs, or not knowing how to overcome difficult situations.[25]

Sadness was also present in the provision of care due to the presence of suffering and death: *"I feel sad (…) it's very hard, getting home and still thinking about that person (…)"* E1, *"(…) you get attached to them and then you feel sadder (…)"* E4. They described feeling sad and depressed on some days at work.

Casmarrinha[21], when studying relatives of terminally ill patients, also noted the sadness they felt, due to fear of the day of the death of their family member. Although the relatives interviewed described feeling sadness, they said they tried to hide such feelings in front of the patient. The sadness felt stemmed from the awareness of the real consequences of the disease, and the anticipation of the grief they would experience.[21]

Strategies

In such a demanding profession, sharing and mutual assistance between caregivers is crucial, as well as team spirit, which benefits the whole team as well as the elderly themselves, who receive better care.

Mutual help between colleagues can take the form of opinions on a case: *"(…) I like someone to accompany me (…) so we can exchange ideas (…)"* E8, *"(…) I think it was important to try to explain and help."* E9.

The experiences gathered emphasized that collaboration between the team promotes learning among professionals. Mutual assistance, as well as producing a good working environment, can influence the quality of life of the professional caregiver and the quality of service provided to the elderly. Teamwork is seen by the professional caregiver as a protective factor to prevent situations that can be both physically and emotionally disturbing.[18] Parece[28] states that teamwork allows moments of reflection on a number of situations and issues, which should be considered so that caregivers can plan and outline appropriate intervention strategies at each moment together.

The family support felt by caregivers was considered a positive factor, as they know that their families will always be there for them and understand that their work is emotionally draining. *"(…) I have a family that supports me in this (…) they know that our work, as well as being physical, is much more emotional."* E9, *"(…) I get home and tell my husband (…)"* E6.

A study by Fernandes,[10] described family support as support for the individual, as they get to know their family members on a deeper level, knowing how much they can help them.

This study referred to the benefits of creating time for debate through the exchange of experiences: *"(…) there were a lot of debates even within the group of colleagues, because they help us a lot (…)"* E9. For the professional caregivers it is more

helpful to listen to those who are comfortable with the subject and who have experienced similar complicated situations.

Creating spaces of contact for exchanging experiences between the elements of multidisciplinary teams who provide care at the end of life would be beneficial.[28]

Consequences

The experience acquired through years of professional activity is considered by the participants to be of added value. It has made them more capable, more confident and more mature in their work: *"We've been through some bad experiences and life teaches us and prepares us (…)"* E8, *"(…) we learn over time, (…)"* E1.

Experience allows skills to be learnt when carrying out professional tasks, which result from experience gained over time and interaction with colleagues.[25]

The experience acquired through work and interaction with other caregivers is seen by some professionals as sufficient for making up for a lack of academic qualifications in terms of the performance of the professional duties inherent to the profession.[26]

The professional caregivers stated that it was impossible not to take some of their concerns home with them: *"(…) we sometimes take our problems home with us (…)"* E2, *"(…) it's difficult to switch off (…) we don't have a little button (…)"* E4. Parece[28] described how professionals who witness deaths, despite knowing that these form part of the natural cycle of life, often carry these deaths over into their day-to-day life. When a death occurs, the professional often imagines that it could be the death of a member of his or her own family, and this frightening experience often affects their daily life.

While not suggesting it is easy to deal with such occurrences, professional experience in caring for the elderly means that the professional caregiver can prevent their job from influencing their quality of life.[18]

Training

It is considered important to be trained in their professional area, in terms of the importance of knowing, learning and possessing knowledge. Although many caregivers can be employed by RFs without any training, they recognize the importance of improving techniques, learning new concepts and approaches for dealing with specific situations, considering this to be an asset for the day-to-day care of the elderly, which is a potentiating factor for improving their professional and personal satisfaction: *"(…) we should have the proper preparation to know that we're here to provide care (…)"* E1, *"(…) the more training we have, the more information (…)"* E9.

The study by Ribeiro et al.[29] states that caregivers with more education are more able to assist the elderly in more complex situations, such as medication dosage, and receiving and delivering technical instructions. With this greater capacity, elderly persons are encouraged to maintain their autonomy and well-being.

Training can also be viewed, according to the professional caregiver, as a means of preventing, in tandem with other factors, the appearance of burnout.[18] The same author states that, whether as a preventive measure or not, training should be a priority for institutions, especially for professional caregivers. Such training should aim, distancing itself from specific topics such as PC, a theme explored in this study, to raise awareness of the importance of good interpersonal relationships between the employees and the elderly.

In terms of knowledge of their professional area, the participants described having undergone a number of training programs in which PC was studied, meaning that in theory it is not an unknown term: *"(…) I've had a number of training sessions about this."* E1, *"(…) I'm now having training about this, (…)"* E9.

Castanheira[30] concluded that professional caregivers generally had training in geriatrics and, over the course of their careers, had the opportunity for continuous training. Much of the

training in geriatrics occurred after the beginning of their careers. The initial lack of training in this professional area can be explained by the fact that most caregivers do not initially view themselves as carrying out such work in the medium and long term.

Refreshing knowledge is considered beneficial. Updating knowledge, monitoring changing techniques and learning new approaches is supported by several authors. It is considered beneficial that institutions promote such training and when they are unable to do so, facilitate and encourage the participation of their employees in these programs. *"(…) I like to refresh and update my knowledge because there are always new things, new experiences (…)"* E3.

Continuous training is considered useful by all the caregivers, as it makes the tasks they have to perform easier.[30]

The PC services inserted in the Rede de Cuidados Continuados Integrados (Continuous Integrated Care Network) are aimed at the entire population. There is no specific connection, however, with the social response provided by the Emergency Room (ER). Although the PC network in Portugal does not cover everyone who requires such care, hospital teams, inpatient units and home CP support teams are available. These could provide the support that the ER requires by providing external assistance in palliative care. This would benefit the elderly persons as much as the professional caregivers, who would be less overloaded by feelings of impotence when faced with the suffering of the elderly. The Estratégias para o Desenvolvimento do Programa Nacional de CP (the Strategies of the National PC Development Program) plan aims to provide PC to all institutionalized patients, so improving local level interconnection with support entities in order to understand the needs of PC. Another aim of the program is to facilitate the accessibility of PC teams to the respective entities, and of PC training courses for caregivers and workers in these services.[31]

Limitations

Despite the richness of these findings, they cannot be generalized as they are valid only for the group and context studied.

The bibliography of this study area is lacking, as the majority of studies are directed at family members, nurses and the elderly, but rarely at professional caregivers.

During the interviews, it was noted that the professional caregivers are not used to being heard and the recording was an intimidating factor. This was certainly the reason why some of the answers are rather succinct and provide little content in response to the questions.

CONCLUSION

The participants felt a close relationship with the elderly, marked by intense experiences, some of which are less than positive due to the suffering of the elderly. It was hard for the professional caregivers to talk about death, as they try to protect the elderly persons as much as possible, promoting hope and reducing suffering. To this end, presence, touch, support and non-withdrawal are essential.

By experiencing these situations, feelings such as fear, sadness and frustration emerge, as well as affection, fondness and pride in the roles they perform.

To address these difficulties, factors such as the team spirit created between professionals and asking colleagues who have gone through similar situations are important, as well as family support.

In terms of consequences, experience, memories of deceased elderly persons and taking problems home were mentioned.

The experiences described were rich, with the originally described objectives being achieved.

The profession of professional caregiver is reflective of the current job market due to the growing phenomenon of human aging. For this reason, these professionals merit our attention in further studies.

More investigations should be carried out in this area, focusing on the difficulties of professional caregivers, due to the potential usefulness of training programs.

Also in relation to training, the stress and emotional strain that professional caregivers suffer should not be overlooked and should be the target of investment in training programs that focus on this area.

The relationship between the professional caregivers and the elderly persons should also be the focus of investigation and training.

Improving the response of professional caregivers to elderly persons adds dignity to the care provided and, lastly, improves the future of each one of us.

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Profile of Pneumopathic Elderly Persons Admitted to a Pulmonary Rehabilitation Center

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Abstract

Introduction: Pneumopathies are defined as a group of respiratory diseases. Physiotherapy centers are a conventional treatment option which can help prevent and treat various pulmonary conditions. *Objective*: To characterize elderly persons with pneumopathies admitted for pulmonary rehabilitation. *Methods*: 84 elderly persons were admitted for pulmonary rehabilitation. Patients diagnosed with pulmonary disease and aged ≥60 years were included in the study. The following variables were analyzed: gender, age, marital status, profession, medical diagnosis, main medical complaint, associated diseases, and cardiovascular risk factors. *Results*: The most common lung disease is chronic obstructive pulmonary disease (COPD) (26.2%). Women showed a greater association with asthma [odds ratio (OR)=5.875; p=0.010]. Dyspnea was the most prevalent main complaint among this population (50%). Among the main complaints, difficulty walking was more associated with men (OR=2.85; p=0.055). Strokes were the main disease most commonly associated with pneumopathies (12.1%). Women had a greater association with other diseases (OR=5.34, p=0.068), especially when two diseases were presented simultaneously with lung disease (OR=2.32, p=0.041). Among the risk factors, physical inactivity (OR=3.33), alcohol consumption (OR=0.046) and history of smoking (OR=3.00) were significantly associated with men, while depression (OR=5.67) was significantly associated with women. Women exhibited a 3.28 greater association between allergies and pneumopathies than men (p=0.013). The practice of physical activity was more associated with women (OR=3.89; p=0.03). Osteoporosis was more prevalent among elderly women with pulmonary disease (OR=10.75; p<0.0001), and was also significantly associated with a history of smoking (OR=4.31; p=0.009). *Conclusion:* The most frequent diagnosis, main complaint and associated disease were COPD, dyspnea and strokes, respectively. Elderly woman exhibited a greater association with the diagnosis of bronchial asthma, and more diseases associated with lung disease. Physical inactivity, difficulty

Key words: Health Profile. Lung Diseases. Epidemiology.

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walking, and a history of alcohol consumption and smoking are more associated with men, while depression, the presence of allergies, regular physical activity and osteoporosis are more associated with women. Thus, the results demonstrate that these individuals have specific characteristics.

INTRODUCTION

Life expectancy has increased significantly in recent years and with it the goal of healthy and successful aging and good quality of life. Yet disorders related to aging affect elderly individuals, requiring improved treatment and increased knowledge of this population.[1]

Pneumopathies are defined as a set of respiratory system diseases and include acute infections, chronic or pleural lung diseases and respiratory tract malignancies.[2] They are a major global cause of morbidity, and represent approximately 16% of hospitalizations in Brazil.[3] It has been noted that patients with pulmonary disease who are admitted for rehabilitation are mostly elderly.[4]

Within this context, respiratory therapy centers have emerged as conventional treatment centers that help prevent and treat various lung conditions such as airway obstruction, pulmonary hypersecretion, changes in lung ventilation, physical deconditioning and dyspnea. However, there are few studies that characterize lung disease among elderly persons in pulmonary rehabilitation centers.[4]

Studies that characterize different populations are essential and of great importance as they provide relevant knowledge about these individuals and enable national healthcare guidelines be developed or restructured in order to meet the particular needs of a specific population.[4]

Therefore, the present study aimed to characterize elderly people with lung disease admitted to a pulmonary rehabilitation center.

METHOD

A retrospective, nonrandomized exploratory study was performed of elderly patients with lung diseases. The sample consisted of 84 patients admitted for pulmonary rehabilitation in the cardiopulmonary physical therapy department of a medical college in the city of São José do Rio Preto, from March 2002 to December 2010. Patients with a diagnosis of lung disease and aged 60 years or older were included in the survey. During admission to the medical college, patients underwent triage and were forwarded to the Cardiorespiratory Physiotherapy sector. Patients with incomplete admissions records were excluded.

For data collection a specific form based on the data included on the admissions form was created. The following variables were analyzed: gender, age, marital status, profession, medical diagnosis, chief health complaint, associated diseases and the cardiovascular risk factors presented by patients. The cardiovascular risk factors analyzed were: diabetes mellitus (DM), systemic arterial hypertension (SAH), sedentary lifestyle (no regular physical activity), alcohol consumption (constant alcohol intake reported by the patient), depression (with use of medication) and history of smoking ("yes", "no", "passive" and "ex-smoker"). The presence of allergies, regular physical activity (≥ three times/week), dependent mobility and a medical diagnosis of osteoporosis were also evaluated.

Descriptive and inferential statistics were used for data analysis. Descriptive results were expressed as mean, standard deviation (±), and absolute and

relative frequencies. Welch's unpaired t-test was used to compare age between men and women and to verify the similarity between the groups, while Odds Ratio (OR) was calculated with the Chi-squared test to compare the variables. A significance level of $p \leq 0.05$ was adopted. Statistical analysis was performed using the Instat program (version 3.0; GraphPad, Inc., San Diego, CA, USA).

This study was approved by the Ethics Research Committee of the Instituto de Moléstias Cardiovasculares (Institute of Cardiovascular Diseases Committee) (IMC/SP), under Protocol. No. 015.08.010. Data was cataloged using a registration code only to preserve the privacy of patients.

RESULTS

The sample consisted of 84 patients (49 men and 35 women) with a median age of 72 (60-94) years. The sample showed similarities in terms of age, as shown in Table 1. About 61% of the elderly persons were married and 56% were retired (Table 1). Men were more associated with being married (OR=2.97; p=0.009) and retired (OR=2.05; p=0.055).

With regard to medical diagnosis, five patients presented two associated pneumopathies (Table 2). The most common lung disease was COPD (26%). Women were more associated with asthma (OR=5.875; p=0.010).

Table 1. Age range/marital status/occupation of elderly patients with pneumopathies. São José do Rio Preto, São Paulo, 2012.

Age Range	Male n=49 (%)	Female n=35 (%)	Total n=84 (%)
60-69 years	18 (36.7)	12 (34.3)	30 (35.7)
70-79 years	16 (32.7)	18 (51.4)	34 (40.5)
≥80 years	15 (30.6)	05 (14.3)	20 (23.8)
Average age (years)	73.71±8.33	72.14±7.97	p=0.194
Marital Status			
Married/Civil Union	35 (71.4)	16 (45.7)	51 (60.7)
Divorced	03 (6.1)	03 (8.6)	06 (7.1)
Single	02 (4.1)	03 (8.6)	05 (6)
Widowed	09 (18.4)	13 (37.1)	22 (26.2)
Profession			
Retired	31 (63.3)	16 (45.7)	47 (55.9)
Civil Construction	03 (6.1)	-	03 (3.6)
From home	-	12 (34.3)	12 (14.2)
Domestic worker	-	02 (5.7)	02 (2.4)
Business man/woman	02 (4.1)	-	02 (2.4)
Farm worker	03 (6.1)	01 (2.9)	04 (4.8)
Driver	02 (4.1)	-	02 (2.4)
Teacher	-	02 (5.7)	02 (2.4)
Other *	08 (16.3)	02 (5.7)	10 (11.9)

* Different professions that exhibited only one occurrence in their category.

Table 2. Medical diagnosis/main health complaint of pneumopathic elderly persons. São José do Rio Preto, São Paulo, 2012.

	Male n=49 (%)	Female n=35 (%)	Total n=84 (%)
Medical Diagnosis			
Asthma	02 (4.1)	06 (17.1)	08 (9.5)
Atelectasis	01 (2)	01 (2.9)	02 (2.4)
Bronchiectasis	01 (2)	04 (11.4)	05 (6)
Lung cancer	03 (6.1)	01 (2.9)	04 (4.8)
COPD	14 (28.6)	08 (22.9)	22 (26.2)
Rib fracture	02 (4.1)	01 (2.9)	03 (3.6)
Pulmonary hypoventilation	14 (28.6)	05 (14.3)	19 (22.6)
Lobectomy	01 (2)	01 (2.9)	02 (2.4)
Pneumonia	08 (16.3)	06 (17.1)	14 (16.7)
Others[a]	06 (12.2)	04 (11.4)	10 (11.9)
Total occurrences	52	37	89
Main Health Complaint			
Tiredness	09 (18.4)	04 (11.4)	13 (15.5)
Difficulty walking	11 (22.4)	03 (8.6)	14 (16.7)
Dyspnea	24 (49)	18 (51.4)	42 (50)
Lumbago	03 (6.1)	04 (11.4)	07 (8.3)
Paresthesia	02 (4.1)	01 (2.9)	03 (3.6)
Secretions	07 (14.3)	01 (2.9)	08 (9.5)
Cough	07 (14.3)	06 (17.1)	13 (15.5)
Others[b]	11 (22.4)	14 (40)	25 (29.8)
Total occurrences	74	51	125

a: Medical diagnoses that occurred only once per category; b: Main health complaints that occurred less than three times per category.

Dyspnea was the most prevalent main health complaint among this population (50%). Around 29 individuals had two associated complaints and six individuals had three, totaling 125 complaints. Among the main complaints, difficulty in walking was most associated with elderly men (OR=2.85; p=0.055).

Cerebrovascular accidents (CVA) were the main disease associated with these pneumopathies (12%) (Table 3). About 26 of the elderly persons had two diseases associated with the pneumopathies and six had three, totaling 89 associated diseases. Women were more associated with other diseases (OR=5.34, p=0.068), especially when they had more than two associated lung pathologies (OR=2.32; p=0.041).

With regard to risk factors, physical inactivity was present among 85.7% of subjects, followed by a history of smoking (66.7%) (Table 4). Among the risk factors, physical inactivity, alcohol consumption and a history of smoking were significantly more associated with men; while depression was more associated with women (Table 4).

History of smoking, presence of allergies, dependent mobility, physical activity and osteoporosis are described in Table 5. Women had a 3.28 times greater association between allergies and lung disease than men (p=0.013). Physical activity was more associated with women (OR=3.89; p=0.03). Osteoporosis was more prevalent among elderly women with pneumopathies (OR=10.75; p<0.0001) and was significantly associated with smoking (OR=4.31; p=0.009).

Table 3. Associated illnesses exhibited by elderly pneumopathy suffererers. São José do Rio Preto, São Paulo, 2012.

	Male n=49 (%)	Female n=35 (%)	Total n=84 (%)
Associated diseases			
Heart arrhythmia	03 (6.1)	02 (5.7)	05 (6)
Stroke (CVA)	09 (18.4)	02 (5.7)	11 (13.1)
Migraine	01 (2)	03 (8.6)	04 (4.8)
Rheumatism	02 (4.1)	03 (8.6)	05 (6)
Fibromyalgia	-	04 (11.4)	04 (4.8)
Gastritis	02 (4.1)	04 (11.4)	06 (7.1)
Lumbago	04 (8.2)	04 (11.4)	08 (9.5)
Hypothyroidism	01 (2)	03 (8.6)	04 (4.8)
Parkinson	03 (6.1)	03 (8.6)	06 (7.1)
Others*	21 (42.9)	15 (42.9)	36 (42.9)
Total number of occurrences	46	43	89

* Associated illnesses that occurred less than three times per category.

Table 4. Risk factors presented by elderly pneumopathy sufferers. São José do Rio Preto, São Paulo, 2012.

Risk factors	Male (n=49)	Female (n=35)	Total (n=84)	OR	*p* (χ^2)
Diabetes *Mellitus*	14 (28.6%)	05 (14.3%)	19 (22.6%)	2.40	0.061
Systemic arterial hypertension (SAH)	27 (91.8%)	17 (48.6%)	44 (52.4%)	1.30	0.277
Sedentary lifestyle	45 (53.6%)	27 (77.1%)	72 (85.7%)	3.33	0.029*
Alcohol consumption	11 (22.4%)	03 (8.6%)	14 (16.7%)	3.09	0.046*
Depression	07 (14.3%)	17 (48.6%)	24 (28.6%)	5.67	>0.001*
Smoking history	36 (73.5%)	20 (57.1%)	56 (66.7%)	3.00	0.013*
Total occurrences	140	89	229		

OR (Odds Ratio): Level of association between gender and risk factors; *Significant association between gender and the presence of a cardiovascular risk factor in elderly sufferers of pneumopathies, evaluated by chi-squared test (χ^2).

Table 5. Events presented by elderly sufferers of pneumopathies. São José do Rio Preto, São Paulo, 2012.

	Male	Female	Total
History of smoking			
Ex-smoker	30	09	39-
Passive smoker	01	05	06
Smoker	05	06	11
Allergy	10	16	26
Dust	04	08	12
Medications	03	07	10
Others	03	01	04
Dependent mobility	09	05	14
Practices physical activity	09	04	13
Osteoporosis	21	06	28

DISCUSSION

We previously observed a prevalence of pneumopathies among elderly patients.[4] With population aging, the installation of such diseases and a change in the health profile of the population can be identified, with chronic diseases and their morbidities being most prevalent, requiring the direct use of health services.[5] It is therefore important to study this population specifically, given the high prevalence of this condition and associated socioeconomic costs.

COPD was the most pneumopathy and a history of smoking was one of the main risk factors, with the latter being more associated with men. The same results were previously observed in individuals from different age groups.[4] Tobacco has been found to increase the risk of developing COPD, although there is also a need for individual susceptibility for a pathological condition to be installed.[6] Among the Brazilian population, morbidity and mortality rates from COPD have been increasing in the last twenty years, which is a worrying scenario considering that the disease is preventable. It is therefore important to invest in anti-smoking policies.[7,8]

Dyspnea was the main health complaint. According to the American Thoracic Society,[9] this term refers to respiratory distress of varying intensity diagnosed from the subjective experience of the individuals. It is based on behavioral and physiological responses that are influenced by the environment, psyche and physiological factors.[9]

Elderly women were more associated with a diagnosis of bronchial asthma, a result also found in other studies.[10-13] Recognition of this pathological condition improves the diagnosis and notification process and optimizes diagnostic tests for these patients, as well as reducing errors during admission.[12] There is a significant association between asthma and allergies in women,[14] explaining the greater association identified between these two clinical profiles and women.

A sedentary lifestyle was the main cardiovascular risk factor presented by the patients, with men more associated with sedentary lifestyles and difficulty walking, and women exhibiting greater physical activity. Physical inactivity is a characteristic factor of some lung diseases and a risk factor for the worsening of symptoms, and consequently a marker for health condition.[15] Greater life expectancy is expected within this context.

Strokes were the most frequent disease among patients admitted for pulmonary rehabilitation. Lung diseases such as pneumonia and pulmonary embolism are prevalent post-stroke complications, directly related to immobility.[16] Therefore, early physical therapy in a hospital environment is of fundamental importance.

Depression was more prevalent in elderly persons with lung disease. This result has also been observed in the general elderly population and is related to the decline in physical function and a poor quality of life.[17] Another prevalent chronic disease in women is osteoporosis.[17] In the present study, it was observed that osteoporosis was also associated with a history of smoking, a result also found in another article.[18] Smoking reduces bone mineral density due to changes in estradiol, serum *parathyroid* and vitamin D levels, altering calcium absorption in the digestive system and the renewal of bone cells.[19]

During the development of the research, it was noted that analysis based on medical records hinders data collection, as it leads to a loss of individuals included in the study due to failures during the admission assessment. However,

the results of the study proved to be extremely important, especially given the lack of studies on the theme. We suggest that future prospective studies that evaluate the effectiveness of prevention and treatment programs for elderly patients are carried out based on the results of the present study.

CONCLUSION

The most frequent main diagnosis and health complaint were COPD and dyspnea, respectively. Elderly women were more associated with the diagnosis of bronchial asthma and other diseases associated with pneumopathies. Strokes were the disease most associated with pulmonary illness. Physical inactivity, difficulty walking, alcohol consumption and a history of smoking history were more associated with men, while depression, presence of allergies, physical activity and osteoporosis were more associated with women. The present study highlights the need for investment in prevention and health promotion among the elderly, as well as new treatment protocols and the improvement of physiotherapy treatments that can result in a better quality of life for these patients.

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Development of a cognitive training program for the elderly

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Abstract

Introduction: Plasticity in intellectual functioning has been the target of significant research investment. Among non-pharmacological interventions, cognitive training appears as a promising option for delaying the effects of aging on cognition. *Objective:* The present study describes the procedures of a cognitive training program for healthy Brazilian elderly persons (without diagnosis of dementia). *Method:* Cognitive tasks for the training of attention, processing speed, episodic memory and working memory were carried out. The program training was performed over 12 individual sessions, and included an Instruction Book, a Stimulus Book and Protocol Record. To assess the effects of training, five subtests of the WAIS-III test were used: Picture completion, Coding, Arithmetic, Matrix Reasoning and Digit Span. The cognitive training program was tested with 15 individuals, divided into an experimental group (EG), which received training, and a control group (CG). The EG was formed of seven participants, aged between 70 and 82 years (M=73.57, SD=4.11) and with an average schooling of 5.8 years (SD=1.02). The CG was formed by 8 participants, aged 69-77 years (M=74.00, SD=4.58), and who had an average schooling of 2.88 years (SD=2.58). *Results:* Repeated measures ANOVA revealed a training effect for three subtests: Coding: [F(1)=5.40, p=0.03, η2G=0.09], Arithmetic [F(1)=9.03, p=0.01, η2G=0.004] and Picture completion [F(1)=8.01, p=0.01, η2G=0.19]. There were no gain effects for Matrix Reasoning [F(1)=1.43, p=0.25] and Digit Span [F(1)=10.04, p<0.001]. *Conclusion:* The results of this pilot study show the importance of testing the impact of cognitive training through a randomized clinical trial to verify its effects on the mental performance of older adults. The importance of greater disclosure in literature of the construction procedures involved in cognitive training tasks, as well as the formulation of intervention strategies, is highlighted.

Keywords: Elderly. Cognition. Cognitive Training

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INTRODUCTION

In the extensive field of non-pharmacological interventions for the elderly population, cognitive interventions are becoming increasingly popular. This procedure involves the training of specific cognitive mechanisms in standardized tasks that represent a direct and experimentally controlled method of investigating the degree of plasticity in intellectual functioning during the aging process.[1] One underlying assumption about cognitive interventions is that performing mental exercises and using cognitive learning strategies can improve or (at least) preserve the functioning of a determined domain. Another assumption is that the effects of this practice will be generalized beyond the immediate context of the intervention. The importance of the assessments of the impact of cognitive interventions on the mental performance of elderly individuals has increased over the last decade.[2-5] The results suggest that proper interventions produce learning effects, an improved performance in the skills targeted in the intervention and (less frequently), generalized gain effects for the different contexts of the intervention (such as daily activities) and transference effects for non-trained cognitive abilities.[6-10] There is also evidence of the positive impact of these interventions on the performance of elderly individuals with accentuated mental decline due to dementia, suggesting the possibility of assuaging and/or delaying cognitive impairment, although the scope of the interventions is more limited when compared with non-clinical groups.[11-13]

There is some confusion about the terms commonly used to define the different types of cognitive interventions for the elderly.[14,15] Literature contains several different terms to describe intervention techniques, of which the most common are cognitive stimulation, cognitive training and cognitive rehabilitation. Despite the fact that these terms are often used in a way that would suggest that they are synonymous, they actually differ in terms of the methodology used.[16] This low level of concordance in relation to the use of terminology has hindered meta-analysis studies, which seek to correctly classify the type of intervention reported by the authors. An attempt to create a taxonomic reference was initiated by Clare et al and subsequently discussed and revised by Belleville, Mowszowski et al. and Bahar-Fuchs, Clare & Woods. Based on these studies, the following classifications have been made[17,18]:

1) Mental stimulation: also known as brain training, this refers to the repeated performance of standardized tasks, often carried out using computerized formats or games.[19] This type of intervention is quite common in neuropsychological bias approaches and is characterized by the commercialization of products in the form of games, which are sometimes available via websites.* A significant characteristic of brain training is the absence of a structured and managed learning situation, since this type of training seeks to involve the individual in a situation of mental effort through the performance and repetition of tasks. Given that learning strategies involve little effort, mental stimulation has become a powerful tool in interventions with clinical groups. [20]

2) Cognitive training: this type of intervention is centered on the performance of a set of standardized tasks that reflect certain cognitive functions, including memory, attention, problem-solving, reasoning and processing speed, among others. This type of intervention can be unimodal, which focuses on the training of a specific ability (for example, episodic memory), or multimodal, which trains several cognitive abilities. The stimuli used can be of the "pencil and paper" variety, or may be computerized. It is also common to include activities of daily living.[21,22] The performance of activities can be completed individually or in groups,[23] or even with family members.[24] It differs from mental stimulation in that the participants are taught a number of strategies to optimize their mental functioning.

* Ex: http://www.sharpbrains.com and http://www.luminous.br

3) Cognitive rehabilitation: this type of intervention is aimed at clinical groups and is typically characterized by involving the patient in a range of general activities (including cognitive stimulation) and discussions (commonly performed in groups). The main aims of cognitive rehabilitation are to obtain a general improvement in daily cognitive and social functioning[25] and to help patients with early or moderate dementia to get the best out of their memory and cognitive functioning, despite the difficulties they are facing.

Cognitive training can be conducted in different formats, which vary in relation to the following aspects: 1) the modality used - individual or collective sessions; 2) the target abilities – multi-domain interventions stimulate cognitive abilities in different domains, whereas in a unimodal intervention the target abilities are in the same cognitive domain; 3) the format of the stimuli – "pencil and paper" activities or computerized tasks; 4) cognitive measurements – the measurements can focus on the target abilities of the intervention (the aim of the training), in order to investigate the effects of proximal (near transfer) transference, or non-trained abilities, in order to investigate the effects of distal (far transfer) transference; 5) the follow-up period – long-term monitoring examinations determine the temporal durability effects of the intervention.

Evidence related to the effectiveness of cognitive training programs for the elderly began to appear on the international scene in the 1980s, when the main focus was on investigating the possibility of reversing age-related decline using cognitive psychometric tests.[26-28] One of the most significant pioneers studies was the Seattle Longitudinal Study (SLS).[29] The fifth cycle of the SLS (1984) included a significant contribution by Sherry Willis, who introduced the paradigm of cognitive training to the project.[27]

In the 1990s, one of the most significant randomized clinical trials of cognitive training for the elderly was conducted. The study in question was known as ACTIVE *(*Advanced Cognitive Training for Independent and Vital Elderly) and was conducted between April of 1998 and December of 2004. This project was coordinated by the New England Research Institute (NERI) and covered six metropolitan regions in the USA.[9,11,30,31] Each intervention group received 10 training sessions for one of the three cognitive abilities: 1) episodic memory training (n=711); 2) reasoning training (n=705); and 3) processing speed training (n=712). The control group contained 704 participants. Four booster training sessions were conducted 11 and 35 months after the original training program in 60% of the sample (for each of the intervention groups). The results indicated an improvement in all of the abilities that were trained in each group (p<0.001), with temporal stability of two and five years. The ten-year monitoring session confirmed gain maintenance effects in the abilities trained, although only for reasoning and speed. As yet, there is no international consensus concerning the impact of these intervention programs,[2,32] although the extensive number of studies has led to the initiation of meta-analysis studies and systematic reviews of evidence from the 1990s [33] until the current day.[13,23,34-38]

In Brazil, studies of cognitive training for the elderly began in the year 2000 with a study by Guilherme Wood.[39] A national literature review was conducted in the Scielo, PsycINFO and PubMed databases between January 1990 and July of 2015 using the following (Portuguese and English) terms: cognitive training; cognitive stimulation; aging; the elderly and Brazilian. Theses and dissertations that were available in digital libraries were also used. In total, 21 national experimental studies were identified. Chart 1 displays the data related to these studies.

Chart 1. Report of national experimental studies. Vitória da Conquista, BA, 2014.

Aramaki FO, Yassuda MS. Cognitive Training based on metamemory and mental images: follow-up evaluation and booster training effects. Dementia and Neuropsychology, 2011; 5(1): 48-53.
[a,b]Brum PS. Treino de memória para idosos saudáveis e com comprometimento cognitivo leve: benefícios sobre parâmetros cognitivos (Dissertação). São Paulo: Faculdade de Medicina, Universidade de São Paulo; 2012.
Carvalho FC, Neri A, Yassuda MS. Treino de Memória Episódica com ênfase em categorização para idosos sem demência e depressão. Psicologia: Reflexão e Crítica , 2010; 23(2): 317-323
[b]Chariglione IPF (2010).A influência de diferentes tipos de treinos cognitivos na memória de idosos institucionalizados (dissertação). Brasília (DF): Programa de pós-graduação em ciências do comportamento, Universidade de Brasília; 2010.
Chariglione IPF. Intervenções cognitivas para o aprimoramento da memória em idosos com envelhecimento cognitivo normal (Tese). Brasília (DF): Programa de Pós-Graduação em Ciências do Comportamento, Universidade de Brasília, 2014
[a]Irigaray TQ, Filho IG, Schneider RH.. Efeitos de um treino de Atenção, Memória e Funções Executivas na cognição de idosos saudáveis. Psicologia: Reflexão e Crítica, 2010; 25(1): 188-202.
[b]Irigaray TQ, Filho IG, Schneider RH. Efeitos de um treino de Atenção, Memória e Funções Executivas na cognição de idosos saudáveis. Psicologia: Reflexão e Crítica, 2010; 25(1): 188-202
Irigaray, T. Q., Schneider, R. H., & Gomes, I. (2004). Efeitos de um treino cognitivo na qualidade de vida e no bem-estar psicológico de idosos. *Psicologia: Reflexão e Crítica*, 24(4), 810-818.
[a,b]Lasca VB. Treinamento de memória no envelhecimento normal: um estudo experimental utilizando a técnica de organização (Tese). São Paulo: Universidade Estadual de Campinas; 2003.
[b]Lima-Silva TB, Yassuda MS. Treino cognitivo e intervenção psicoeducativa para indivíduos hipertensos: efeitos na cognição. Psicologia: Reflexão e Crítica, 2010; 25(1): 30-40
Lima-Silva TB, Ordonez TN, Santos GD, Fabricio AT, Aramaki FO, Almeida EB, et al Effects of cognitive training based on metamemory and mental images. Dementia and Neuropsychology, 2010; 4(2): 114-119.
[b]Lima-Silva TB, Oliveira ACB, Paulo DLV, Malagutti MP, Danzini VMP, Yassuda MS. Treino cognitivo para idosos baseado em estratégias de categorização e cálculos semelhantes a tarefas do cotidiano. Revista Brasileira de Geriatria e Gerontologia, 2011; *14*(1): 65-74.
[b]Olchik MR. *Treino de memória: um novo aprender no envelhecimento* (Tese). Porto Alegre: Universidade Federal do Rio Grande do Sul; 2008.
[b]Oliveira TCG, Soares FC, Macedo LDD, Wanderley DL, Diniz P, Bento-Torres NVO, Picanço-Diniz CW. Beneficial effects of multisensory and cognitive stimulation on age-related cognitive decline in long-term-care institutions. Clinical Interventions in Aging, 2014;14(9): 309-321.
[b]Paulo DLV, Yassuda MS. Elderly individuals with diabetes: adding cognitive training to psychoeducational intervention. Educational Gerontology, 2012; *38*(4): 257-270.
[b]Santos IB. Oficinas de estimulação cognitiva em idosos analfabetos e com transtorno cognitivo leve (Dissertação). Brasília (DF): Programa de Pós-Graduação em Gerontologia, Universidade Católica de Brasília; 2010
Silva HS, Yassuda MS. Memory Training for older adults with low education: mental images versus categorization. Educational Gerontology, 2009; *35*(10): 890-905.
[b]Teixeira-Fabrício A, Lima-Silva TB, Kissaki PT, Vieira MG, Ordonez TN, Oliveira TB, et al. Treino cognitivo em adultos maduros e idosos: impacto de estratégias segundo faixas de escolaridade. Psico-USF, 2012; 17(1): 85-95.
[a,b]Yassuda MS, Batistoni SST, Fortes AG, Neri AL. Treino de memória no idoso saudável: benefícios e mecanismos. Psicologia: Reflexão e Crítica, 2006; 19(3): 470-481.
[b]Zimmermann N, Netto TM, Amodeo MT, Ska B, Fonseca RP. Working memory training and poetry-based stimulation programs: are the differences in cognitive outcomes in healthy older adults? NeuroRehabilitation, 2014; 35(1): 159—170.
[a,b]Wood GMO. Efeitos do nível de auto-eficácia cognitiva percebida e de programas de treinamento cognitivo sobre a capacidade de memória de trabalho de indivíduos idosos (dissertação). Belo Horizonte: Programa de Pós-Graduação em Psicologia, Universidade Federal de Minas Gerais; 2000.

a=study reported training protocol construction procedures; b=study outlined the cognitive tasks used during the training.

This late start in comparison to international studies has led to a smaller accumulation of evidence concerning the effectiveness of Brazilian interventions and consequently, a reduced number of standardized intervention protocols. In addition, the dissemination of intervention design procedures and the descriptions of the cognitive tasks used in training has sometimes been neglected. Of the 21 national studies analyzed, only five (23%) provided the design procedures of the cognitive tasks and the strategies used or indicated the source of the protocol when using protocols created by other authors. Concerning the specifications of the tasks, 14 (66%) studies provided adequate details of the cognitive tasks and mnemonic strategies used in the intervention (Chart 1).

The aim of the present study was to present the development procedures of a cognitive training protocol for elderly individuals that was designed for a Brazilian context, as well as to describe the intervention tasks and strategies used. This research also reported the preliminary results of a training protocol that was tested in a pilot study.

METHOD

Development of the Cognitive Training Protocol

Concerning the task training development procedures, we first opted to create an original protocol for Brazil, rather than using a protocol that had been created by other authors. This decision was motivated by the absence (in both national and international literature) of multi-modal training models for elderly individuals of the "pencil and paper" variety. The idea was that these protocols would be adequately disseminated or made available with instructions related to the application and stimuli, as well as the recordings of the performance of the participant.

The first stage consisted of a review of national and international studies addressing cognitive interventions for the elderly, with a particular focus on randomized clinical trials, meta-analysis studies and systematic reviews, in order to define the choices to be made in relation to structural aspects of an intervention. This first stage resulted in the adoption of the following protocol format and structure:

a) Individual *versus* collective modality: we opted to conduct individual training sessions given that most of the relevant Brazilian studies have proposed collective interventions.[39-41] Thus, there is a lack of evidence available related to individual training, which makes it difficult to compare the two modalities. Despite the common argument in Brazilian literature that collective training increases the motivation and adherence of the participants,[23] it is not possible to delineate an intervention that is adapted to the level of the individual's abilities during collective training sessions.

b) Multi-domain *versus* unimodal intervention: we opted to create an intervention focusing on multiple abilities, with a wide variety of tasks, due to the results of earlier studies, which suggested that multi-domain training is more effective.[42,43] Conversely, a meta-analysis study reported a greater effect size after an intervention that only trained processing speed, when compared with multi-domain training.[34] In the present study, the training was developed to focus on the following abilities: focused attention; processing speed; episodic memory and working memory.

c) Mnemonic strategies: for the sessions involving the training of episodic memory, compensatory strategies were generally used due to their greater adequacy for the target public of the research.[12] These strategies included mental visualization, name-face association and idea association. One strategy classified as restorative (spaced recovery) was included in memory training as it was more suitable to storytelling memory activities.[12]

d) Attention training: it was decided that attention exercises would be included before memory training, based on findings that suggest better results in memory training when it is preceded by attention training (pre-training).[44]

e) "Pencil and paper" format *versus* computerized format: the present study used a “pencil and paper” format rather than a

computerized format as the latter can cause intervening variables, due to the difficulties the individuals have with computerized technology.

f) Adapted format: we decided to use an intervention format that was adapted in two ways: 1. the level of performance of the participant: the completion of the protocol tasks was conditioned to the cognitive performance of the participants in order to avoid tiredness and frustration, which may have occurred if they were asked to perform tasks that were beyond their level of ability; 2. daily activities: a number of episodic memory tasks were elaborated in such a way as to apply the strategies learned in daily individual situations.

After the definition of the structural aspects of the protocol, the general intervention criteria were stipulated. These were applied by the examiner during the performance of the tasks. These guidelines were established in order to standardize the application of the intervention using specific instructions to improve the participant's performance during the task. Three guidelines were created for the coordination of the tasks:

- Levels of difficulty: the items were organized using three levels of difficulty (easy, medium and difficult). Each level of difficulty contained approximately three items.
- Interruption criteria: interruption criteria were created for the participant in relation to the three levels of difficulty, thereby providing the program with a format of applicability that was adapted to the performance of the participant. This adaptation was created in order to assuage the effects of tiredness among the participants and to increase their motivation and adherence to the program.
- Number of attempts: most of the tasks involved items classified as "second attempt" or "second stimulation". This set of items is preceded by a set of interventions (instructions/ tips and/or cognitive strategies) that sought to improve the performance of the individuals in the task in question.

Finally, a set of tasks was created for each target-ability of the training protocol, which was applied over 12 sessions. Chart 2 displays the tasks used in each cognitive domain trained, as well as a description and the specification of the number of items involved.

Chart 2. Description of the cognitive training tasks per session. Vitória da Conquista, Bahia, 2014.

Session 01			
Cognitive domains	Tasks	Description	No. of items
Concentrated attention and processing speed	Explaining attention	Information about what is attention, how this ability affects our routine and how we could improve it.	
	Game of seven errors	Identify differences between two figures;	7 items
	Mazes	Draw the correct path through a maze, without crossing over the lines, in a controlled time period; Repeat the same maze in half the time required to complete it the first time.	Easy – 3 items Medium – 3 items Difficult – 3 items

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Continuation of Chart 2

Session 02			
Cognitive domains	Tasks	Description	No. of items
Memorizing visual stimuli	Figures	Analyze a figure and reproduce it while looking at it; Analyze a figure and reproduce it without seeing it anymore.	Easy – 3 items Medium – 3 items Difficult – 2 items
	Cinema	Watch the short film "Solo" and answer questions about the story and characters	1 item
Session 03			
Cognitive domains	Tasks	Description	No. of items
Attention for auditory stimuli and episodic memory	Sound stimulation	Identify, in a set of several words, the one that is wrong or does not exist.	10 items
	Retelling stories	Listen carefully to a story, divide it into segments; retell the story partly; retell the story in its entirety.	Easy – 3 items Medium – 3 items Difficult – 3 items
Session 04			
Cognitive domains	Tasks	Description	No. of items
Concentrated attention and processing speed	Visual search	Mark the stimulus-target within a series of distractor stimuli, with controlled time; repeat the task in half the time required for the first attempt.	Easy – 3 items Medium – 3 items Difficult – 3 items
	Film	Discussion of the short film "Dona Cristina lost her memory".	1 item
Session 05			
Cognitive domains	Tasks	Description	No. of items
Episodic memory (strategy of mental visualization)	Visualization	Close your eyes and describe the room around you; look at the image of a house and when the image is no longer present, describe it.	2 items
	Photography	Analyze personal photographs and once they are no longer visible, describe them and answer questions about them.	2 items
	Parts of the body	Imagine that each part of the body is transformed into a different object.	6 items
	Visualizing figures	Analyze figures and once they are gone, visualize them in your mind to answer questions about them	3 items

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Continuation of Chart 2

Session 06			
Cognitive domains	Tasks	Description	No. of items
Episodic memory (strategy of idea association)	Idea association	Make associations to memorize tasks	3 items
	Implementing future actions	Imagine you are performing future actions	1 item
	Medicine	Make associations to memorize drugs	Variable in accordance with the number of drugs per participant
	Commitments	Make associations to memorize commitments	Variable in accordance with the number of commitments per participant
Session 07			
Cognitive domains	Tasks	Description	No. of items
Episodic memory	Memorizing names	Create different strategies to memorize the names of people	11 items
Session 08			
Episodic memory	Tasks	Description	No. of items
	Memorizing numbers	Create different strategies to memorize numbers	3 items
	Important numbers	Create different strategies to memorize important personal numbers	Variable in accordance with the number of important numbers per participant
Session 09			
Episodic memory	Tasks	Description	No. of items
	Commemorative dates	Create different strategies to memorize important dates	Variable in accordance with the number of commemorative dates per participant

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Continuation of Chart 2

Session 10			
Cognitive domains	Tasks	Description	No. of items
Working memory	Phonological domino	The instructor says a word and the participant should state a name that begins with the same syllable as the last syllable said by the instructor	10 items
	Pa-pa-ra-pa-Pá	Count the number of stimuli-targets in a set of distractor stimuli, while intoning a rhythm at the same time	3 items
Session 11			
Cognitive domains	Tasks	Description	No. of items
Working memory	Sequence of stories	Read disorganized sections of a story to later retell it in the correct order, without help from the stimuli	4 items
	Rescuing stories	The participant received blank cards and each one represents a significant event in a decade of life. At the end, they organize the material in chronological order.	1 item
Session 12			
Cognitive domains	Tasks	Description	No. of items
Working memory	Months	The participant should repeat a sequence of months, following the order of the calendar	Easy – 4 items Medium – 4 items Difficult – 4 items
	Number of letters	Saying the number of letters in a word, without printed stimuli	Easy – 5 items Medium – 5 items Difficult – 5 items

The training program material consisted of three manuals for individual use: 1) the stimuli manual, which contained all of the stimuli presented to the participant; 2) the protocol of records, which was used to record the participant's performance in all of the tasks; 3) and the instruction manual, which contained the material created by the examiners and detailed instructions about the application procedures for each session.

The stimuli used to apply the tasks, as well as the application instructions and the method of recording responses, can be seen in the work by Santos.[45] Once finalized, the training protocol consisted of 12 sessions of thirty minutes, which were conducted on a weekly basis using the individual modality application.

Pilot study

A pilot study was conducted to ascertain what improvements and corrections were required for the training protocol, as well as: 1) to determine the effects of the training protocol on the mental performance of elderly individuals; 2) to determine the adequacy of the language used in the instructions for the tasks (how well they were understood); and 3) to determine the feasibility of the session planning in relation to the number of tasks stipulated.

Participants

In total, 15 elderly individuals took part in the present study. The following exclusion criteria were applied: a) a severe cognitive deficit reported in the anamnesis interview; b) symptoms of depression: a geriatric depression scale (GDS-15) score of >5, in accordance with the criteria of the Brazilian sample;[46] c) a diagnosis of dementia; d) a severe visual and/or auditory deficit that would have a negative effect on communication. After the screening, the participants of the final sample (N=15; mean age =73.13, SD=3.37; mean years of education =4.33, SD=2.44), who were all female, were divided into two groups: the experimental group (EG) received the training; the control group (CG) did not receive training but participated in dynamic and psycho-affective meetings. The division was conducted in a non-random manner based on convenience, given that the control group was formed by members of a care center for the elderly. The experimental group (EG) contained seven participants (n=7), who were aged between 70 and 82 years (M=73.57, SD=4.11) and had a mean education of 5.8 years (SD=1.02). The control group (CG) contained eight participants (n=8), who were aged between 69 and 77 years (M=74.00, SD=4.58) and had a mean education of 2.88 years (SD=2.58).

Instruments

The following instruments were used to screen the participants:

- Anamnesis interview: created especially for the present study, the interview addressed the current and past clinical health condition of the participants, the presence of emotional and cognitive symptoms, psychiatric disorders and senile dementia.
- Geriatric depression scale:[46,47] the aim of this scale is to identify and quantify depressive symptoms in the elderly population. The reduced version (15 items) was used for the present study, in accordance with the criteria for a Brazilian sample. Participants with a score above 5 on the scale were excluded.
- Mini mental state examination:[48,49] this short 30-point questionnaire was used to track cognitive losses and the estimate the severity of dementia. It contains questions and simple problems related to several issues: orientation in time and space; short-term memory; arithmetic; language comprehension and basic motor skills.

Cognitive measurements before and after training

In order to assess the cognitive performance before and after the training, five subtests of the Wechsler Adult Intelligence Scale (WAIS-III) were used:[50] figures; codes; arithmetic; matrix reasoning and digits. The instruments were applied individually in a single session, with an interval of 15 minutes, or in two sessions, depending on the availability and level of tiredness of the participants.

Instruments to assess the structural aspects of the training

In order to understand the level of understanding of the participants, a brief interview was conducted with each member of the EG. To determine the feasibility of the format proposed in the sessions, the examiners applied an open questionnaire that assessed the quality of the stimuli, the recording of the responses and the application instructions.

Procedures

After the construction of the cognitive training protocol and the elaboration of the tasks, elderly individuals were invited to participate in the study based on the recruitment process. The research project was explained to them and those who agreed to participate signed a free and informed consent form. A group of six psychology students were trained to conduct the intervention and apply the cognitive tests. The monitors were trained for three months under the careful guidance of one of the researchers responsible for this project, who also supervised the application of the activities.

Since the interventions were conducted individually, the number of sessions varied in accordance with the individual performance of the participants (due to their speed while performing the tasks and the application of the interruption criteria). This is not typical of collective modality training studies, in which all of the participants follow the same pace in a fixed number of meetings. In the pilot study, the examiners were instructed to interrupt the session if they noticed signs of tiredness and to anticipate tasks that were planned for a later meeting if the participant was performing very well. Thus, the program is adaptive: a number of tasks in the domain "episodic memory" worked with the daily activities of the participants, including taking medicine, commitments, dates and important numbers, thereby preventing the standardization of the application time. These factors resulted in a variable number of sessions, since some participants finished the training protocol in only nine sessions (of the 12 planned sessions), whereas other participants needed 13 sessions to complete it.

The cognitive measurements were applied before (pre-training) and immediately after (post-training) training in the individual modality. At the end of the study, each participant was interviewed (individually) once again and received a written report outlining their performance. The interview involving the participants of the EG (to determine the adequacy of the language used in the instructions) was always performed at the end of each session. The questionnaire that was used by the examiners to assess aspects of the feasibility of the protocol was applied at the end of the intervention.

The present study received approval from the Research Ethics Committee of the Universidade Federal de Minas Gerais (Federal University of Minas Gerais) under protocol number (CAAE: 30885414.8.0000.5149) and satisfied all ethical standards and demands.

Data analysis

Initially, descriptive statistics were used with the weighted scores to calculate the mean and standard deviation values for the pre- and post-test scores in the EG and the CG. The differences between the two groups in the pre-test scores were then analyzed using the Mann-Whitney test. Subsequently, the Shapiro-Wilk normality test was computed for the subtest scores of the WAIS-III. This test is appropriate for samples with less than 100 participants and tests the hypothesis that the sample is from a population with normal distribution. For the subtests that refuted the null hypothesis of the Shapiro-Wilk test (p-value greater than 0.05), ANOVA for repeated measurements was conducted. Rank transformation ANOVA[51], a non-parametric test to assess repeated measurements, was carried out for the subtests that exhibited significance in the Shapiro-Wilk test. The effect size was calculated using the eta generalized squared test.[52] All of the analysis was conducted using free R software. The interviews conducted with the participants of the EG and the protocol assessment questionnaire (completed by the examiners) were analyzed qualitatively.

RESULTS

The descriptive statistics were calculated using the weighted scores of the WAIS-III subtests, as per the age group tables for the Brazilian sample.[50] Table 1 displays the mean and standard deviation values for each measurement, separated by group. In general, the results indicate an increase or stabilization for all of the post-training scores in the EG, whereas the participants in the CG exhibited stable or declining scores after the intervention.

Table 1. Descriptive statistics for the EG and CG. Vitória da Conquista, Bahia, 2014.

	Experimental Group				Control Group			
Subtest	Pre-test		Post-test		Pre-test		Post-test	
Figures	M	SD	M	SD	M	SD	M	SD
	12.14	3.07	15.86	1.77	9.25	1.98	8.88	1.88
Codes	M	SD	M	SD	M	SD	M	SD
	8.86	1.46	10.86	3.02	7.00	1.06	6.75	1.48
Arithmetic	M	SD	M	SD	M	SD	M	SD
	9.29	3.09	10.29	3.25	4.75	1.90	3.88	1.24
Matrix reasoning	M	SD	M	SD	M	SD	M	SD
	10.71	2.98	13.43	4.07	7.88	1.45	7.50	1,06
Digits (total)	M	SD	M	SD	M	SD	M	SD
	10.57	3.04	13.00	3.41	8.71	2.21	8.13	1.35

It was also found that the individuals in the CG performed worse in the pre-test than the individuals in the EG, which was expected due to the lower level of education of the individuals in the CG. The Mann-Whitney test was used to determine the statistical significance of the difference in performance between the two groups in the pre-test, with the following results: codes ($U=48$, $p=0.02$), arithmetic ($U=52{,}5$, $p=0.005$) and matrix reasoning ($U=49$, $p=0.01$). No significant differences were found between the groups for figures ($U=43{,}5$, $p=0.08$) or digits ($U=34$, $p=0.24$).

The Shapiro-Wilk normality test was used to determine the normality of the data distribution. Normal distribution was confirmed for all of the measurements except matrix reasoning ($W=0.80$, $p=0.004$). Therefore, ANOVA for repeated measurements was conducted for the subtest figures, codes, arithmetic and digits, whereas rank transformation ANOVA was conducted for matrix reasoning.

The results of the ANOVA for repeated measurements confirmed a significant interaction effect between the time versus group factors for figures [$F(1)=8.01$; $p=0.01$, $\eta^2_G=0.19$], indicating a significant increase in performance among the participants in the EG between the pre- and post-tests, when compared with the participants in the CG. A significant interaction effect was also recorded between the time versus group factors for the subtest codes [$F(1)=5.40$, $p=0.03$, $\eta^2_G=0.09$], indicating a significant increase in performance among the participants in the EG between the pre- and post-tests. There was also a significant effect for the isolated group factor [$F(1)=12.60$, $p=0.003$, $\eta^2_G=0.42$], indicating differences between the groups regardless of the period of the study. For the subtest arithmetic, a significant interaction was found between the time versus group factors [$F(1)=9.03$; $p=0.01$, $\eta^2_G=0.004$], indicating that there was a significant improvement in the performance of the participants in the EG, when compared to those in the CG. There was also a significant effect for the isolated group factor [$F(1)=1.96$, $p<0.001$, $\eta^2_G=5.87$], indicating differences between the groups regardless of the period of the study. No time versus group interaction effect was recorded for digits, although there was a significant result for the isolated group factor [$F(1)=10.04$, $p<0.001$], confirming significant differences between the groups regardless of the period of the study. The

subtest matrix reasoning exhibited an abnormal distribution. Consequently, rank transformation ANOVA, which is a non-parametric test for repeated measurements, was carried out. The result did not indicate a significant time versus group interaction effect [F(1)=1.43, p=0.25] for this measurement.

After analyzing the questionnaires (completed by the participants of the EG and the examiners) used to assess the structural aspects of the program, the following modifications were made to the protocol: 1) the seven errors game was removed: the participants found this task to be childish and the examiners thought it burdened the session unnecessarily, given the low cognitive effort that it required; 2) the cinema and film exercises were considered excessive by the examiners. However, the participants found them to be motivating and as such, they were classified as optional; 3) the participants resisted the copies exercise as it demanded drawings and the examiners found the task to be too extensive. The number of items was reduced and the task instructions were improved in an attempt to achieve greater adherence; 4) the teaching instructions for the mnemonic strategy "idea association" were reformulated, as the participants had found them confusing.

DISCUSSION

In recent decades, the field of cognitive intervention has made significant advances in relation to the development of techniques, strategies and the format of intervention programs, as well as the methodological aspects of studies.[23,34] However, when comparing the amount of evidence accumulated in international and Brazilian literature, the difference is immense, particularly in relation to the quantity of protocols of training originally developed for the Brazilian population and the number of experimental studies conducted to test the effectiveness of these interventions. In addition to this gap, there is a scarcity of scientific studies that focus on disseminating the design procedures for training protocols, which hinders methodological advances in the area:

1. Modern day cognitive interventions are characterized by the extreme heterogeneity of the training protocols. This phenomenon has been reported in international literature [2] and in Brazilian studies, and includes aspects such as structure, format, the number of sessions, cognitive tasks and the mental strategies taught. This heterogeneity hinders the performance of meta-analysis studies, which are essential if the field is to advance and resolve the divergences related to the hypothesis of cognitive enrichment** and adequate comparison parameters among studies for the subsequent analysis. One of the greatest challenges reported in meta-analysis studies is obtaining the comparison parameters required for such a heterogeneous range of interventions. [23,34,36]

2. The poor availability of the protocols used in experimental studies, detailing the tasks, stimuli and instructions, damages the principle of scientific reproducibility, thereby hindering or even preventing a training protocol from being extensively assessed by other researchers in different contexts.

3. Finally, the lack of Brazilian studies reporting the creation procedures of training protocols prevents the field from advancing and achieving a gold standard, with guidelines for the development of cognitive interventions.

Analysis of 21 Brazilian studies in the field confirmed that only five (23%) reported the development procedures of the intervention used or provided the sources when protocols developed by other authors were used. It is important to stress, however, that none of the studies in this small group set out to share the stages of development of the intervention. In addition, little over half of the studies (61%) disseminated the tasks used in the training with an adequate level of specificity. Based on these issues, the present study shared the stages and procedures involved in the development

** The hypothesis of cognitive enrichment addresses the possibility of promoting a stable alteration in the cognitive structure of elderly individuals. For more information, see Hertzgov et al (2009) and Salthouse (2006).

of a cognitive training protocol and reported the preliminary results of its impact on the mental performance of the elderly individuals in question.

Different cognitive tasks were elaborated, with a focus on stimulating and teaching strategies of concentrated attention, processing speed, episodic memory and working memory. The tasks were split into 12 sessions of individual training, which were conducted on a weekly basis and lasted one hour and thirty minutes each. Three manuals were created for the training process: 1) an instruction manual, for the use of the monitor; 2) a stimuli manual, containing all of the stimuli presented to the participant; and 3) a records manual, which was used to record the answers and performance of the participants during the meetings.

The protocol was tested on a group of 15 elderly individuals, who were divided into an experimental group (who received the training) and a control group (no intervention). Of the five cognitive measurements used, the ANOVA test confirmed an effect of the training for three subtests: training gain effects were observed immediately after the intervention for attention and processing speed tasks related to codes [$F(1)=5.40$, $p=0.03$, $\eta^2_G=0.09$]; for mental calculations and working memory, assessed by the subtest arithmetic [$F(1)=9.03$; $p=0.01$, $\eta^2_G=0.004$]; and for the ability to categorize and identify essential and non-essential details in the figures subtest [$F(1)=8.01$; $p=0.01$, $\eta^2_G=0.19$]. No gain effects were observed for matrix reasoning [$F(1)=1.43$, $p=0.25$] or digits [$F(1)=10.04$, $p<0.001$]. The qualitative results led to significant modifications to the training protocol, in order to improve it for subsequent studies.

Concerning the similarities between the results of the present study and those found in international literature, consonance was observed with the results of the longitudinal project known as ACTIVE (Advanced Cognitive Training for Independent and Vital Elderly),[11,30] which reported an increase in cognitive performance immediately after training among participants who received training for attention and processing speed. Conversely, intervention effects were obtained for episodic memory and reasoning tasks. More recently, a meta-analysis study of ten clinical trials of elderly individuals[34] reported a significant effect size, with the following measurements: 0.22 for processing speed (Cohen d); 0.16 for reasoning training; 0.15 for multimodal training and; (a weaker effect) 0.12 for memory training. In 2011, a systematic review of 14 intervention programs for healthy elderly individuals[35] found that the interventions were effective and led to significant improvements in attention and processing speed.

Irigaray et al. conducted attention and memory training and reported intervention effects in the experimental group for certain cognitive measurements, including the measurements of working memory and verbal memory (recognition). Similar to the present study, which confirmed training effects for the attention measurement, Brum also found a significant effect for two attention measurements, one of which was for the subtest codes. Conversely, Chariglione (2013) reported a significant improvement in the experimental group for episodic memory measurements, which was not the case in the present study.

However, it is important to highlight two limitations when comparing the results of the present study with those reported in other studies: 1) the results reported herein are restricted and do not favor conclusions about the effectiveness of the training on the cognitive gain of the elderly participants, considering the non-randomization of their distribution and the size of the sample. There were also differences between the EG and the CG that limited comparisons between them; 2) as previously reported in international meta-analysis studies, different types of training and different cognitive measurements limit comparisons between studies, since each study has a unique structure and number of sessions, using different strategies and cognitive measurements to determine the effects.

CONCLUSION

The present study was successful in terms of fulfilling its aim of creating a protocol of cognitive training for the elderly, with the systemization of mental exercises and cognitive strategies in printed material and the possibility of recording the performance of the participant in a separate protocol. Notably, the individuals in the experimental group performed better in three of the five cognitive measurements after the intervention. However, these results do not allow us to conclude that the training had a significant effect. There may be a need to conduct a randomized clinical trial to adequately test the effects of the program. The present study contained a number of limitations related to the creation phase of the training protocol: the absence of analysis performed by judges, in which the tasks could have been judged by specialists in terms of their level of representativeness of the relevant cognitive abilities. This is common in content validity studies in the field of measurements. In the present study, it was possible to investigate the sources of evidence of content validity through the assessment of structural aspects of the training (by participants and examiners). Concerning the pilot study and the aim of determining the impact of the training on the mental performance of the elderly individuals, the different performance levels recorded in the pre-test (between the EG and the CG) for the subtests codes, arithmetic and matrix reasoning, as well as the different education levels found between the two groups, represent limitations. For future research, the authors intend to develop the following studies: 1) a clinical randomized trial with an experimental design to increase the power of inference on the effects of the cognitive training developed; 2) a study of structural validity, to analyze the performance of the sample in training tasks and to ascertain if the factorial structure subjacent to the protocol corroborates its theoretical model (concentrated attention, processing speed, episodic memory and working memory).

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Central adiposity among elderly women in a gerontology-geriatric unit

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Abstract

Objective: To evaluate central adiposity in elderly women in a gerontology-geriatric care unit of the Universidade Federal de Pernambuco (the Federal University of Pernambuco). *Method:* A cross-sectional study involving a sample of 182 elderly women, aged from 60 to 89 years, who received care from January to July 2011, was performed. The variables analyzed were the socio-economic and demographic conditions, lifestyle, waist circumference (WC) and body mass index (BMI) of the women, as well as the occurrence of hypertension, diabetes mellitus and high total cholesterol levels. Yates' chi-squared test and Fisher's exact test were applied. A significance rate of 5% was adopted for the rejection of the null hypothesis. *Results:* Of the elderly women surveyed 82.4% had a WC signifying a large waist size, 57.2% were over-weight, 78.3% presented hypercholesterolemia, 63.2% had hypertension and 23.6% had diabetes. 61.5% were aged between 60 and 69 years old; 56% received up to two minimum salaries; 63.5% had less than eight years of schooling, 74.7% stated that they did not smoke, 87.9% did not drink alcohol; and 51.4 had sedentary habits. An association was observed between BMI and central adiposity (CA) (p=0.000). CA tended to be present around 1.2 times more frequently in elderly women with excess weight than among those who were not overweight. *Conclusion:* The high frequency of central adiposity and overweight indicates the susceptibility of this population to these factors. While no association with cardiovascular risk factors was observed, there is a clear need for monitoring by a multidisciplinary team, so as to identify and treat this debilitating condition, thereby contributing to the quality of life of this population.

Keywords: Obesity Abdominal. Elderly. Cardiovascular Diseases. Abdominal Circumference. Body Mass Index.

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INTRODUCTION

Chronic non-communicable diseases include a wide spectrum of illnesses, including systemic arterial hypertension (SAH), type 2 diabetes mellitus (DM2), cardiovascular disease (CVD), respiratory, musculoskeletal and neuropsychiatric conditions and certain types of cancer. These, in turn, are directly related to functional disability among the elderly and a reduced quality of life.[1]

Obesity is a chronic disease characterized by excess adipose tissue and is related to several of the comorbidities listed above. In addition, overweight and obesity alter metabolism and biochemistry in all age groups, including the elderly, and affect both genders.[2]

The accumulation of adipose tissue in the abdominal region, also known as Central Adiposity (CA) or android obesity, is considered an independent risk factor for many morbidities, representing a more significant risk than other forms of body fat distribution.[3] Various methods can be used to determine visceral adipose tissue, such as: a) Computed Tomography (CT) which, despite traditionally being considered the most efficient and accurate method, is impractical for routine use due to its high cost and the fact it subjects individuals to radiation; b) magnetic resonance imaging, which provides similar results to CT, but is even more prohibitively expensive for use in clinical practice and research and; c) Ultrasonography, which is a noninvasive method with good reproducibility that is fast, easy to use and a low cost option, and appears to be effective and have good applicability for the measurement of visceral fat, although specific equipment and a trained examiner are required.[4] Given the lack of more precise methods, a more affordable alternative would be to measure Waist Circumference (WC) which indirectly determines visceral fat.[5] This is often evaluated in clinical practice and is a simple and low cost measurement and an important signaler of metabolic complications and evaluator of cardiovascular risk,[6-8] which suggests a frequent requirement for this assessment in the clinical and nutritional assessment of patients.[11]

The increase in the elderly population stimulates the need for studies to investigate the accumulation of abdominal fat in relation to the risk of metabolic complications. Therefore, the present study aimed to evaluate central adiposity among elderly persons receiving care in a gerontology-geriatric unit.

METHOD

A cross-sectional study was conducted using a database that forms part of a project currently in progress at the Núcleo de Atenção ao Idoso (Elderly Health Center) (NAI), which is an outpatient unit linked to the Programa do Idoso (Elderly Program) (PROIDOSO) of the Pró-Reitoria de Extensão (Office of the Dean for Extension Studies) of the Universidade Federal de Pernambuco (Pernambuco Federal University) (UFPE). The NAI is aimed at the individual and group care of elderly patients aged 60 or over, with the premise of promoting and encouraging actions to improve the health status of patients, considering the resources available and through work in multidisciplinary teams.

The sample consisted of 182 elderly persons, selected by convenience, who were residents of the city of Recife and received healthcare at the NAI nutrition clinic from January to July 2011.

Amputees, elderly patients with catabolic conditions such as hyperthyroidism, acquired immunodeficiency syndrome or cancer, and users of drugs such as corticosteroids, immunosuppressants and hormone therapy, as well as individuals with the presence of edema or ascites, were excluded from the study.

Data relating to socioeconomic and demographic conditions was collected through interviews with the patient using the Associação Brasileira de Estudos Populacionais (Brazilian Association for Populational Studies) (ABEP) questionnaire.[9] This instrument was constructed with the use of statistical techniques to define large classes segmented by purchasing power and was directly applied with the patients during outpatient visits.

Waist circumference was measured with the patient standing, using a non-extensible tape with a 0-150 cm scale and resolution of 0.1cm. The tape circled the individual at the midpoint between the last rib and the iliac crest and the reading was taken at the moment of exhalation.[10]

Weight and height measurements were taken in duality according to the technique proposed by Lohman.[11] The participants were weighed using a Filizola® platform type digital electronic scale, with a maximum capacity of 150 kg and precision of 100 g. Height was measured with the patient barefoot, in the Frankfurt position, with a stadiometer attached to a platform scale with a capacity of 1.90 m and an accuracy of 1 mm. For data consistency, measurements with differences greater than 100g for weight, 0.5 cm for height and 0.1 cm for waist circumference were repeated.[12]

For assessment of the risk of metabolic complications cutoff points for CA in Caucasian women of <80 cm (no risk); ≥80 cm (increased risk) and ≥88 cm (substantially increased risk) were used.[13] The Body Mass Index (BMI) for the elderly was used to evaluate nutritional status in accordance with Lipschitz,[14] whose classification values are defined as low weight: <22 kg/m² eutrophic: 22 to 27kg/m², overweight: >27kg/m².

Data on life habits (alcohol consumption, tobacco use and physical activity) was collected through interviews with the patient. A questionnaire specifically designed for the research subject was used. Smoking and alcohol consumption was defined according to the use of both, irrespective of frequency. Physical activity was defined based on the time criterion for the definition of a sedentary condition, with elderly persons who practiced less than 150 minutes of moderate physical activity per week classified as sedentary.[15] Data on medical condition was also collected: the presence of hypertension, a systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg in individuals who were not using antihypertensive medication in accordance with guidelines.[16] Elderly women who used antihypertensive medication were also categorized in the hypertensive group. For DM2, the following diagnostic criteria were used: fasting glucose ≥126mg/dL and/or the occurrence of polyuria, polydipsia and weight loss, plus random blood glucose levels above 200 mg/dL.[17] For hypercholesterolemia, lipid profile reference values for adults older than 20 years were used(CT>200 mg/dL).[18]

The database was tabulated in the Microsoft Office Excel 2010 program and statistical analysis was performed using the Epi Info program version 6.04 [WHO/CDC, Atlanta, GE, USA] and SPSS version 13.0 [SPSS INC., Chicago, IL, USA]. Statistical analysis was divided into two steps. Firstly, descriptive analysis (univariate) was carried out to characterize the distribution of the occurrence of events, including the frequency of each study variable and employing a 95% confidence interval, and then bivariate analysis of the relationship between the dependent variable (central adiposity) and the independent variables was performed, allowing the prevalence ratio (PR) and respective 95% confidence interval to be determined for each characteristic studied. The chi-squared test was used to assess the association between variables, and when this was not applicable Fisher's exact test was used. A 5% significance level was adopted for the rejection of the null hypothesis.

The study was duly approved by the Ethics Committee of the Pernambuco Federal University, under CAAE 413/11.

RESULTS

Of the 182 elderly women, 61.5% aged between 60 and 69. The per capita income of 56% of the study population was lower than between 1 and 2 minimum wages. In terms of the consumption of alcohol and smoking, most individuals described not having such habits, representing 87.9% and 74.7%, respectively.

Some losses occurred at the time of data collection for the variables of education, physical

activity and high cholesterol levels, resulting in a final sample of 181 for the first two variables and 180 for hypercholesterolemia. Regarding the educational and physical activity levels of the population studied, 63.5% reported having studied for less than 8 school years and 51.4% said they performed no physical activity.

With respect to the comorbidities associated with aging, 78.3% of respondents in the sample had hypercholesterolemia, 63.2% suffered from hypertension and 23.6% were diagnosed with DM2.

In terms of nutritional status, 57.2% of the women were overweight and 82.4% had a very high waist circumference measurement.

Table 3 shows the association between central adiposity and associated factors, with a significant association found only with overweight.

Table 1. Socioeconomic, demographic and clinical characteristics of elderly women receiving care at the nutrition clinic of the Elderly Care Center. Recife, Pernambuco, 2011.

Variables	n	%	$CI_{95\%}$
Age (years)			
≥60 to 69	112	61.5	54.02-68.56
>69	70	38.5	31.44-45.97
Family Income (minimum salary)			
≤2	102	56.0	48.50-63.32
>2	80	44.0	36.67-51.49
Education (study)			
≤8 years	115	63.5	56.02-70.45
>8years	66	36.5	29.54-43.97
Smoker			
Yes	46	25.3	19.27-32.35
No	136	74.7	67.65-80.73
Alcohol Consumption			
Yes	22	12.1	7.90-17.9
No	160	87.9	82.06-92.10
Performs physical activity			
Yes	88	48.6	41.17-56.12
No	93	51.4	43.87-58.82

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Continuation of Table 1

Variables	n	%	$CI_{95\%}$
SAH*			
Yes	115	63.2	55.70-70.11
No	67	36.8	29.89-44.30
DM2**			
Yes	43	23.6	17.79-30.60
No	139	76.4	69.40-82.21
Elevated TC ***			
Yes	141	78.3	71.45-83.97
No	39	21.7	16.02-28.54

*SAH: Systemic Arterial Hypertension (systolic arterial pressure ≥140 mmHg and/or diastolic arterial pressure ≥90 mmHg,); **DM2: Type 2 Diabetes Mellitus (fasting glucose ≥126mg/dL and/or casual glucose >200mg/dL); *** CT: Heightened Total Cholesterol (CT>200 mg/dL).

Table 2. Characterization of nutritional status according to the body mass index and waist circumference of elderly women receiving care at the nutrition clinic of the Elderly Care Center. Recife, Pernambuco, 2011.

Variables	nº	%	$CI_{95\%}$*
WC**(cm			
No risk[1]	16	8.8	5.27-14.13
Increased risk[2]	16	8.8	5.27-14.13
Substantially increased risk[3]	150	82.4	75.93-87.50
BMI*** (kg/m^2)			
Underweight[4]	13	7.1	4.06-12.17
Eutrophic[5]	65	35.7	28.86-43.19
Overweight[6]	104	57.2	49.60-64.38

*$CI_{95\%}$: 95% Confidence Interval; **WC: Waist Circumference; ***BMI: body mass index; No risk[1]: <80 cm; Increased risk[2]: ≥80 cm; Substantially increased risk[3]: ≥88 cm; Underweight[4]: <22kg/m²; Eutrophic[5]: 22 to 27kg/m²; Overweight[6]: >27kg/m².

Table 3. Association between central adiposity and the studied variables of elderly women receiving care at the nutrition clinic of the Elderly Care Center. Recife, Pernambuco, 2011.

Variables	Total	In adequate		Adequate		*p*#	PR	$CI_{95\%}$
	N	N	%	n	%			
Elevated CT***								
Yes	141	127	90.1	14	9.9	0.528	0.95	(0.87-1.04)
No	39	37	94.9	2	5.1			
BMI								
Excess	105	104	99.0	1	1.0	0.000	1.2	(1.1-1.4)
No excess	77	62	80.5	15	19.5			
SAH*								
Yes	115	106	92.2	9	7.8	0.741	1.0	(0.9-1.1)
No	67	60	89.6	7	10.4			
DM2**								
Yes	43	41	95.3	2	4.7	0.366	1.1	(1.0-1.2)
No	139	125	89.9	14	10.1			
Educational Level								
≤8 years	115	104	90.4	11	9.6	0.86	0.98	(0.9-1.1)
>8 years	66	61	92.4	5	7.6			
Income								
Up to 2 salaries	101	95	94.1	6	5.9	0.21	1.1	(1.0-1.2)
2 salaries	81	71	87.7	10	12.3			
Physical Activity								
Yes	88	80	90.9	8	9.1	0.88	1.0	(0.9-1.1)
No	93	85	91.4	8	8.6			

*SAH: Systemic Arterial Hypertension (systolic arterial pressure ≥140 mmHg and/or diastolic arterial pressure ≥90 mmHg,); **DM2: Type 2 Diabetes Mellitus (fasting glucose ≥126mg/dL and/or casual glucose >200mg/dL); *** CT: Elevated Total Cholesterol (CT>200 mg/dL); #$p<0.05$

DISCUSSION

The characterization of health care specifically for the elderly requires an evaluation of the population receiving treatment in order to observe characteristics that are peculiar to the clients in question. In the present study, the fact that the sample was composed only of women reflects their interest in healthcare, which is also seen in primary health care. Such evidence corroborates findings in existing literature which identify greater female demand for health services.[19]

With regard to the age of the study group, the highest frequency of elderly persons in the healthcare unit was in the 60 to 69 year age group, which seems to indicate that this population can still enjoy greater autonomy and independence in this period of life.

It was found that half of the sample of the present study did not practice physical activity, which contributes to increased health risks. Siqueira et al.[20] found a prevalence of a sedentary lifestyle of around 58% for elderly persons, similar to the values found in the present study. With regard to limiting factors for the practice of physical activity by elderly women, Fuchs et al.[21] concluded that cognitive capacity, frailty resulting from reduced anabolic hormonal activity and a chronic inflammatory state culminate in a self-sustained energy reduction cycle, weight loss, inactivity, low food intake and sarcopenia. Physical inactivity, according to literature, is one of the risk factors that most triggers the onset of chronic diseases, when associated with poor diet and tobacco use.[20]

Smoking and alcohol consumption were observed in lower proportions in the sample analyzed. This may suggest an increased care and concern for health in this elderly group. Similar findings were observed in the study by Ferreira et al.[22] who analyzed cardiovascular risk factors in 418 elderly users of the Sistema Único de Saúde (the Unified Health System) and found that a minority smoked or consumed alcohol. Such bad living habits are important cardiovascular risk factors and feature in 7 of the 14 leading causes of death among the elderly, constituting a major public health problem today.[1]-

The anthropometric variables featured in the present study revealed that more than half of the analyzed sample was overweight and over 80% had a greatly increased risk of metabolic complications, according to the assessment of BMI and WC, respectively, corroborating results described by other authors.[8,23,24]

The findings of the present study showed a significant association between overweight and central adiposity (PR=1.2). A study by Santos & Sichieri[3] found that there was a strong correlation between WC and BMI in the group of age of older between 60 to 70 years (r=0.76; p=0.003). Previato et al.,[25] who evaluated the same anthropometric variables, found that BMI was significantly associated with WC (r=0.87; $p<0.001$).

Castro[26] reported that the aging process is an important influence on the increase of adipose tissue in the abdominal region, as the elderly undergo changes in body composition as a natural factor of senescence and/or due to the occurrence of metabolic disorders. Changes in body composition lead to the redistribution of body fat from the limbs to the torso, or in other words, becoming more central, resulting in increased visceral adiposity in elderly persons in general, with this process being more significant in women than in men. From these body changes, the summation of cardiovascular risk factors can lead to death.

The lack of an association between central adiposity and the cardiovascular risk factors found in this study was an unexpected finding, since several studies[2,27-33] have described opposite results. This finding may be explained by the size of the sample assessed in the present study. The Diabetes Epidemiology: Collaborative analysis of Diagnostic criteria in Europe (DECODE) study found that most anthropometric measurements (WC, WHR and waist-height ration) that identify abdominal obesity were more effective than BMI in predicting cardiovascular mortality.[34]

Warren Andersen et al.[27], in a cohort study conducted in China with the aim of examining the relationship between central adiposity and waist-hip ratio (WHR) and risk of death, found that both men and women with a WHR in the bottom quintile had a 1.5 times greater risk of death than those in the first quintile, highlighting the damaging association between high central adiposity and death. This positive association is observed regardless of age, comorbidity, or smoking among men.

Cabrera and Jacob[2] evaluated 847 elderly persons in an outpatient clinic and found an association for BMI and WHR with DM, SAH, hypercholesterolemia, low cholesterol (HDL-C), hypertriglyceridemia, social class, physical activity and smoking. Jansen and Katzmarzyk[30] found that central adiposity is a major risk factor for the development of cardiovascular diseases, dyslipidemias, diabetes, metabolic syndrome and some forms of cancer, indicating a significant risk in relation to other measures of body fat distribution.

The possible mechanism for this relationship between central adiposity and cardiovascular risk factors can be justified by the fact that intra-abdominal adipocytes are likely to release their free fatty acids directly into the portal vein, exposing the liver to high concentrations of such fatty acids, which can lead to hyperinsulinemia, dyslipidemia and hypertension. In addition, adipose tissue, especially abdominal, secrets substances (adipokines) that can promote the development of chronic diseases.[28]

Insulin, hypertriglyceridemia and cholesterol fractions were not analyzed in the present study due to the use of a database which did not include such information. This may be considered a limitation, as this data could further enrich the results.

Although increased cardiovascular mortality can only be demonstrated in longitudinal studies, the findings of this study suggest that the diagnosis of overweight based on BMI and the evaluation of central adiposity can help define an increased risk subgroup among the elderly in a simple and effective manner, which may support local interventions with lower operating costs that contribute to the prevention of CVD through effective actions involving multidisciplinary teams.

CONCLUSION

The high frequency of increased central adiposity and overweight among the elderly found in this study indicates the susceptibility of this population. The aging process causes functional disorders such as the reduction of muscle mass and increased fat tissue, which are also influenced by poor eating habits and a sedentary lifestyle, common characteristics related to the industrialization and modernization of society. Despite the lack of an association, it is known that overweight and an excess of centralized fat are cardiovascular risk factors, highlighting the importance of the use of multidisciplinary teams in the gerontology-geriatric unit in question, with the implementation of programs that prevent and control excessive weight gain. Therefore, further studies are needed to elucidate the association between central adiposity and cardiovascular risk factors among the elderly.

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Taste sensitivity of adults and elderly persons

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Abstract

Objective: To compare the taste sensitivity of adults and elderly people, considering nutritional status, smoking and alcohol consumption. *Method:* Forty-six volunteers participated in the research, thirteen of whom were adult employees of a company from the food industry and thirty-three of whom were elderly residents of three Long-Term Care Facilities for the Elderly from the Vale do Taquari (Taquari Valley). They responded to a structured questionnaire about their socioeconomic data and use of medication, smoking and alcohol consumption, and underwent a nutritional evaluation and a taste sensitivity test. The taste sensitivity test was applied at three different concentrations for every flavor, with 4 drops dripped on the tongue of the volunteer, who described the level of perceived palatability, giving a score of 0-5. Data was analyzed through statistical analysis using the Statistical Package SPSS 20.0, considering a value of significance of $p<0.05$. *Result*: a reduction in the taste sensitivity of the elderly persons was noted for the sweet and sour solutions, in comparison with adults, as the majority of the elderly people demonstrated lower sensitivity scale scores for the citric acid solution in concentration 1 ($p=0.004$) and concentration 2 ($p=0.049$) and sucrose in concentration 3 ($p=0.026$). *Conclusion:* Elderly people had a lower perception of the sweet and sour flavors than adults. Moreover, nutritional status, gender, alcohol consumption, smoking and medication use were not significantly associated with the taste perception of the individuals evaluated.

Keywords: Adult. Taste Perception. Aging.

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INTRODUCTION

According to the 2010 Demographic Census,[1] the Brazilian population aged 40-59 years was 43,259,335, and 12.1% of Brazilians were aged below 60.[2] According to projections for 2050, the elderly portion of Brazilian society will reach 38 million, exceeding the young population.[3]

Aging can be biologically considered to be a morphofunctional involution, variably affecting major physiological systems.[4] Biofunctional changes begin in the second decade of life, albeit imperceptibly. At the end of the third decade functional and structural changes occur and after 40 years of age there is a loss of about 1% of function per year in different bodily systems.[5] From the age of 40 onwards functional decline ranges from 10 to 30% in relation to young adulthood.[6]

The physiology of the elderly changes on structural, functional and molecular levels, in addition to the physiological alterations that the organs suffer over the years.[7] Different age groups have different taste perceptions; for example, the level of flavor perceived by children differs from adults, and may also differ between groups of people.[8] To have the same perception of taste, individuals aged over 80 require a more intense taste stimulus than people aged 20.[9]

Even though aging is a natural process, there are limitations on the selection and intake of food due to reduced physical capacity. The reduction of masticatory function may also result in malnutrition and an unbalanced diet.[10] During the process of senescence a decline in the perception of smell and taste is common. The reduction of these senses can cause a loss of appetite, food monotony, decreased dietary intake and malnutrition.[11] Simchen et al. found that taste perception is reduced in individuals older than 65 years.[12] Mojet, Heidema and Christ showed that the taste perception of the five basic flavors in young people aged 19-33 years was more preserved than among those aged 60 to 75 years.[13]

The perception of taste occurs through the taste buds which form part of the gustatory system and are primary receivers, hosting a heterogeneous collection of taste receptor cells, which translate the five basic tastes (sweet, bitter, salty, sour and umami) into electrochemical signals transmitted via sensory neurons to the brain.[14]

Taste is attributed to the non-volatile compounds present in foods such as sugars, salts, acids and limonin, which determine the basic flavors such as sweet, salty, bitter and acidic.[15] Individuals with decreased taste sensitivity present difficulties in enjoying the taste of food, which can in some cases result in a reduction of diet and an underweight condition.[16]

Population aging presents political, social and economic challenges, as Brazil currently has a lower rate of population growth and is undergoing a significant increase in its elderly population. In this context, the purpose of this study was to compare the taste sensitivity of adults with that of elderly persons and relate gustatory levels to nutritional status, smoking and alcohol consumption.

METHOD

We studied 46 subjects aged 40 to 94 years. The adults aged 40 to 59 years were the employees of a catering company in Vale do Taquari, in the state of Rio Grande do Sul, and were economically active, mostly male and did not continuously use medication. The elderly persons were residents of three long-stay institutions for the elderly (LTCF), located in the Vale do Taquari region. All were retired and most had some degree of dependence in terms of self-care. Volunteers of both genders aged 40 or over who agreed to participate and signed a Free and Informed Consent Form were included. The initial selection was made through invitations to participate in the study. For the adult group the invitation was made at the entrance to the company cafeteria for all employees; while for the elderly it was held collectively in the connivance rooms of LTCFs. Thus, the guests were free to choose. After the initial selection, elderly persons who had some degree of dementia were excluded, due to the need to respond to the questionnaire and the

taste sensitivity scale, as well as those who were not physically able to undergo nutritional assessment.

The participants responded to a structured questionnaire set by the researcher on socioeconomic data and use of medication, smoking and alcohol consumption, as well as a nutritional assessment and a taste sensitivity test between the months of July and August 2015.

The application of the structured questionnaire was conducted in interview form in a private room in the company or LTCF to which the participant was attached, ensuring privacy and the confidentiality of the data collected.

For the anthropometric measurements weight, height and waist circumference were measured. Body weight was measured by properly calibrated Plenna® brand scales with a capacity of 150 kg, with the individual in an orthostatic position and wearing light clothing. To estimate the weight of elderly persons who were unable to remain in an upright position, the Chumlea et al. formula was used, based on arm circumference (AC) and knee height (KH). The AC was measured at the midpoint between the acromion and the humerus-radial joint of the arm, with the muscles relaxed.[17] KH was measured with the volunteer sitting with his or her feet flat on the floor at 90 degrees. The length between the heel and the anterior surface of the leg (fibular head) was measured.

Height was measured using an Avanutri® brand 20-210 cm portable stadiometer, with the individual barefoot and positioned facing the evaluator with weight distributed on both feet, the head in the Frankfurt plane position, and the heels, calves, buttocks, back and back of the head against the wall. To estimate the height of elderly people unable to remain upright, the Chumlea, Roche and Steinbaugh formula was used, which takes into consideration age and knee height, measured as described above.[18] For the classification of body mass index (BMI) the World Health Organization (WHO 1998) classification for individuals aged 40-59 years[19] and the Pan American Health Organization (PAHO) classification for the elderly were used.[20]

For the measurement of waist circumference (WC) the volunteer remained standing and was measured at the midpoint between the iliac crest and the lower costal margin.[21] A FisioStore® inelastic tape measure with a precision of 1 mm was used. Waist circumference was classified according to the WHO for all subjects, according to gender.[21] Waist/height was classified using the 0.5 cut-off point as a reference, with a single cut-off applied to the general population, regardless of gender, age and ethnicity.[22]

The aqueous solutions for the sucrose, sodium chloride, citric acid and caffeine sensitivity tests were produced from commonly consumed food compounds such as sugar, salt, lemon and coffee. Each flavor had three different concentrations, with the first being the weakest, the second intermediate and the third concentration strongest, as described in chart 1.

Chart 1. Concentration of aqueous solutions of sucrose, sodium chloride, citric acid and caffeine, Vale do Taquari, Rio Grande do Sul, 2015.

FLAVOR	CONCENTRATION 1	CONCENTRATION 2	CONCENTRATION 3
Sugar	Solution 1 (1g of sugar/ 100ml)	Solution 2 (2g sugar /100ml)	Solution 3 (4g sugar /100ml)
Concentration of sucrose	1g of sucrose	2 g of sucrose	4g of sucrose
Salt	Solution 1 (1g of salt/ 100ml)	Solution 2 (2g salt/100ml)	Solution 3 (4g salt/100ml)
Concentration of sodium	0.39g of Na	0.78g of Na	1.57g of Na
Lemon	Solution 1 (1ml of lemon/ 100ml)	Solution 2 (2ml of lemon/100ml)	Solution 3 (4ml lemon/100ml)
Concentration of citric acid	0.06 ml citric acid	0.12 ml citric acid	0.24 ml citric acid
pH	3.20	3.0	2.90
Coffee	Solution 1 (1g of coffee/ 100ml)	Solution 2 (2g coffee /100ml)	Solution 3 (4g coffee/100ml)
Concentration of caffeine	0.05g of caffeine	0.1g of caffeine	0.2g of caffeine

Data shows concentration of solutions tested.

The weighing for the preparation of the solutions was performed using an ACS model LC-C1 digital scale. Verification of the pH of solutions with citric acid was carried out using a Digimed® DM-20 brand pH-meter in the Univates Chemical Laboratory.

Before beginning the taste sensitivity test, adapted from Mueller et al.,[23] the individual was advised to drink a small quantity of water. Then, four drops of each solution were dripped onto the center of the tongue of the volunteer, who within one minute described the degree of taste sensitivity perceived, allocating a score of 0 to 5 on the taste sensitivity scale.

The options for classification were: 0- no flavor; 1- very weak flavor; 2- weak flavor; 3- moderate flavor; 4- strong flavor; 5- very strong flavor. For statistical analysis, the answers to the taste test were grouped into the categories 0, 1 and 2, considered as no, very low, or low taste sensitivity and the categories 3, 4 and 5, considered as moderate, high or very high taste sensitivity. Firstly, the three concentrations of the solution containing sucrose (sweet) were tested, followed by the solutions with sodium chloride (salty), citric acid (sour) and caffeine (bitter). A glass of water was provided between each sample tested, as well as a recipient for the volunteer to expel the solutions, if so desired. The procedure was the same for all flavors and concentrations, with an interval of 1 to 3 minutes between each sample tested.

The results were analyzed through average descriptive statistics and standard deviation for the quantitative variables and absolute and relative frequency for the qualitative variables. The comparison between the degrees of palatability of different concentrations of the test solutions was performed using the chi-squared test, which was also used to evaluate the association between degree of palatability and sample characteristics such as gender, age, smoking, alcohol consumption, frequent consumption of the tested substances and nutritional status. Statistical analysis was performed with the SPSS 20.0 statistical package, with values $p<0.05$ being considered significant.

The present study was approved by the Ethics Research Committee of the Centro Universitário da Univates (Univates University Center), under protocol 934.818 registered on 09/01/2015.

RESULT

The mean age of the participants of the present study was 67.33±15.98 years, with the majority being female (n=27; 58.7%), widowed (n=17; 37%), literate (n=40; 87%) and retired (n=32; 69.6%). The majority of the participants (n=33; 71.7%) reported never having smoked and (n=33; 71.7%) never having consumed alcohol. The majority of participants described using some type of medication (n=34; 73.9%), with the most commonly used being antidepressants (n=19; 41.3%) and anti-hypertensives (n=18; 39.1%).

A total of 20 participants (43.5%) were classified as eutrophic, nine volunteers (19.6%) were underweight, eight individuals (17.4%) were overweight and nine (19.6%) were overweight. In terms of anthropometric indicators of cardiovascular risk, the majority of participants, (n=32; 69.6%) exhibited an elevated/extremely elevated cardiovascular risk and (n=14; 30.4%) of the volunteers were classified as not being at cardiovascular risk based on waist circumference and waist/height ratio.

Table 1 shows the characteristics relating to the taste sensitivity test for the solutions studied. Significant differences were observed for the degree of palatability of all the solutions, depending on concentration. The majority of participants described higher levels of palatability for solutions with a greater concentration of substances tested.

Table 1. Association between level of palatability and different concentrations of sucrose, sodium chloride, citric acid and caffeine solutions in adults and elderly persons. Vale do Taquari, Rio Grande do Sul, 2015.

Aqueous sucrose solution				
Taste	Concentration 1	Concentration 2	Concentration 3	p
No sensitivity	30 (65,2%)	12 (26,1%)	9 (19,6%)	
Very low sensitivity	13 (28,3%)	19 (41,3%)	11 (23,9%)	
Low taste sensitivity	2 (4,3%)	8 (17,4%)	11 (23,9%)	<0,001
Moderate sensitivity	1 (2,2%)	5 (10,9%)	11 (23,9%)	
High sensitivity	0 (0%)	2 (4,3%)	4 (8,7%)	
Very high taste sensitivity	0 (0%)	0 (0%)7	0 (0%)	
Aqueous sodium chloride solution				
Taste	Concentration 1	Concentration 2	Concentration 3	p
No sensitivity	2 (4.3%)	3 (6.5%)	1 (2.2%)	
Very low sensitivity	6 (13%)	7 (15.2%)	5 (10.9%)	
Low taste sensitivity	7 (15.2%)	15 (32.6%)	13 (28.3%)	
Moderate sensitivity	14 (30.4%)	9 (19.6%)	5 (10.9%)	0.014
High sensitivity	13 (28.3%)	11 (23.9%)	21 (45.7%)	
Very high taste sensitivity	4 (8.7%)	1 (2.2%)	1 (2.2%)	
Aqueous citric acid solution				

continuous on next page

Continuation of Table 1

Taste	Concentration 1	Concentration 2	Concentration 3	p
No sensitivity	21 (45.7%)	10 (21.7%)	6 (13.0%)	
Very low sensitivity	14 (30.4%)	12 (26.1%)	5 (10.9%)	
Low taste sensitivity	9 (19.6%)	9 (19.6%)	7 (15.2%)	
Moderate sensitivity	2 (4.3%)	10 (21.7%)	15 (32.6%)	<0.001
High sensitivity	0 (0%)	4 (8.7%)	8 (17.4%)	
Very high taste sensitivity	0 (0%)	1 (2.2%)	5 (10.9%)	
Aqueous caffeine solution				
Taste	Concentration 1	Concentration 2	Concentration 3	p
No sensitivity	3 (6.5%)	3 (6.5%)	1 (2.2%)	
Very low sensitivity	6(13%)	1 (2.2%)	2 (4.3%)	
Low taste sensitivity	7 (15.2%)	3 (6.5%)	1 (2.2%)	<0.001
Moderate sensitivity	20 (43.5%)	16 (34.8%)	6 (13%)	
High sensitivity	8 (17.4%)	20 (43.5%)	16 (34.8%)	
Very high taste sensitivity	2 (4.3%)	3 (6.5%)	20 (43.5%)	

Chi-squared test; Values of $p \leq 0.05$ considered statistically significant; Data expressed in absolute and relative frequency.

The association between the degree of palatability of the solutions and age, gender, smoking, alcohol consumption and frequency of consumption of the test foods was evaluated. A significant difference was observed in the degree of taste sensitivity between adults and elderly persons for the citric acid solution at concentration 1 (p=0.004) and 2 (p=0.049) and for the sucrose solution at concentration 3 (p=0.026). A higher proportion of elderly persons than adults exhibited lower sensitivity values for the citric acid and sucrose solutions. The degree of palatability did not differ between adults and elderly persons, regardless of concentration, for the caffeine and sodium chloride solutions, as shown in Table 2 and Table 3.

Table 2. Association between degree of taste sensitivity for solutions of sucrose and sodium chloride at different concentrations and by age range. Vale do Taquari, Rio Grande do Sul, 2015.

	Adults (n=13)	Elderly Persons (n=33)	P
Sodium Chloride solution			
Concentration 1			
No sensitivity	53,85%	72,76%	0,067
Very low sensitivity	38,46%	24,24%	
Low sensitivity	7,69%	0%	
Moderate sensitivity	0%	3%	
High sensitivity	0%	0%	
Very high sensitivity	0%	0%	
Concentration 2			
No sensitivity	0%	36,4%	
Very low sensitivity	46,1%	39,4%	
Low sensitivity	30,8%	12,1%	
Moderate sensitivity	15,4%	9,1%	0,112
High sensitivity	7,7%	3,0%	
Very high sensitivity	0%	0%	
Concentration 3			
No sensitivity	0%	27,3%	0,026
Very low sensitivity	15,4%	27,3%	
Low sensitivity	46,2%	15,2%	
Sodium Chloride Solution			
Concentration 1			
No sensitivity	7,7%	3,0%	0,165
Very low sensitivity	23,1%	9,1%	
Low sensitivity	30,8%	9,1%	
Moderate sensitivity	15,4%	36,4%	
High sensitivity	23,1%	30,3%	
Very high sensitivity	0%	12,1%	
Concentration 2			
No sensitivity	0%	9,1%	0,246
Very low sensitivity	23,1%	12,1%	
Low sensitivity	53,8%	24,2%	
Moderate sensitivity	7,7%	24,2%	
High sensitivity	15,4%	27,3%	
Very high sensitivity	0%	3,0%	
Concentration 3			
No sensitivity	0%	3,0%	0,877
Very low sensitivity	7,7%	12,1%	
Low sensitivity	38,5%	24,2%	
Moderate sensitivity	7,7%	12,1%	
High sensitivity	46,2%	45,5%	
Very high sensitivity	0%	3,0%	

Data shown as relative frequencies. Chi-squared test. Values of $p \leq 0.05$ considered significant.

Table 3. Association between degree of taste sensitivity for citric acid and caffeine solutions for different concentrations and ages. Vale do Taquari, Rio Grande do Sul, 2015.

	Adults (n=13)	Elderly Persons (n=33)	P
Citric acid solution			
Concentration 1			
No sensitivity	7,7%	60,6%	0,004
Very low sensitivity	38,5%	27,3%	
Low taste sensitivity	46,2%	9,1%	
Moderate sensitivity	7,7%	3,0%	
High sensitivity	0%	0%	
Very high sensitivity	0%	0%	
Concentration 2			
No sensitivity	0%	30,3%	
Very low sensitivity	15,4%	30,3%	
Low taste sensitivity	23,1%	18,2%	
Moderate sensitivity	46,2%	12,1%	0,049
High sensitivity	15,4%	6,1%	
Very high sensitivity	0%	3%	
Concentration 3			
No sensitivity	0%	18,2%	0,372
Very low sensitivity	7,7%	12,1%	
Low sensitivity	15,4%	15,2%	
Moderate sensitivity	30,8%	33,3%	
High sensitivity	23,1%	15,2%	
Very high sensitivity	23,1%	6,1%	
Caffeine solution			
Concentration 1			
No sensitivity	0%	9,1%	0,130
Very low sensitivity	15,4%	12,1%	
Low sensitivity	30,8%	9,1%	
Moderate sensitivity	53,8%	39,4%	
High sensitivity	0%	24,2%	
Very high sensitivity	0%	6,1%	
Concentration 2			
No sensitivity	0%	9,1%	0,624
Very low sensitivity	0%	3%	
Low sensitivity	0%	9,1%	
Moderate sensitivity	46,1%	30,3%	
High sensitivity	46,2%	42,4%	
Very high sensitivity	7,7%	6,1%	
Concentration 3			
No sensitivity	0%	3%	0,372
Very low sensitivity	0%	6,1%	
Low sensitivity	0%	3%	
Moderate sensitivity	0%	18,2%	
High sensitivity	38,5%	33,3%	
Very high sensitivity	61,5%	36,4%	

Data shown as relative frequencies. Chi-squared test. Values of $p \leq 0.05$ considered significant.

When the degree of palatability of men and women was compared, no significant difference was observed, regardless of the solution and the concentration of the substance. When the degree of literacy of participants was compared, palatability for sucrose, caffeine, sodium chloride and citric acid did not differ between literate and illiterate individuals, regardless of the concentration of the solution ($p>0.05$ for all analyses).

There was no association between smoking, alcohol consumption and frequent use of the tested substances and the palatability of the solutions, independent of concentration. There was also no significant difference between the degree of palatability of the solutions based on the nutritional status of the study participants, regardless of the solution concentration.

DISCUSSION

The aging process causes functional changes, including a reduction in lean body mass and increased central adiposity.[24,25] Teixeira et al. conducted a study to identify cardiovascular risk in adults and elderly persons and found an increased waist circumference in 92.23% of those examined.[26] In the present study, we found that 69.6% of participants had an increased or greatly increased waist circumference, a relevant result as these risk factors are directly associated with the genesis and progression of cardiovascular disease (CVDs).[21] Among CVDs, Laks et al. stated that atherosclerosis is the main cause of morbidity and mortality in the elderly population.[27,28]

There was no significant correlation between nutritional status and palatability, regardless of the concentration of the solutions evaluated. The results of a study by Skrandies and Zschieschang were contrary to the findings of the present study, identifying the influence of body weight on the gustatory and olfactory perception of 66 healthy adults surveyed, with a greater BMI related to a decrease in the perception of taste and smell.[29]

A ratio between the degree of taste sensitivity and the concentration of the tested solution was found, with the participants achieving greater scores on the sensitivity scale for solutions with higher concentrations. A higher gustatory perception in more concentrated solutions can be explained by the fact that as concentrations increase, the amount of solute doubles from one to another. Evaluating the three concentrations of each flavor, it was observed that even in cases of no, low or very low sensitivity, most people were able to notice changes in the concentrations, with taste sensitivity increasing with more intense solutions.

In addition to the increased taste sensitivity of the participants at greater concentrations, there was a significant difference in the degree of taste sensitivity between adults and elderly persons. Compared to adults, the elderly group showed a reduction in taste sensitivity for two flavors. This may be related to the number of gustatory corpuscles present in the tongue. While in younger people more than 250 corpuscles are found in each papilla, in elderly persons aged over 70 years this number is reduced to less than 100 corpuscles. This has consequences for the detection and identification of taste, which is related to the number of corpuscles present in the gustatory corpuscles present in the lingual papillael.[30]

Several authors have observed this fact in their studies, including Anhe et al., Nordin et al., and Landis, Welge and Brämerson, who studied the taste perception of different age groups, including young people, adults and elderly persons. These studies demonstrated a significant reduction in palatability with advancing age, and found the elderly have less sensitivity to flavors than young individuals.[31-33] Simchen et al. evaluated the smell and taste of two age groups, one group aged under 65 years and the other over 65 years, and concluded that the perception of flavor decreased with increasing age.[12] Additionally, Mojet, Heidema and Christ, as well as Davenport, reported that sensory abilities suffer a sharp decline with age.[13,34] Different results were described by Alves and Dantas, who found no reduction of perception in older participants when compared with younger participants in a sample of 46 healthy individuals aged between 23 and 71 years.[11]

It is important to note that although there is reduced taste sensitivity in elderly persons compared to adults, this did not occur for all the flavors tested in this study. The palatability of the caffeine and sodium chloride solutions did not differ between the age groups, regardless of the concentration tested. This result can be explained by the preserved sensitivity for salty and bitter tastes, both in adults and among the elderly, which can be related to the low consumption of these substances in everyday life. Therefore, when there is an intake of these flavors, even in a less concentrated form, they are more easily perceived. Another aspect that may be related to the greater perception of salty and bitter flavors is the part of the tongue with which the solutions made contact. In this case, the sodium and caffeine chloride solutions may have come into contact with parts of the tongue with more receptors for these flavors, allowing more intense identification of the salty and bitter flavors than the other flavors tested.[35]

Regardless of the concentration assessed, no significant associations were found in the present study between taste sensitivity and factors such as smoking, alcohol consumption, use of medication, gender and nutritional status. These findings may be associated with the similar life habits of the adults and elderly persons studied. Similar results were found by Passos, Venzke and Bós, who did not identify a significant association between palatability and consumption of alcohol, medication use, gender, nutritional status and smoking.[36] However, a recent study obtained a different result from that of the present study and the study by Passos, Venzke and Bós in relation to smoking. Santos, Echeveste and Vidor identified a relationship between palatability and smoking in their study, when, in evaluating the taste perception of 48 volunteers divided among smokers and non-smokers, they concluded that smokers had a lower gustatory perception than the group of non-smokers.[37] The current study obtained contrasting results, as there was no significant difference in taste perception among smokers and non-smokers when compared with the other volunteers.

There was no significant difference in the degree of palatability of men and women in the present study, independent of concentration and flavor, demonstrating similarity in the degree of palatability between the genders of the population in question. Similar findings were reported by Passos, Venzke and Bós, who also found no relationship between taste sensitivity and gender.[36] A different result, however, was described by Simchen et al., who observed an association between gender and olfactory and gustatory abilities, finding that women had greater gustatory and olfactory skills than men.[12] Mojet, Heidema and Christ; Anhe et al.; Nordin et al., and Landis, Welge and Brämerson also found that women are more perceptive to flavors than men.[13, 31-33] These findings differ from those of the present study, where no significant differences in taste sensitivity were identified between men and women in the sample studied.

The present study suggests a reduction in palatability for the sweet and bitter flavors with the passing of the years. However, the study has certain limitations in relation to the low number of individuals surveyed and the cross-sectional design, variables which may have influenced the results of the study. The present study highlights the need for more studies with a larger sample size and the follow-up of individuals over time.

CONCLUSION

It was concluded that most participants had a higher taste sensitivity for more concentrated solutions. Elderly persons had a lower perception of flavor than adults for the citric acid solution at concentrations 1 and 2 and the sucrose solution at concentration 3. There were no differences in taste sensitivity between men and women. Nutritional status, alcohol consumption, smoking and use of medications had no significant association with the perception of taste in the evaluated individuals.

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Functional disability and associated factors in elderly stroke survivors in Vitória, Brazil

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Abstract

Objective: The aim of the present study was to estimate the prevalence of disability and associated factors in elderly stroke survivors. *Methods:* A cross-sectional study of 230 elderly persons was conducted in the 22 territories of the Estratégia de Saúde da Família (the Family Health Strategy) of Vitória, in the state of Espirito Santo. Patients were assessed using the modified Rankin Scale. Poisson regression with robust variance in crude and adjusted analyses was employed. *Results:* The majority of subjects were men (52.1%) aged between 60 to 98 years, with a mean age of 75.8 (sd±9.2). The prevalence of disability was 66%. Age ≥80 years, self-perceived limitations in bodily function, considering the physical structure of the street to be a barrier to leaving home and believing street lighting to be insufficient were positively associated with functional disability. Possessing 12 or more years of schooling was inversely associated with the outcome. *Conclusions:* The high prevalence of disability and associated factors in elderly stroke survivors reinforce the need for a health system that operates continuously and proactively, promoting active aging.

Keywords: Elderly. Stroke. Family Health Strategy. Aging. Primary Health Care. Public Health.

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INTRODUCTION

Population aging is considered a common phenomenon around the world.[1] Proportionally, however, the increase in the elderly population and the decrease in the younger population is not the same in each country. While population aging is gradual in developed countries it is more accelerated in developing countries, and takes place before the desired economic development.[2] In Brazil, the proportion of people aged 60 or more increased from 9.7% in 2004 to 13.7% in 2014. The Instituto Brasileiro de Geografia e Estatística (the Brazilian Institute of Geography and Statistics - IBGE) indicates that this trend will continue, with the ratio reaching 33.7% by 2060, or in other words, when one in every three people will be 60 years or older.[3]

The growth of the elderly population is at the root of many of the challenges for health systems, because as time progresses the functional capacity of the individual declines and the risk of developing chronic diseases increases.[2,4] Functional capacity can be defined as the set of physical and mental abilities needed to independently perform activities of daily living. Similarly, functional disability can be defined as the difficulty or inability to perform these activities.[5]

From a broader perspective, the World Health Organization (WHO) defines disability as the product of a complex and dynamic interaction between health condition (such as injury and illness), personal factors (such as lifestyle, age and educational level) and environmental factors.[6] The Politica Nacional de Saúde da Pessoa Idosa (the National Health Policy for the Elderly - PNSPI)[7] argues that functional capacity is a new paradigm of health and that the main problem that affects the elderly today is not a specific disease, but the loss of functional capacity. Studies have shown that the rate of disability in the elderly population is between 19.2% and 26.8%.[8,9]

Considered to be the main cause of long term disability in adulthood, cerebrovascular accidents or strokes (CVA)[10,11] occupy a prominent position among the chronic diseases that affect the elderly population.[2] According to the national system of hospital information, strokes are the main reason for hospitalization in the Sistema Único de Saúde (the Unified Health System - SUS).[12] It is estimated that 25% to 74% of the 50 million stroke survivors in the world have some kind of disability, whether physical, emotional or cognitive, requiring partial or total assistance to perform activities of daily living.[11] Brazilian surveys have revealed a strong association between strokes and disability (OR=51.8, p=0.05; OR=6.62, p<0.001) of the elderly population.[13,14]

Population aging, the emergence of chronic diseases and long-term disabilities are challenges to contemporary public health and require changes to the health care model.[15] The PNSPI recommends that assessment and functional diagnostics are performed mainly in Primary Health Care (PHC) through the Family Health Strategy (FHS), to ensure the maximum autonomy of the elderly.[7] Thus, calculating the prevalence of disability and identifying associated factors in elderly persons after strokes, within PHC, may contribute to the planning of strategies directed at the health needs of this population. Given this context, the present study aimed to assess functional disability and possible associated factors in older adults after CVAs, who were registered with the Family Health Strategy in the city of Vitória, Espirito Santo.

METHOD

A descriptive cross-sectional study was carried out in Vitória, the capital of the state of Espirito Santo. The municipality began the implementation of the Family Health Strategy in 1998 and currently has 29 Basic Health Units (BHUs), 22 of which are included in the FHS.[16,17] The estimated population for the municipality in 2010 was 327,801 inhabitants and the number of people aged 60 or more registered in the 22 territories of the FHS totaled 29,552.[16]

Considering the population of registered elderly persons and the prevalence of strokes (2.9%)[18] the study population was calculated at 900 individuals. Subsequently, the prevalence of disability after a stroke was defined as 60%,[11,19] along with a significance level of 5%, a margin of error of 7%

and a design effect of 1.4, arriving at a minimum sample size of 218 elderly persons. To compensate for possible losses or refusals a further 5% was added, resulting in a sample of 230 subjects.

Sampling by quotas was carried out proportional to the number of elderly persons enrolled in each health territory. The number of elements to be observed in each of the 22 dimensions was defined by the formula: $n^1=fxN^1$, wherein:

N^1=total elements of the territory; n^1=size of sample in each territory; f=n/N (n=sample size N=population size)

To operationalize selection, a strategy was designed with the FHS teams and technicians of the Municipal Health Department, which allowed access to the Rede Bem Estar (Wellness Network) (RBE), the health management software of the municipality. Through this system it was possible to identify elderly patients who had been clinically diagnosed as having suffered a CVA. When the number of elderly persons was not sufficient to reach the quota for the territory or in cases of death or a change of address the teams selected the remaining elderly persons required to complete the quota.

The inclusion criteria were: aged equal to or older than 60 years, had suffered a stroke and resided in a Family Health Strategy territory. Elderly persons who were not located after three attempts were excluded, as well as those who were not able to respond alone or who were not accompanied by a caregiver who was able to answer and those living in micro areas without a Community Health Agent (CHA).

Data was collected between October 2013 and May 2014. The interviews took place at the homes of participants and were accompanied by a CHA to facilitate access to homes and contact with the elderly. A team of three interviewers were trained and supervised by the researcher. A structured questionnaire with closed pre-coded questions was created for the study, which consisted of demographic data (gender, skin color, age, family income, level of education and living with a partner); health conditions (recurrence of stroke, presence of pain, diabetes, hospitalization in the last year, perception of health and difficulty in the following body functions: movement of the arms and legs, voice and speech, memory, chewing and swallowing, vision and sphincter control (urinary and fecal), as well as data on perception of the environment (has difficulty accessing health services, has difficulty leaving home because of architectural barriers, and whether signage on roads and walkways is sufficient/insufficient).

The outcome variable was measured by the modified Rankin Scale (mRS), which was chosen as it is the most commonly used instrument for measuring disability in contemporary research on CVAs.[20] The scale consists of six categories ranging from 0 to 5, with 0 corresponding to the absence of symptoms and 5 corresponding to severe disability. Following the trend of studies by Hardie et al.[21] and Bettger et al.[22] the turning point between functional capacity and disability was level 3 of the scale; thus those with $mRS \leq 2$ were classified as independent and those with $mRS \geq 3$ were classified as functionally disabled.

Data was entered in Excel. Statistical analyzes were performed using the Statistical Package for Social Sciences software package (SPSS) version 22.0 for Windows. Initially, descriptive statistics were used for the outcome prevalence and the absolute and relative frequencies of the independent variables. Poisson regression with robust variance estimation was employed, with calculations of the unadjusted and adjusted prevalence ratio and a confidence interval of 95%. For data analysis a hierarchical model was used that considered three levels to determine disability: the first level (distal) was perception of the environment variables, the second level (intermediate) was sociodemographic variables, and the third level (proximal) was variables related to health conditions. Multivariate analysis retained variables with a p value <0.20, considering the effect of the variable in relation to the outcome, controlled for the other variables of the same and higher levels. Variables with $p<0.05$ were considered significant.

This study was approved by the Municipal Health Secretary of Vitória and the Ethics and Research Committee of the Santa Casa de

Misericórdia de Vitória Science College, under CAAE number 14435213.6.0000.5065. All of the participants were fully informed about the nature of the study and signed a Free and Informed Consent Form.

RESULT

A total of 230 elderly persons aged between 60 and 98 years took part in the study. The mean age was 75.8 years (SD=9.2), 26.0% of the elderly individuals were aged between 60-69 years, 36.9% 70-79 years and 36;9% 80 years or older. Individuals with between one and four years of schooling predominated (44.7%), as well as those who described themselves as Non-white (55.8%) and who had a family income of between one and three minimum salaries (40.3%).

Just over half of the elderly persons were male (52.1%) and lived without a partner (51.1%).

Table 1. Description of sample. unadjusted and adjusted analysis of Functional Disability according to socioeconomic and demographic variables. Vitória. Espírito Santo. 2013/2014.

Variables	N (%)	Disability (%)	Unadjusted PR (CI 95%)	p	Adjusted PR (CI 95%)	p
Socioeconomic and demographic variables (intermediate level)						
Gender						
Male	120(52.1)	31.7	1		1	
Female	110(47.8)	34.3	1.18 (0.98-1.42)	0.07	1.18 (0.93-1.51)	0.16
Age range						
60-69 years	60(26)	14.7	1		1	
70-79 years	85(37)	21.7	1.03 (0.78-1.37)	0.79	1.04 (0.73-1.49)	
≥80 years	85(37)	29.5	1.42 (1.10-1.80)	0.01	1.47 (1.08-2.01)	0.01
Skin color						
Non-white	128(55.8)	54.3	1		1	
White	102(44.5)	45.7	1.04 (0.87-1.26)	0.63	1.03(0.85-1.27)	0.7
Family income						
<1 min wage	52(23.3)	14.7	1		1	
1-3 min wages	90(40.4)	27.3	1.04 (0.89-1.22)	0.60	1.06 (0.88-1.26)	0.49
3-5 min wages	49(22.0)	14.3	1.02 (0.84-1.22)	0.83	0.99 (0.80-1.23)	0.99
>5 min wages	32(14.3)	7.3	0.87 (0.71-1.09)	0.26	0.79 (0.64-1.02)	0.08
Schooling						
None	48(21)	17.3	1		1	
1 to 4 years	102(44.7)	28.6	0.77 (0.64-0.94)	0.009	0.73 (0.57-0.94)	0.01
5 to 8 years	27(11.8)	6.9	0.71 (0.50-0.99)	0.04	0.62 (0.39-0.98)	0.04
9 to 11 years	33(14.4)	9.1	0.76 (0.57-1.01)	0.06	0.67 (0.45-1.01)	0.60
12 or more	18(7.8)	3.0	0.46 (0.25-0.84)	0.01	0.39 (0.18-0.82)	0.01
Lives with partner						
No	117(51)	36.9	1		1	
Yes	112(48.9)	29.1	0.83 (0.68-1.00)	0.06	0.79(0.61-1.50)	0.07

PR: prevalence ratio; CI: confidence interval of 95%; statistically significant value $p \leq 0.05$. Minimum salary 2013: R$ 678.00.

Many of the respondents (43.9%) had suffered more than one CVA. Regarding self-perceived health, 54.5% considered their health as good or very good. 36.0% said they had been diagnosed with diabetes and 56.5% experienced musculoskeletal pain. Just over a third (36.9%) had been hospitalized in the previous year. When asked about the limitations that arose after a CVA, more than half reported having difficulty with between three and five body functions (56.5%), with the most cited difficulty with moving legs (84.3%), arms (74.7%) and difficulty with memory (51.3%).

Table 2. Description of sample, unadjusted and adjusted Functional Disability according to health condition variables. Vitória, Espírito Santo. 2013/2014.

Variables	N (%)	Disability (%)	Unadjusted PR (CI 95%)	p	Adjusted PR (CI 95%)	p
Health condition variables (proximal level)						
More than 1 CVA						
No	129(56.0)	33.9	1		1	
Yes	101(43.9)	32.1	1.21 (1.01-1.45)	0.03	1.26 (0.99-1.60)	0.06
Pain						
No	100(43.5)	26.0	1		1	
Yes	130(56.5)	40.0	0.84 (0.69-1.03)	0.09	1.19 (0.93-1.53)	0.16
Diabetes						
No	147(63.9)	40.0	1		1	
Yes	83(36.0)	26.0	1.15 (0.96-1.38)	0.12	1.16 (0.91-1.48)	0.21
Self-perceived health						
Good	101(54.5)	23.0	1		1	
Poor	84 (45.4)	23.9	1.24 (0.98-1.58)	0.07	1.23 (0.97-1.57)	0.08
Hospitalization in previous year						
No	145(63.0)	38.6	1		1	
Yes	85 (36.9)	27.4	1.20 (1.01-1.44)	0.04	1.25 (0.98-1.58)	0.06
BF Limitations						
0-2	52 (22.6)	9.1	1		1	
3-5	132(57.9)	39.1	1.65(1.16 -2.34)	0.005	1.57 (1.09-2.28)	0.010.01
≥6	47 (20.4)	17.8	2.16 (1.53-3.05)	0.001	2.00 (1.33-2.99)	

PR: prevalence ratio; CI: confidence interval of 95%; statistically significant value $p \leq 0.05$. BF: Body Function

As regards perception of environment, 54.7% said that the signage of pedestrian walkways and footbridges was insufficient, 58.2% found it difficult to leave due to architectural barriers and 40.4% described experiencing difficulty in accessing health services (Table 3). The prevalence of disability in the studied population was 66% (mRS≥3). Table 4 shows the sample distribution by the Rankin scale classification.

Table 3. Description of sample, unadjusted and adjusted analysis of Functional Disability according to perception of built environment variables. Vitória, Espirito Santo, 2013/2014.

Variables	N (%)	Disability (%)	Unadjusted PR (CI 95%)	P	Adjusted PR (CI 95%)	p
Environmental Perception Variables (distal level)						
Difficulty in leaving the house due to AB						
No	96(41.7)	20.8	1		1	
Yes	134(58.2)	45.2	1.55 (1.24-1.93)	<0.001	1.89 (1.39-2.57)	<0.001
Road signage						
Sufficient	103(44.7)	26.0	1		1	
Insufficient	126(54.7)	39.5	1.32 (1.01-1.50)	0.03	1.32 (1.02-1.71)	0.03
Difficulty accessing HS						
No	137(59.5)	37.3	1		1	
Yes	93(40.4)	28.6	1.13 (0.94-1.35)	0.18	1.22 (0.96-1.55)	0.10

PR: prevalence ratio; CI: confidence interval of 95%; statistically significant value $p \leq 0.05$; AB: Architectural Barrier, HS: Health Service.

Table 4. Distribution of sample according to degree of disability according to modified Rankin Scale. Vitória, Espirito Santo, 2013/2014.

Degree	Rankin Scale Classification	Description	n	%
1	No significant disability	Capable of carrying out normal tasks and activities.	37	16.1
2	Mild disability	Incapable of carrying out previous activities. but independent of personal care.	41	17.8
3	Moderate disability	Requires some assistance. but is capable of walking without assistance (can use cane or walker).	67	29.1
4	Moderate/severe disability	Incapable of walking without assistance and meeting own physiological needs without help.	36	15.7
5	Serious disability	Bed-ridden. Incontinent. Requires care and constant nursing attention.	49	21.3

In unadjusted analysis the variables 80 years or older, 12 or more years of study, experience problems with three or more body functions, have suffered more than one CVA, have been hospitalized in the last year, report difficulty leaving the house because of architectural barriers and consider road and walkway signage to be insufficient were associated with the outcome (Table 1, 2 and 3).

In adjusted analysis the prevalence of disability was significantly higher among elderly patients aged 80 years or older than among those aged 60-69 years (PR=1.47, CI 95% 1.08 to 2.01). Elderly persons with 12 years or more of schooling had a lower prevalence of disability than individuals with no education (PR=0.39; CI 95% 0.18 to 0.82), (Table 1). Those who perceived problems in six or more body functions were twice as incapacitated as those who perceived limitations in zero to two body functions (PR 2.00, CI 95% 1.33 to 2.99) (Table 2).

Among the distal level variables, there was a significant association between disability and difficulty in leaving home because of architectural barriers (PR=1.89; CI 95% 1.39 to 2.57) and considering the signage of roads and walkways to be insufficient (PR=1.32; 1.02 to 1.71), (Table 3). Having suffered more than one stroke and hospitalization in previous year lost significance after adjustment for the other variables.

DISCUSSION

In the present study, the prevalence of disability among elderly persons after a CVA was 66%.[23] A household-based survey carried out in France found that 34.5% of the population suffered functional disability (mrs≥3) after a CVA, or in other words one in every three stroke survivors was in a position of dependency.[23] In a similar survey in Brazil the prevalence of disability was 29.5% in men and 21.5% in women.[24] Neither study delimited age and the Brazilian study did not apply an instrument to assess functional capacity.

Half of CVA survivors in a Brazilian rehabilitation center exhibited functional disability (mRS≥3), while 23.5% were classified with moderate dependence and 29.3% with severe dependence (mRS=4).[25] A multi-center study conducted in Pakistan found that 64% of the population who had suffered a CVA was functionally disabled (mRS≥3).[26] Chandra et al.[19] divided the population after a CVA into two groups: under 80 and 80 or older, and found that 74% of elderly people were functionally disabled (mRS≥3).

Kisoli et al.[27] assessed disability among an elderly population with various neurological diseases using the Barthel Index and found that 63% of CVA survivors were dependent for basic activities of daily living. It can be seen that there is a large discrepancy in the prevalence of disability and many factors can influence such rates, such as the sample location, age of participants, the recurrence of CVAs, the time of evaluation and the type of instrument applied.[28]

The present study found a higher prevalence of disability among elderly persons aged 80 or more, a result in line with national and international studies, which found that advancing age was associated with functional loss in the elderly population.[8,14,29] Studies evaluating CVA survivors also associated old age with disability.[19,25] There is a consensus in literature that functional capacity increases during childhood, reaches its peak in early adulthood and declines soon after, although the speed of such decline is not the same for everyone and is determined by factors related to lifestyle and environmental and external factors.[2]

Elderly persons who reported problems with or the loss of six or more body functions showed a higher probability of suffering disability than those who described problems in none or up to two functions. The World Health Organization[6] through the International Classification of Functioning, Disability and Health defines disability as a problem in the functions or structures of the body, and therefore this result demonstrates a connection between the perception of disability and incapacity measured by the Rankin Scale.

There was a significant association between living with disabilities and considering that the physical conditions of the street made it difficult to leave home and that roads and walkways were lacking signage. Lien et al.[30] associated the perception of environmental physical barriers with disability in basic and instrumental activities of daily living among elderly Thai people. Zhang et al.[31], assessing CVA survivors in rural China, found an association between physical barriers and limitations in performing activities and restrictions in participation. The WHO says that environmental characteristics influence the functional capacity of individuals and many people could achieve a higher level of functionality if they lived in more favorable environments. It recommends, among other things, the removal of barriers, the creation of safe neighborhoods, the establishing of standards and guarantee of accessibility in buildings, houses and modes of transport.[32]

The present study identified an inverse association between education and disability. This result corroborates Brazilian surveys that assessed the functional capacity of the elderly and concluded that a higher education makes disability less likely.[13,28] The Pesquisa Nacional de Saude (National Health Survey) (PNS) associated a higher prevalence of CVAs with a lower educational level, but found no association between disability and the level of formal education among those who survived CVAs.[24] In the last decade, according to IBGE data, there was a reduction in the illiteracy rate among all age groups except for the population aged over 65 years. Thus, the relative weight of the elderly in the illiterate population grew from 46.7% in 2004 to 58.2% in 2014.[3]

By analyzing these results, it was observed that the association between suffering more than one CVA and experiencing disabilities lost significance after adjustment for other variables. Gall et al.[33] found a positive association between suffering more than a stroke and having a disability. Park and Ovbiagele[34] however, found a higher level of disability after a first CVA with the risk of recurrence.

Unadjusted analysis also identified a positive association between having been hospitalized in the last 12 months and having a disability, but this result was not maintained after adjusted analysis. Alves et al.[29] found that elderly patients hospitalized in the previous year were highly likely to have great difficulty or a complete inability to climb a slope when compared to older people who had not been hospitalized.

Data was collected from 22 FHS territories in order to achieve a heterogeneous sample, representative of the elderly population of the city of Vitória. This can be considered a differential of this study when compared to similar studies conducted in rehabilitation centers and hospitals. On the other hand, limitations in the sample selection should be considered, such as the selection of subjects based on the information of health teams, a form of selection that is subject to diagnostic suspicion and information bias. In addition, cross-sectional studies are not analytical research strategies and their results do not establish causal links.

CONCLUSION

The present study revealed a high prevalence of disability among elderly persons who had suffered a CVA and were registered with the Family Health Strategy in Vitória, Espirito Santo. Many of the individuals with disabilities had experienced more than one CVA. The result reiterates the importance of applying measures to monitor functional capacity and the promotion of support for the elderly after CVAs within the Primary Healthcare System.

The Poisson regression model helped positively identify some factors associated with disability, such as: age, self-perceived limitations in body functions, considering the physical structure of the street as a barrier and road signage to be insufficient. A total of 12 years or more of schooling was inversely associated with functional disability, however. These findings may contribute to planning actions aimed at minimizing or delaying disability in the elderly after a CVA, as well as subsidizing public policies directed at the elderly.

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Profile of lifestyle of older elderly persons

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Abstract

Introduction: Lifestyle has been widely studied in recent years, especially in the context of longevity and aging well. *Objective:* The aim of this study was to analyze the lifestyle profile of older elderly persons and the relationship between lifestyle and chronic diseases. *Method:* A cross-sectional study evaluating 132 older persons aged over 74.6 years, who were resident of the Capão Redondo district of São Paulo, was carried out. The study was conducted in 23 institutions such as churches, community centers, parks, nursing homes and residences. All participants completed two questionnaires, with the first based on lifestyle and the second on socio-economic classification, and also answered some questions about the presence and control of non-communicable chronic diseases (NCDs). *Result:* the mean age was 78.8(±4.5) years and the respondents had a mean BMI of 25.5(±5.5). Most were women from social classes C and D. A total of 46 were former smokers, seven were smokers, and 82 had NCDs, with heart diseases the most prevalent. The mean lifestyle questionnaire score was 30.2(±3.5). There was no statistical difference in scores between those with NCDs and those that did not suffer from such diseases. The physical activity component had the lowest score, followed by the nutrition component. The prevalence of NCDs was significantly higher for smokers and former smokers than for those who had never smoked. *Conclusion:* The majority of older persons demonstrated an excellent lifestyle with healthy habits. Even those with a diagnosed NCD had a good lifestyle. Cardiovascular diseases were the most prevalent in this population. The risk of NCD was greater for smokers and former smokers than for those who had never smoked.

Keywords: Health of the Elderly. Health Promotion. Longevity. Life Style.

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INTRODUCTION

The increase in the elderly population requires a change in political, economic and social paradigms and strategies, so that elderly persons can have the expectancy of a healthy life with the minimum of physical disabilities and/or special needs care.[1-4]

If elderly persons themselves and the various sectors of society do not contribute to these changes, aging may be marked by increasing social and economic demands caused by disabilities and non-communicable chronic diseases (NCD). Such conditions can result in complications and sequelae that compromise the Independence and autonomy of elderly persons, which can be costly to these individuals, their families and health systems.[5]

Aging with the minimization of chronic diseases can be influenced by immutable and mutable factors. Immutable factors include gender, age and genetic inheritance. Mutable factors relate to the lifestyle of the individual or a particular group. These factors involve practices related to nutrition, physical activity, preventive behavior, social relationships and stress management. Such practices are enhanced by socioeconomic, cultural and environmental conditioning factors.[3,4]

From this perspective, it can be argued that a study which analyzes the lifestyle of older elderly persons is useful for the diagnosis of the factors that contribute to the fact that such individuals surpass the life expectancy of their generation, as well as identifying those that are harmful to an active and healthy life and which could be prevented, treated and controlled.

METHOD

The present study forms part of the "multifactorial profile of older elderly persons" and is a field study, with a quantitative approach, explanatory profile, and cross-sectional design. Data collection was carried out following the approval of the Research Ethics Committee of UNASP/SP, under number 871.829. This analysis complied with resolution 466/12 of the National Health Council.[6]

Data collection was performed from March to June 2015 and carried out in churches, community centers, parks, and nursing and residential homes located in the region of Capão Redondo, situated in the Technical Health Department of Campo Limpo, in the south region of the city of São Paulo. To be included in the study subjects had to meet the following criteria: be aged 74.6 years or older and be a resident of the Capão Redondo region of São Paulo. Subjects with clinical and psychological conditions that meant they were incapable of responding to the study questionnaires were excluded. The 132 older elderly persons included in this sample were visited in the institutions and locations mentioned and, after being duly informed about the protocol of the study and signing a clear and informed consent form, responded to interviews and questionnaires about the presence and control of non-communicable chronic diseases, their health conditions, sociodemographic status and lifestyle.

The Nahas Individual Lifestyle Profile questionnaire was used to evaluate lifestyle. This is a questionnaire on lifestyle which assesses the following components: "nutrition", "physical activity", "preventive behavior", "social relationships" and "stress management". Each component is worth a maximum of nine points. The sum of the five components can reach a maximum of 45 points.[7]

The questionnaire is comprised of 15 questions that are divided in a uniform manner into the five components mentioned above. Each question uses a Likert answer scale that varies from "0" to "3". The values "0" and "1" are linked to a negative lifestyle profile while responses "2" and "3" are associated with a positive lifestyle. The questionnaire considers the lifestyle of the individual during the majority of his or her life.

To characterize the sample and identify the profile of the study participants, such as gender, ethnicity, marital status and educational level, the

socioeconomic questionnaire of the Associação Brasileira de Empresas de Pesquisa (ABEP)[8] (the Brazilian Association of Research Companies) was used.

Data is presented as mean and standard deviation. The symmetry of the data was analyzed using the Kolmogorov-Smirnov Test. The comparison between groups was performed using the t-test or analysis of variance considering the number of variables to be analyzed. To identify the weight of each variable in terms of its contribution to longevity, multivariate regression was performed. Only variables that were significant in this model were submitted to analysis of risk. *P* values ≤0.05 were considered statistically significant.

RESULTS

The mean age of the participants in the sample was 78.8±4.5 and the majority were women. In terms of socioeconomic classification, four older elderly persons belonged to class A2; 14 to class B1; 18 to B2; 21 to C1; 47 to C2 and 20 to D. With respect to health conditions, 46 were ex-smokers, seven were smokers and 82 participants said they had some type of NCD (table 1).

Table 1. Characterization of biological and socioeconomic variables of sample. São Paulo, state of São Paulo, 2015.

Variables	N=132
Height (m)	1.6(±0.10)
BMI (k/m^2)	25.5(±5.5)
Gender (M/F)	42/90
Socioeconomic Class A2	4
Socioeconomic Class B1	14
Socioeconomic Class B2	18
Socioeconomic Class C1	29
Socioeconomic Class C2	47
Socioeconomic Class D	20
Ex-smokers	46
Smokers	7
Non-communicable chronic disease (+)	82

The mean Nahas Individual Lifestyle Profile score was 30.2(±3.5) points. Analyzing the components separately, a mean score of 4.1(±3) was found for "physical activity", with CI 95% (3.6 to 4.6). The mean score for "nutrition", was 6.1(±4.1), with CI 95% (5.8 to 6.5). The mean "social relationships" score was 7(±2.2) with CI 95% (6.0 to 6.8), while for "stress management" the mean score was 8.0 ± 1.6 with CI 95% (6.6 to 7.2). In "preventive behavior" the mean score was 8.0±2.2 with CI of 95% (6.6 to 7.4). The score for the "physical activity" component was significantly lower than the scores of the other components (p<0.0001). The mean score of the "nutrition" component was also significantly lower than the scores of the "preventive behavior" and "stress management" components (p<0.001) (Figure 2).

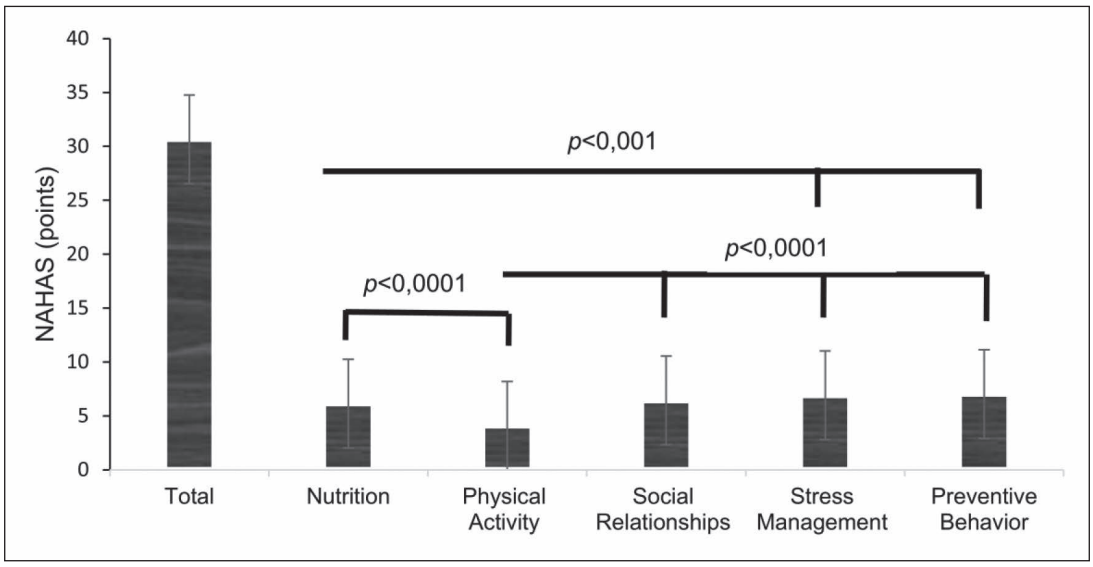

Figure 1. Lifestyle of studied population evaluated by Nahas Individual Lifestyle Profile. São Paulo, state of São Paulo, 2015.

Of the 132 participants, 62% said they had been diagnosed with some type of non-communicable chronic disease. No significant differences were found based on the proportions of men and women or the marital status or age of those who either did or did not have a non-communicable chronic disease.

Among those who said they had a NCD, 74.3% had a cardiovascular illness; 26.8% Diabetes *Mellitus*; 23% dyslipidemias; 10.9% chronic obstructive pulmonary disease; 6.0% thyroid diseases and 4.8% cancer.

There was no significant difference in the lifestyle of groups with and without non-communicable chronic diseases. For the group with non-communicable chronic diseases, the mean Nahas Individual Lifestyle Profile score was 30(±7), with CI95% (28 to 32). The group without non-communicable chronic diseases had a Nahas Individual Lifestyle Profile score of 32(±6), with CI 95% (30 to 33) (Figure 2).

The proportion of smokers with NCD was 85.7%, while 76.1% of elderly ex-smokers suffered from such illnesses. Among those that had never smoked, the proportion with NCD was 51.8%. There was a greater predominance of cardiovascular diseases among smokers and ex-smokers than among those who had never smoked (figure 3).

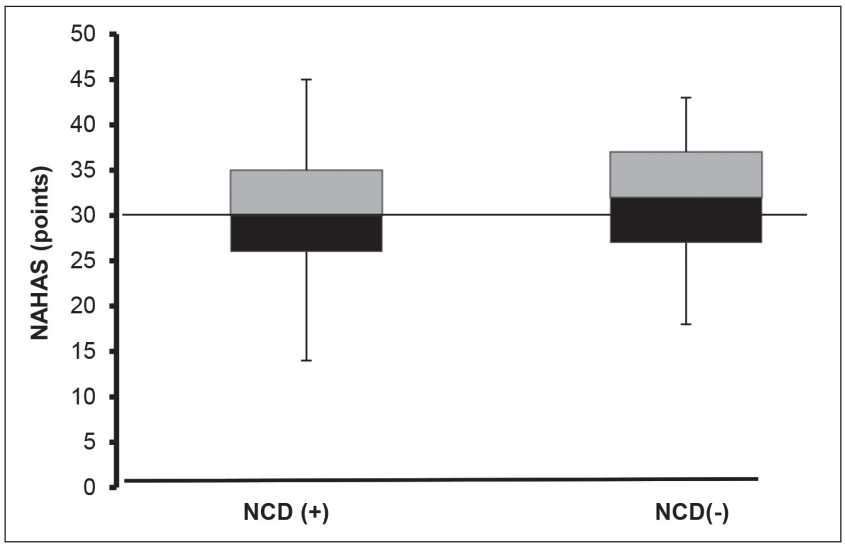

Figure 2. Analysis of Nahas Individual Lifestyle Profile for individuals with and without non-communicable chronic diseases. São Paulo, state of São Paulo, 2015.

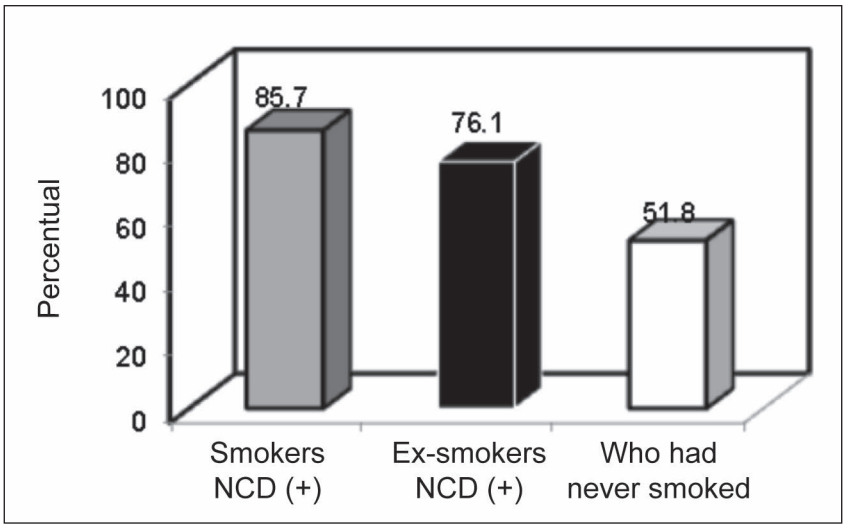

Figure 3. Proportion of smokers, ex-smokers and those who had never smoked with non-communicable chronic diseases (NCD). São Paulo, state of São Paulo, 2015.

The risk of a smoker devolving a NCD in relation to an individual who had never smoked was OR 11.3 with CI of 95% (1.3 to 19.9) and p=0.01. In terms of ex-smokers in comparison with those who had never smoked, the risk was OR5.1, with CI of 95% (2.0 to 12.9) and p=0.03. Stopping smoking (ex-smokers *vs* smokers) reduced the risk by OR 0.1 in comparison with those who continued smoking (CI of 95% (0.7 to 8.2).

DISCUSSION

The present study analyzed the Nahas Individual Lifestyle Profile in relation to the diagnosis of non-communicable chronic diseases in 132 older elderly persons. The main result found was that the participants had a good lifestyle, achieving a mean Nahas Individual Lifestyle Profile score of 30.2 points. The highest scores were registered

in the components of *social support*, *preventive behavior*, *stress management* and *quality of diet*. The *physical activity* component had the lowest score in the evaluation of the lifestyle of the participants. Cardiovascular diseases were the most prevalent NCDs and tobacco use significantly increased the risk of such diseases.

In terms of the analysis of lifestyle based on the Nahas Individual Lifestyle Profile questionnaire, the results show that the older elderly persons evaluated had a positive lifestyle profile, or in other words, their nutritional state, preventive behavior, stress management and social relationships were satisfactory. Such profiles can a determining factor for longevity.[7]

Studies have found that elderly persons with satisfactory social networks of support and friendship can increase their chances of longevity by 22%. Another interesting finding is the fact that having more and closer friends is a protective factor for the cardiovascular health of older men, when compared with more solitary individuals. Elderly women with more friends throughout life had a lower incidence of cognitive problems, compared to those with smaller and more fragile social networks.[9,10]

Irrespective of gender, age and ethnicity, elderly persons with a stable circle of friendships preserve their memories to twice the extent of less socially integrated elderly individuals. Generally speaking, close, satisfactory social relationships reduce morbidity and mortality and are vital sources of emotional strength and overall well-being.[3,11]

Another factor that promotes health and longevity is preventive behavior, which involves collective and individual actions of caring for one's own health. This type of behavior involves primary, secondary and tertiary prevention and treatment of illnesses that are common to aging individuals.[12]

Primary prevention includes, for example, respecting traffic laws and abstaining from tobacco and alcohol use. Secondary prevention involves actions aimed at screening for early detection of chronic diseases, while tertiary prevention means seeking proper medical treatment. All these forms of prevention help reduce the risk of disability and were assessed by the Nahas Individual Lifestyle Profile questionnaire, revealing an excellent mean score. This result demonstrates that these practices are associated with longevity.[4,12]

With respect to smoking, results showed that the use of tobacco significantly increased the risk of chronic diseases. This is the most important modifiable risk factor for NCDs for young and old people and is the leading cause of preventable death. Smoking is a risk factor for an extensive and growing list of diseases, and the effects of its use are cumulative and long lasting. There is no safe level of tobacco use, but it is known that a longer exposure time results in a greater risk of developing NCDs. One of the most important changes that elderly smokers could make to their lifestyle was ceasing tobacco use. Only 5.3% of the population analyzed continued to smoke.[13, 14]

One negative result observed in this study was that the *physical activity* component of the population analyzed presented a much lower average than all the other components. Physical inactivity is prevalent among the elderly. Modern lifestyles involve spending most of one's free time in sedentary activities, such as sitting watching television for long periods. The main problem with a sedentary lifestyle is that it has proven to be an important risk factor for obesity and increased cholesterol and blood sugar levels. Those who cease to be sedentary, meanwhile, decrease the risk of death from cardiovascular diseases by 40%. It is possible that if older persons performed more physical activity, the prevalence of NCDs would be lower.[15-17]

The results for the *nutrition* component show that, although the diets of the analyzed population were not excellent, they were generally composed of fruit, vegetables and food that was rich in fiber and had a low quantity of saturated fats. It is possible that these individuals adopted this style of diet late in life, perhaps following the diagnosis with a NCD. Diets rich in saturated fat and salt, and that are low in fruit and vegetables and have an insufficient quantity of fibers and vitamins, combined with a sedentary lifestyle, are the greatest risk factors for such diseases.[18,19]

Another important result was that cardiovascular illnesses were the most prevalent of the NCDs in the sample. According to the Sociedade Brasileira de Cardiologia (the Brazilian Society of Cardiology), diseases of the circulatory system were among the top ten causes of death in 2009 in both developing and developed countries. These illnesses accounted for 28.7% of deaths in developing countries and 26.6% in developed countries. Brazilian data showed that cardiovascular diseases accounted for one third of all mortalities and nearly 30% of all deaths in the 20-59 year age group, affecting the most productive phase of an adult life.[12,13]

There are several risk factors for cardiovascular disease. Some of these are modifiable and relate to the individual's lifestyle, such as habits and behaviors that can be prevented, treated and controlled. Other risk factors are immutable and include, for example, family history and ethnicity. These factors, as well as contributing to the development of cardiovascular diseases, can be challenges for the treatment and control of such illnesses.[20]

Although the prevalence of cardiovascular disease was found to be high in the sample (74.3%), the majority of elderly respondents said they went to the doctor, underwent routine checkups and took prescribed medication to control the disease. In addition to these preventive actions, other behavior adopted by the elderly subjects of this study favored the treatment and control of cardiovascular diseases. It appears that even with cardiovascular diseases, a healthy lifestyle was found to be a positive factor for longevity.[7,12]

The clinical implications of this study are based on the finding that a lifestyle focused on healthy habits can be a contributing factor for longevity. Such lifestyles should therefore be encouraged among young people and young adults, as the earlier a healthy lifestyle is adopted, the better health conditions will be during aging.

The main limitations of the present study include the fact that there was no evaluation of the period of time for which the lifestyle in question had been adopted, although the applied questionnaire referred to the longest possible time in which the individual remembered having had followed his or her lifestyle. There are, however, few studies in Brazil about the lifestyle of older elderly persons. Therefore, the aim of the present study was to analyze the lifestyle of such individuals, and its relationship with non-communicable chronic diseases.

CONCLUSION

In summary, we can conclude that in the present study the majority of elderly persons had an excellent lifestyle with healthy habits. Even those diagnosed with a NCD had a good lifestyle. Cardiovascular diseases are the most prevalent type of illnesses for this population. The risk of a NCD was higher for smokers and non-smokers than for those who had never smoked. It is suggested that future studies continue this theme by investigating the impact of an active lifestyle on aging, preferably adopting a longitudinal approach.

The results suggest that a lifestyle based around health habits is a contributing factor for longevity. Public policies aimed at stimulating and promoting a healthy lifestyle among young people and young adults should therefore be encouraged, as it appears that the younger such lifestyles are adopted, the better health conditions will be during aging.

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Factors associated with the functional independence of elderly women in the city of Cuiabá

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Abstract

Objective: To analyze the prevalence of and factors associated with functional independence among community based elderly women. *Methods:* A cross-sectional study was conducted in the urban area of the city of Cuiabá, in the state of Mato Grosso, involving 247 women aged 60 and over. Data was collected through interviews, using instruments such as the Mini Mental State Examination, a questionnaire about demographic and health data, the Katz Index and the Lawton and Brody Scale. Prevalence ratio and the chi-squared test (p=0.05) were used as measures of association, whereas for multivariate analysis, the Poisson regression model was used. Calculations were performed with the Statistical Package for Social Sciences 22.0 program. *Results:* The prevalence of functional independence was 63.2%. The variables associated with independence were a younger age, an income greater than the minimum wage; the use of up to two drugs, did not need hospitalization in the last 6 months, had not experienced immobilization that prevented locomotion after age 60, visiting friends and relatives, social participation and physical activity. *Conclusion:* All the variables were strongly associated with healthy aging. Even in the presence of pathologies considered common to the aging process, the practice of physical activity and social interaction are important markers of functional independence.

Keywords: Elderly. Woman's health. Aging.

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INTRODUCTION

The 60 years or older age group is the fastest growing population segment in the world when compared proportionally with other age groups. Globally, the number of elderly women is significantly higher (a difference of 70 million) than the number of elderly men.[1] In Brazil, 55.8% of all individuals aged 60 years or more are female.[2] This phenomenon has been called the "feminization of the elderly" and is caused by the greater longevity of women when compared to men.[3]

This increase in the number of elderly individuals has led to global concerns about the need to implement new public policies that favor the maintenance of the functional independence of this segment of the population throughout the aging process. In accordance with a proposal by the World Health Organization,[4] the Ministry of Health has used its care network and certain public policies to develop strategies for the recovery, maintenance and promotion of independence among the elderly.[5] It is therefore hoped that this group of people will retain their ability to perform activities of daily living for as long as possible, without requiring assistance, as well as their autonomy, freedom of action and decision making skills.[6,7]

A number of tools have been created to assess the degree of care (from third parties) required by the patient in order to complete motor and cognitive tasks. One such tool is the Functional Independence Measure (FIM).[8] However, these assessments are difficult to apply to community-dwelling elderly individuals and are usually conducted with institutionalized or hospitalized patients.

The independence scale for basic activities of daily living (ADLs) was originally created to assess the results of treatment protocols for elderly patients, the prognosis of which provides a brief description of the ability of patients with chronic illnesses to take care of themselves and perform daily functions. This instrument is used to measure the functional capacity of community-dwelling and institutionalized elderly individuals.[9] Instrumental activities of daily living (IADLs) are considered more complex and are related to the capacity of the elderly individual to live in the community. [10]

Several authors have reported that the prevalence of dependence is higher among women than men.[11,12] Since they tend to live longer, women become more susceptible to a reduction in their functional capacity, as well as in their ability to perform activities of daily living or community-based activities, even when certain morbidities are involved.[13,14] However, reports in literature do not always agree on the functional capacity of elderly women.[15,16]

In this context, it is important to understand the conditions that favor the independence of these elderly women and the complex inter-relationships between all the factors involved in the aging process.

It is common knowledge that the main healthcare models for the elderly in Brazil are highly medicalized, inefficient and expensive, due to the use of highly-complex services. The identification of factors associated with functional independence can guide health promotion and disease prevention practices in other sections of the population, thereby decreasing the intense use of more complex health care services among the elderly.

The monitoring of health conditions and its determinants can favor the development of more effective health and social policies. Therefore, the aim of the present study was to analyze the prevalence (and associated factors) of functional independence among elderly community-dwelling women.

METHOD

A cross-sectional study was conducted with elderly women who lived in the urban zone of the municipality of Cuiabá, in the state of Mato Grosso. The women were selected based on a previous study by Cardoso et al.,[17] who assessed the health condition and associated factors of elderly individuals in the urban zone of Cuiabá. In this earlier study, the sample was determined using a calculation for finite populations, with a

confidence interval of 95% and a sampling error of 5%. Sampling by conglomerates was used to determine visitation in 11 census sectors. In order to determine the quantity of elderly individuals to be interviewed in the urban districts of Cuiabá, the total number of elderly residents in each district was stratified by gender, giving a total of 573 elderly individuals. Of this total, 319 were women aged 60 years or more. These women were selected for participation in the present study.

The following exclusion criteria were applied: the presence of cognitive decline; or when present, the absence of a caregiver to help the elderly individual with the interview responses. Cognitive decline was assessed using the mini mental state examination (MMSE), applying the education score established by the Ministry of Health.[6]

The following situations were classified as cognitive decline: illiterate elderly women with a total MMSE score of less than 19; elderly women with one to three years of education and a score of less than 23; elderly women who studied for between four and seven years and scored less than 24 points; and elderly women who studied for more than seven years and scored less than 28 points.[6] Data was collected between March 30 and May 30 of 2014 in the home of the participant, after they had read and signed a free and informed consent form. The data was collected through semi-structured interviews using a previously-tested questionnaire containing the following socio-demographic information: age was categorized as between 60 and 79 years or 80 years or more; marital status was dichotomized as married versus separated/widow/single; living conditions were classified as living alone or living with somebody; education was classified as illiterate, 1 to 3 years, four to seven years, or more than seven years (this was later reclassified as illiterate or up to three or four years of study or more); retired (yes or no); occupation (active/inactive); and income of up to or more than the minimum wage (MW). The health condition of the participants was classified as follows: self-perception of health (very good/good versus normal/poor/very poor); hospitalization in the previous six months (yes/no); health issues (yes/no), which were obtained from a list of health issues that are common in the elderly population; how many health issues (one and two or more); regular use of medication (yes/no); how many different drugs used (up to two or three or more); reported falls after reaching 60 years of age (yes/no); suffering injuries or fractures after reaching 60 years of age (yes/no); immobility after 60 years of age (yes/no), which meant be unable to move, be bedridden or use a wheelchair, irrespective of the cause. Social relationships were classified as follows: visits friends or relatives (yes/no); receives visitors (yes/no); attends a social group (yes/no); performed physical exercise at least once a week in the previous month (yes/no).

Functional independence was determined using the Katz index,[9] which assesses the capacity of elderly individuals to perform six ADLs (take a shower/bath, dress themselves, go to the toilet, get around, continence and nourishment), and the Lawton and Brody scale,[10] which determines the capacity to perform nine IADL activities (using the telephone, travelling a long distance using some form of transport, going shopping, making their own meals, cleaning the house, performing manual domestic tasks, washing clothes, taking medication and looking after their finances). Both of these scales have been validated and adapted for use in Brazil and are recommended by the Ministry of Health.[6]

From a hierarchical perspective, functional losses occur in the IADL>ADL direction. Following this principle, the elderly women were classified *a priori* as independent if they scored 27 points on the Lawton and Brody scale and did not require assistance to perform the Katz index tasks. Participants who scored between 10 and 26 points were classified as partially dependent, while those who scored up to nine points for IADLs and required complete assistance in all ADLs were considered to be completely dependent.

Thus, we began with the notion that if the participant was able to perform all of the IADLs without assistance, they would obviously be able to perform ADLs. Notably, none of the participants scored nine points or less for the IADLs and thus, none of the participants were completely dependent.

The data was codified and digitalized, with bivariate analysis conducted using EPI-INFO 7.0 software. The variables were described using absolute (n) and relative (%) frequencies. Bivariate analysis identified associations between the variable response (functional independence) and the other variables of exposure. The chi-squared test ($p \leq 0.05$) and the Mantel-Haenszel method (CI 95%) were used to calculate the statistical significance of the associations.

Multiple analysis was conducted using the Poisson regression model and the Statistical Package for Social Sciences 22.0 (SPSS). All variables with a p-value of ≤0.20 in the crude analysis were included, using a method that enabled the insertion of blocks of variables. Socio-demographic data was inserted first, followed by health conditions and social relationships. Associations that lost their statistical significance ($p > 0.05$) in each block were excluded using the progressive withdrawal method (stepwise backward). At the end of the analysis, variables with a *p*-value of ≤0.05 were considered as having a statistically significant association.

The present study was approved by the Research Ethics Committee of the Hospital Universitário Júlio Müller (Júlio Müller University Hospital) under protocol number 528.443/2014 and fulfilled the guidelines of resolution 466/12 of the National Health Council.

RESULT

The final sample contained 247 elderly women, after the following exclusions: one individual was excluded due to a diagnosis of cognitive decline; 33 participants were excluded due to a change of address or interrupted monitoring (after three visits had been completed); 28 individuals had died since the completion of the previous study; and 10 elderly women refused to participate in the research. Of the 247 individuals who did participate, 40.4% were aged between 70 and 79 years, and the mean age was 73 years (SD±7.9). There was a predominance of widows (44.5%) with four to seven years of education (29.5%), who were retired (54.7%) and received an income of up to the minimum wage (55.1%). These values are not contained in the tables.

Concerning the distribution of the elderly women in accordance with functional capacity, the prevalence recorded for independence was 63.2% (CI: 57.0-68.9) of the population assessed, while the remaining 36.8% (CI: 31.1-43.0) were classified as partially dependent. None of the subjects was classified as completely dependent.

In the bivariate analysis, statistically significant correlations were recorded for the following variables: aged between 60 and 79 years; five or more years of education; marital status of married; living with a partner or family member; working; and earning more than the minimum wage (Table 1).

Table 1. Distribution of the elderly women, according to socio-demographic variables. Cuiabá, Mato Grosso, 2014.

Variable	Independent		Dependent		PR[1]	CI 95%[2]	*p*-value[3]
	n	%	n	%			
Age group							
60 to 79 years	141	71.94	55	28.06	2.44	1.58-3.77	<0.001
80 years or more	15	29.41	36	70.59	1.00		
Marital status							
Married	70	71.43	28	28.57	1.23	1.02-1.49	**0.029**
Single/separated/widow	86	57.72	63	42.28	1.00		
Lives alone							
No	132	62.26	80	37.74	0.91	0.71-1.16	0.474
Yes	24	68.57	11	31.43	1.00		
Years of education							
4 years or more	99	72.26	38	27.74	1.39	1.13-1.71	<0.001
Illiterate/1 to 3 years	57	51.82	53	48.18			
Occupation							
Active[4]	26	86.67	4	13.33	1.44	1.21-1.72	0.004
Inactive[5]	130	59.91	87	40.09	1.00		
Income							
> 1 MW[6]	68	76.40	21	23.60	1.37	1.14-1.64	0.001
Up to 1 MW	88	55.70	70	44.30	1.00		

PR[1]: prevalence ratio; CI[2] 95%: confidence interval for the proportion of 95%; P[3]: level of significance considering the distribution of the chi-squared test ($p \leq 0.05$); Active[4]: income from work only or from work and other sources; Inactive[5]: income from non-work sources (retirement funds, pensions, health assistance, donations, others); MW[6]: minimum wage at the time (R$724.00).

Concerning health conditions, the following variables correlated with independence among the elderly women: no more than one health problem; taking no more than two drugs concomitantly; and no hospitalizations in the previous six months. Statistically significant associations were maintained for participants who had suffered no falls, immobility, injuries or fractures after reaching 60 years of age (Table 2).

In the analysis of social relationships, statistically significant associations were recorded for the following variables: visiting friends or relatives; attending a social group; and performing physical exercise (Table 3).

Table 2. Distribution of elderly women, according to the health condition variables. Cuiabá, Mato Grosso, 2014.

Variable	Independent		Dependent		PR[1]	CI 95%[2]	*p*-value[3]
	n	%	n	%			
Self-perception of health							
Very good/good	81	67.50	39	32.50	1.14	0.94-1.38	**0.0169**
Normal/poor/very poor	75	59.06	52	40.94	1.00		
Health problems							
No	4	80.00	1	20.00	1.27	0.81-1.99	0.431
Yes	152	62.81	90	37.19	1.00		
Quantity of health problems							
0-1	25	80.65	6	19.35	1.32	1.08-1.62	0.031
2 or more	131	60.65	85	39.35	1.00		
Uses medication regularly							
No	9	69.23	4	30.77	1.10	0.75-1.60	0.641
Yes	147	62.82	87	37.18	1.00		
Quantity of drugs							
0-2	108	68.79	49	31.21	1.28	1.03-1.60	0.015
3 or more	48	53.33	42	46.67	1.00		
Hospitalized in the previous six months							
No	132	67.01	65	32.99	1.39	1.03-1.89	0.013
Yes	24	48.00	26	52.00	1.00		
Suffers falls after 60 years							
No	62	72.94	23	27.06	1.25	1.04-1.51	0.021
Yes	94	58.02	68	41.98	1.00		
Falls in the previous year							
No	101	66.89	50	33.11	1.16	0.95-1.43	0.128
Yes	55	57.29	41	42.71	1.00		
Injury/fracture after 60 years							
No	114	69.94	49	30.06	1.39	1.10-1.77	0.002
Yes	42	50.00	42	50.00	1.00		
Immobility after 60 years							
No	149	68.04	70	31.96	2.72	1.42-5.20	**<0.001**
Yes	7	25.00	21	75.00	1.00		

PR[1]: prevalence ratio; CI[2] 95%: confidence interval for the proportion of 95%; P[3]: level of significance considering the distribution of the chi-squared test ($p \leq 0.05$).

Table 3. Distribution of the elderly women, according to social relationships. Cuiabá, Mato Grosso, 2014.

Variable	Independent		Dependent		PR	CI 95%	*p*-value
	N	%	n	%			
Visits friends/relatives							
Yes	127	70.17	54	29.83	1.59	1.19-2.13	<0.001
No	29	43.94	37	56.06	1.00		
Receives visits							
Yes	153	64.02	86	35.98	1.70	0.69-4.19	0.126
No	3	37.50	5	62.50	1.00		
Attends a group							
Yes	53	81.54	12	18.46	1.44	1.21-1.71	<0.001
No	103	56.59	79	43.41	1.00		
Performs physical exercise*							
Yes	56	84.85	10	15.15	1.53	1.30-1.81	<0.001
No	100	55.25	81	44.75	1.00		

PR[1]: prevalence ratio; CI[2] 95%: confidence interval for the proportion of 95%; P[3]: level of significance considering the distribution of the chi-squared test ($p \leq 0,05$)

In the Poisson multiple regression analysis, the following variables remained associated with functional independence: an age of between 60 and 79 years; having an income of more than the minimum wage; no hospitalizations in the previous six months; using no more than two types of medicine on a regular basis; the absence of immobilization after 60 years of age; visiting friends or relatives; attending social groups and performing some form of physical exercise (Table 4).

Table 4. *Poisson* multiple regression model of the variables associated with the functional independence of elderly women. Cuiabá, Mato Grosso, 2014.

Variable	PR_{Gross*}	CI – 95%	$PR_{adjusted**}$	IC – 95%	p-value
Age group					
60-79	2.44	1.58-3.77	1.32	1.21-1.43	<0.001
80 years or more	1.00		1.00		
Income					
>1 MW	1.37	1.14-1.64	1.16	1.07-1.24	0.002
Up to 1 MW	1.00		1.00		
Quantity of drugs					
0- 2	1.28	1.03-1.60	1.11	1.03-1.20	0.015
3 or more	1.00		1.00		

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Continuation of Table 4

Variable	PR_{Gross*}	CI – 95%	$PR_{adjusted**}$	IC – 95%	p-value
Hospitalized in the previous six months					
No	1.39	1.03-1.89	1.11	1.02-1.21	0.003
Yes	1.00		1.00		
Immobility after 60 years					
No	2.72	1.42-5.20	1.19	1.01-1.32	0.002
Yes	1.00		1.00		
Visits friends/relatives					
Yes	1.59	1.19-2.13	1.11	1.02-1.20	0.007
No	1.00		1.00		
Attends groups					
Yes	1.44	1.21-1.71	1.11	1.01-1.21	0.049
No	1.00		1.00		
Performs physical exercise					
Yes	1.53	1.30-1.81	1.11	1.01-1.21	0.050
No	1.00		1.00		

*Gross prevalence ratio; **adjusted prevalence ratio

DISCUSSION

The prevalence of functional independence (FI) in the present study was 63.2%, which is quite similar to the results of a study conducted in Norway, in which 74.3% of the women monitored were classified as independent.[15] Similarly, a study of 1339 elderly women in Uberaba, in the state of Minas Gerais (Brazil) reported a FI prevalence of 69.2%.[18] However, other studies have shown lower levels of independence among elderly women.[19]

One of the possible explanations for this result is the fact that most of the participants have lived at a time when, historically, women have more rights and opportunities.[20] The oldest women exhibited the greatest growth in relation to their inclusion in the workforce[21] and their involvement in family decisions. These modern benefits have made them more financially independent.[22,23] In addition, they have found new meaning in their lives, broadening their horizons, seeking more information, incorporating new knowledge and expanding their interpersonal relationships.[24]

A number of studies have shown that many elderly women are more physically resistant, maintaining their health and autonomy. [23,25] Nowadays, they take care of themselves and participate in social activities that preserve their physical and cognitive condition through activities such as dancing, travelling and crafts workshops. [22,25,26]

The association found in the present study between the age group of younger elderly women and FI is not surprising. Studies have shown that women aged under 80 years are more independent.[18,27,28] This is due to the aging process itself, in which physiological decline and pathological risks progress over time, leading to the onset of disabilities at more advanced ages.[3] Similarly, elderly women who did not exhibit immobility after 60 years of age, had not been hospitalized recently and performed some form of physical exercise were associated with FI, thereby confirming that the maintenance of an active and healthy body is directly related to the preservation of FI.[13]

The reduction of disabilities comes from the conservation of physical mobility and the prevention and control of chronic illnesses and biopsychosocial equilibrium. [29] Women tend to perform less physical exercise than men,[30] which leads to organic-functional benefits, as well as other benefits related to sociability, beauty and esthetics.[31] In addition, active aging reduces the demand for health services, thereby reducing the cost of treating illnesses and hospitalizaitons.[13]

The association found between elderly women with a higher income and FI in the present study was also reported by Ribeiro and Neri.[30] These authors assessed 1538 elderly individuals aged 65 years or more in six Brazilian cities and determined the influence of socioeconomic factors on aging. A higher salary improves the level of self-care of an individual (in terms of their health), ensuring that incapacitating processes are delayed and the autonomy of the individual is maintained.[25,30] A higher family and per capita income favors more socializing among elderly individuals, thereby improving their ability to perform daily activities and interact with different social groups. Consequently, a higher income "socially modifies the idea that aging is linked to reclusion, passivity and rest".[23]

The association between the non-use or low consumption of drugs and FI is significant. Polypharmacy occurs when an elderly individual exhibits several chronic illnesses concomitantly, which usually involves greater functional dependence.[32] However, knowledge about the adequate and safe use of drugs can prevent illnesses and functional decline.[13]

The social interactions involved in visiting friends or relatives were important to the FI of the elderly women, corroborating the findings of other studies.[7,30,33] These activities prevent the individual from developing a sedentary lifestyle, thereby delaying the onset of disabilities and the loss of autonomy.[7,34] Domestic tasks that make up the daily life of women can also prolong their independence. Furthermore, the maintenance of social relationships and recreation/leisure activities can assist the physical and psychological wellbeing of elderly women. Prevention measures that delay the evolution of illnesses reduce the complexity of the care required and improve the social and family life of individuals, while also increasing their desire to perform physical exercise.[35]

Since this was a cross-sectional study in which the exposure factors and the outcome were determined simultaneously, caution should be used when interpreting associations between factors related to the functional independence of the participants.

It is not possible to rule out the occurrence of information bias or memory bias, given the fact that this study assessed the recollections of elderly women. Functional dependence may be related to cognitive decline or a lack of awareness of the previous situation of the patient (on behalf of the person who helped them to complete the questionnaire). However, the participation of the main researcher in the interviews may have minimized the possibility of this occurrence.

In cross-sectional studies such as this, the use of the prevalence ratio as an effect measurement in both the bivariate analysis and the *Poisson* multiple model favors a satisfactory adjustment of the effect measurements and prevents the overestimation of association measurements.

The significance of the present study lies in the fact that it focused on the identification of factors associated with the functional independence (FI) of elderly women, thereby ensuring that such data could identify predictor variables for healthy aging, specifically among women.

CONCLUSION

The prevalence of functional independence among the elderly women was 63.2%. Strong associations were recorded between FI and age group, an income of more than one minimum wage, no hospitalizations in the previous six months, using a maximum of two medications on a regular basis, mobility after reaching 60 years of age, visits

to friends/parents, attending social groups and performing some form of physical exercise.

The results of the present study showed the diversity of factors that are directly correlated with FI and confirmed that different aspects of daily activities and the physiological aging process can affect an individual's ability to perform ADLs or IADLs.

It is believed that the present study could stimulate new subsidies for the implementation of policies focusing on this segment of the population. Health professionals need to invest in the health education of these women before they become chronologically elderly in order to promote active aging and effective participation in society and in family environments.

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Peripheral and central auditory assessment in among the elderly

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Abstract

Introduction: Presbycusis can affect different portions of the auditory system, causing impacts of varying degrees of seriousness on the daily routine of elderly persons. It is essential that the extent of the deficit as well as the degree of handicap is evaluated, so that the hearing of the elderly can be effectively rehabilitated, improving their quality of life. *Purpose:* To characterize the peripheral and central hearing of elderly individuals and assess their auditory handicaps. *Methods:* A cross sectional observational study was performed. We evaluated 83 elderly persons (60-85 years; 33 men, 50 women) with normal hearing or sensorineural hearing loss. Individuals were divided into 3 groups according to the 3 to 6kHz hearing thresholds: G1 – mean of 0 to 39 dBHL (80 ears); G2 – mean of 40 to 59 dBHL (48 ears); G3 – mean of 60 to 120dBHL (38 ears). All individuals responded to the Hearing Handicap Inventory for the Elderly (*HHIE*), and underwent Pure Tone Audiometry, Auditory Brainstem Response (ABR) and Long Latency Response (P300) evaluation. Results: Men had higher auditory thresholds at frequencies from 500 to 12,000Hz (with a statistical difference between 2-8 kHz) and also significantly greater latencies for ABR components. There was no difference between genders for the P300 evaluation. Comparison between groups showed: a statistically significant difference for age; greater ABR wave latencies and interwave intervals; that questionnaire scores worsened as hearing threshold declined; and similar P300 latencies. *Conclusions:* Elderly people have impairment throughout the auditory pathway (peripheral and central). The P300 was less accurate at identifying the losses that come with age. The *HHIE* demonstrated negative effects on the social life of elderly people, agreeing with the hearing thresholds found.

Keywords: Elderly. Presbycusis. Evoked Potentials. Auditory. Brain Stem. Event-Related Potentials. P300. Hearing. Hearing Loss.

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INTRODUCTION

The elderly population is currently undergoing a period of growth. Demographic projections for the coming years indicate that aging will intensify and will be accompanied by an increase in chronic diseases and presbycusis.[1-3]

Presbycusis is age-related hearing loss, and affects approximately 30% of the population aged over 65. Its etiology may be related to extrinsic and intrinsic factors, including exposure to noise, ototoxic agents, drug treatments, blood pressure, and smoking.[4-6]

It is known that aging may affect the peripheral and/or central portions of the auditory system. The peripheral component of presbycusis mainly relates to changes in the outer and inner hair cells, as well as degeneration of the stria vascularis. These changes can result in hearing loss, especially at high frequencies, with impaired speech recognition.[7-9]

In terms of the core component, meanwhile, changes in the temporal processing of complex acoustic stimuli have been described. This alteration may be related to the reduction of inhibitory neurotransmitters, which permeate the temporal processing of rapid complex acoustic stimuli.[8,9]

Hearing loss can limit or prevent the individual from fulfilling his or her social role, resulting in negative emotional and professional effects. Due to sensory deprivation, the individual becomes unable to communicate properly with others, causing frustration and leading to a deterioration in quality of life.[10-12] The psychological and social damage (participation restrictions) arising from hearing loss is described as a handicap.[13,14]

The evaluation of the impact of hearing loss on emotional and social aspects can be accomplished through the application of self-assessment questionnaires. These instruments can be used to quantify the subjective and qualitative dimensions of hearing loss. Such questionnaires can therefore provide a better understanding of the impact of hearing loss on the elderly, and the needs of this population.[6,12,15]

As presbycusis can affect the auditory system as a whole (peripheral and/or central portion) in different ways and as the subsequent hearing loss can impact various aspects of the life of elderly persons to a greater or lesser extent,[7] it is essential that the extent of the hearing deficit and the degree of handicap are evaluated quantitative and qualitatively, so that the hearing rehabilitation of the elderly individual can occur in a specific and effective manner, aimed at improving quality of life.

Thus, taking into account the impact of hearing loss on the quality of life of the elderly, the need to understand how presbycusis affects the auditory system, and the fact that a review of literature did not identify studies simultaneously evaluating the overall auditory pathways of the elderly, the present study aimed to characterize the peripheral and central hearing of the elderly, as well as evaluating auditory handicap.

METHOD

The participants were 83 elderly people (33 men and 50 women) with normal hearing and sensorineural hearing loss, aged between 60 and 85 years, living in the Butantã region of São Paulo. Subjects were contacted by publicizing the study on the university campus, resulting in a convenience type sample. Data collection took place between April 2009 and April 2011, and was carried out by two researchers who performed all the evaluations together at the Centro de Docência e Pesquisa em Fisioterapia, Fonoaudiologia e Terapia Ocupacional of the Faculdade de Medicina of the Universidade de São Paulo (the Center for Research and Teaching in Physical, Speech and Occupational Therapy of the School of Medicine of the University of São Paulo). The evaluations were carried out on the same day, and lasted around 90 minutes.

To begin, the HHIE (Hearing Handicap Inventory for the Elderly), created by Ventry and

Weinstein[16] in 1983 and translated and adapted for Brazilian Portuguese by Rosis et al in 2009, was applied.[15] The questionnaire consists of 10 questions that assess the perception of the negative effects of hearing loss on the social and emotional life of the elderly. The results are quantified through the allocation of points, ranging from 0 to 4, and the answers to each question can be "yes" (4 points), "sometimes" (2 points) or "no" (0 Score). The degree of handicap is established from the total questionnaire score: 0-9 (no perception of handicap), 10-24 (mild/moderate perception) and above 24 (significant perception).

Otoscopy was then carried out, together with tympanometry and the evaluation of acoustic reflex with AT235h equipment (Interacoustics), to rule out the existence of harm to the middle ear, which was an exclusion criterion.

For the audiological evaluation, thresholds of hearing were evaluated with a GSI 61 audiometer, at the 250-12000 Hz frequency for air conduction and also at 500 to 4000 Hz for bone conduction, when the air thresholds exceeded 20 dB HL.

Following these evaluations, the long and short latency Auditory Evoked Potentials were recorded using the Travel Express System from Biologic.

To record brainstem auditory evoked potential (BAEP), the rarefied polarity click acoustic stimulus was used, presented monaurally at 80 dBnHL, at a 19.1 stimuli per second display speed and a duration of 0.1 millisecond. A total of 2,000 stimuli were employed. The electrodes were placed on the forehead (Fz) and the right and left mastoid (A2 and A1). Two registers were recorded for each side, so verifying the reproduction of the tracings and confirming response. The absolute latencies of the I, III and V waves, and the I-III, III-V and I-V interpeaks were evaluated.

Evaluation of Long Latency Brainstem Auditory Potential (P300), used the "tone-burst" stimulus presented monaurally at 75 dBnHL at a 1.1 stimuli per second display speed, employing a total of 300 stimuli. The electrodes were placed on the vertex (Cz), the right and left mastoids (A2 and A1) and the forehead (Fpz). The frequent stimulus was presented at 1000 Hz and the rare stimulus at 1500 Hz, as of the 300 stimuli presented, 15% referred to the rare stimulus, and the rest to the frequent stimulus (85%). A 512 ms analysis window, gain of 15,000, low-pass filters of 30 Hz and a high pass filter of 1 Hz were used. The patient was advised to mentally count the rare stimuli presented. Wave latency of P300 was analyzed.

The positioning of the electrodes in both tests followed the IES 10-20 guidelines *(International Electrode System).*

For some comparisons, in order to verify whether there was interference of the auditory thresholds in the other evaluations (electrophysiological and HHIE), the 83 individuals were divided based on the average thresholds of hearing for the frequencies of 3 to 6 kHz per ear. The groups were divided as follows: G1 – mean 0-39 dB HL (80 ears); G2 - mean 40-59 dB HL (48 ears); G3 - mean of 60 to 120 dB HL (38 ears).

For the purposes of statistical analysis, ages were first compared between the genders were compared. Subsequently, the thresholds of hearing and latencies of the AEP components were compared first by gender, and later between the groups. The HHIE score was also compared between groups. For this, the non-paired ANOVA parametric test and the Tukey test were used, with a significance level of 5%.

The present study was approved by the Research Ethics Commission of the institution, under number 1024/09. All the participants signed a Free and Informed Consent Form.

RESULT

Of the 83 elderly patients evaluated, 33 were men with a mean age of 68.12 years (±5.98) and 50 were women with a mean age of 67.54 years (±6.23). There was no statistically significant age difference between the genders (p=0.674, ANOVA test).

Initially, the right and left ears were compared with respect to thresholds of hearing and the components of auditory evoked potentials (AEP). None of the comparisons found statistically significant difference between the ears. For this reason, the ears were grouped together for the next comparison.

Gender

The thresholds of hearing and latencies of the AEP components were compared between genders. The descriptive statistics and p values are shown in Tables 1 and 2.

Table 1. Mean values of thresholds of hearing by frequency (in dB HL) between genders. São Paulo, state of São Paulo, 2015.

Frequency (in dB HL)	Female (n=100) Mean (SD)	Male (n=66) Mean (SD)	*p*-valor
250 Hz	20.55 (13.90)	19.77 (14.28)	0.729
500 Hz	20.85 (13.99)	22.19 (18.73)	0.597
1000 Hz	23.65 (15.82)	27.80 (19.92)	0.138
2000 Hz	26.8 (16.87)	35.98 (20.57)	0.001*
3000 Hz	28.95 (18.45)	45.53 (19.98)	<.0001*
4000 Hz	35 (20.11)	51.43 (18.94)	<.0001*
6000 Hz	43.55 (25.04)	58.71 (21.43)	<.0001*
8000 Hz	45.1 (25.01)	59.46 (21.57)	0.0001*
12000 Hz	73.3 (10.99)	75.07 (6.65)	0.240

dB HL: decibel level hearing level; SD: standard deviation; *value of $p \leq 0.05$; n: total number of ears. ANOVA test.

Table 2. Mean latency values of components of ABR (in ms) between genders. São Paulo, state of São Paulo, 2015.

Latencies (in ms)	Female (n=100) Mean (SD)	Male (n=66) Mean (SD)	*p*-valor
Wave I	1.80 (0.32)	1.95 (0.39)	0.005*
Wave III	3.90 (0.32)	4.07 (0.37)	0.001*
Wave V	5.78 (0.32)	5.96 (0.42)	0.001*
I-III	2.26 (0.32)	2.42 (0.37)	0.002*
III-V	1.90 (0.21)	1.94 (0.34)	0.404
I-V	4.36 (0.89)	4.71 (1.09)	0.026*
P300	351.25 (40.52)	347.71 (42.42)	0.590

dB HL: decibel level hearing level; SD: standard deviation; ms: millisecond; *value of $p \leq 0.05$; n: total number of ears. ANOVA test

In terms of thresholds of hearing, it was noted that men exhibited lower thresholds for frequencies from 500 to 12,000 Hz than females, with a statistically significant difference from 2 to 8 kHz (Table 1). With respect to ABR, men exhibited greater latencies than women for all components, with statistically significant differences for all components except for the III-V range. In terms of P300, there was no statistically significant difference between the genders (Table 2).

Comparison between groups (ears divided based on means of 3 to 6 kHz)

Table 3 and Figure 1 illustrate the thresholds of hearing by frequency for the ears divided within the groups. Obviously, it can be seen that the groups differ significantly in terms of mean thresholds of hearing, as the division by groups was based on exactly this criterion. It is worth noting that although the division was made based on the frequencies of 3 to 6 kHz there were also differences at lower frequencies. It can also be observed that these groups showed a statistically significant difference with respect to age, with G1 the youngest group, although G2 did not differ from G3.

Based on the division by groups, the latency of the AEP components was compared (Table 4).

In terms of ABR, there was no absence of a response to any of the potential components. Table 4 shows that as the hearing threshold declined (according to the division by groups), the more the latencies of waves and interpeak intervals increased. The statistically significant differences between the three groups and within the groups after pairwise comparison are shown in Table 4. With respect to P300, statistically significant differences were observed between the groups G1, G2 and G3 (Table 4).

Table 3. Mean threshold of hearing values by frequency (in dB HL), comparing groups G1, G2 and G3. São Paulo, state of São Paulo, 2015.

	G1 (n=65) Mean	G2 (n=48) Mean	G3 (n=38) Mean	*p*-valor
Mean Age (SD)	65.6 (4.97)	70 (5.97)	69.6 (6.78)	<0.0001*
250 Hz	15	21.4	29.9	<0.0001*
500 Hz	14.6	23.3	33.3	<0.0001*
1 kHz	16.8	26.7	41.4	<0.0001*
2 kHz	18.2	34.0	51.8	<0.0001*
3 kHz	19.8	40.3	62.6	<0.0001*
4 kHz	24.3	47.5	70.4	<0.0001*
6 kHz	29.4	57.3	82.4	<0.0001*
8 kHz	31	61.4	79.2	<0.0001*
12 kHz	71.5	76.4	76.3	0.0042*

db HL: decibel Hearing Level; SD: standard deviation; Hz: Hertz; KHz: kilohertz; * value of $p \leq 0.05$; n: total number of ears. ANOVA test. Tukey test for age - G1 X G2: $p<0.01$; G1 X G3: $p<0.01$; G2 X G3: p not significant.

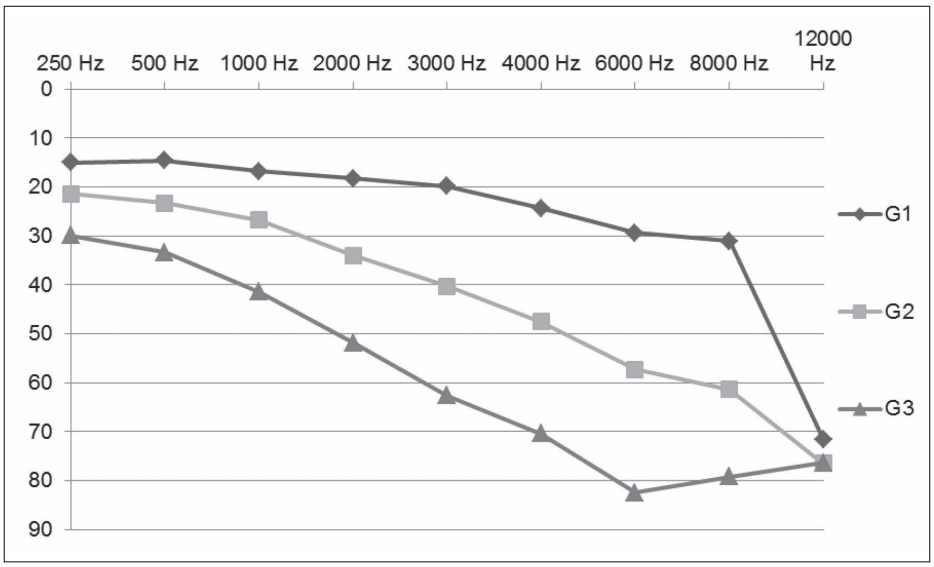

Figure 1. Mean thresholds of hearing by frequency (in db HL) for groups G1, G2 and G3. São Paulo, state of São Paulo, 2015.

Table 4. Mean latency values for ABR components (in ms), comparing groups G1, G2 and G3. São Paulo, state of São Paulo, 2015.

Latencies (in ms)	G1 (n=65) Mean (SD)	G2 (n=48) Mean (SD)	G3 (n=38) Mean (SD)	p-value (Anova)	Pairwise comparison (Tukey)
Wave I	1.77 (0.28)	1.86 (0.34)	2.06 (0.43)	<0.0001*	G1 X G2 – n.s. G1 X G3 - p<0.01* G2 X G3 - p<0.05*
Wave III	3.83 (0.02)	4.01 (0.12)	4.21 (0.24)	<0.0001*	G1 X G2 – p<0.05* G1 X G3 - p<0.01* G2 X G3 - p<0.01*
Wave V	5.70 (0.21)	5.91 (0.38)	6.08 (0.50)	<0.0001*	G1 X G2 – p<0.05* G1 X G3 - p<0.01* G2 X G3 – n.s.
I-III	2.22 (0.30)	2.33 (0.32)	2.52 (0.40)	<0.0001*	G1 X G2 – n.s. G1 X G3 - p<0.01* G2 X G3 - p<0.05*
III-V	1.87 (0.21)	1.95 (0.28)	1.97 (0.34)	0.114	-
I-V	4.21 (0.74)	4.52 (0.93)	5.08 (1.24)	<0.0001*	G1 X G2 – n.s. G1 X G3 - p<0.01* G2 X G3 - p<0.01*
P300	351.31 (39.52)	347.35 (44.50)	349.89 (41.27)	0.869	-

SD: standard deviation; ms: millisecond; * value of $p \leq 0.05$; n: total number of ears; n.s: not significant.

Handicap - HHIE score

Table 5 shows a statistically significant difference between the groups in terms of HHIE scores, which diminished in accordance with the reduction in thresholds of hearing (in accordance with division by groups). It was also observed that the scores for G2 and G3 were not statistically significant different.

Table 5. Mean point score according to HHIE questionnaire, comparing groups G1, G2 and G3. São Paulo, state of São Paulo, 2015.

Groups	Mean (standard-deviation)	Pairwise comparison (Tukey)
G1	11.87 (9.45)	G1 X G2 - $p<0.05$
G2	16.66 (8.87)	G1 X G3 $p<0.05$
G3	19.68 (8.53)	G2 X G3 – n.s.
Anova Test	$p<0.0001$	

SD: standard deviation; ms: millisecond; * value of $p\leq0.05$; n: total number of ears, n.s: not significant.

DISCUSSION

It was observed that men had lower thresholds of hearing at frequencies from 500 to 12,000 Hz than women, with a statistically significant difference from 2 to 8 kHz. These findings agree with previous studies,[11,17,20] which reported lower thresholds of hearing, especially at high frequencies, for men. Factors such as high blood pressure, smoking and exposure to noise contributes to the worsening of hearing with age.[18]

Similarly, just as males had lower thresholds of hearing in pure tone audiometry than women, in terms of ABR, men had greater latencies than women for all components, with a statistically significant difference for all components except for the III-V range.

It is known that the prolongation of ABR wave latencies can be caused by sensorineural hearing loss. Literature shows that in cochlear hearing loss, for thresholds higher than 50 dB HL at high frequencies, an increase of 0.1 to 0.2 ms in the latency of the V wave is expected for every 10 dB of hearing loss.[21] As the stimulus used in this study was the click (frequency range between 3 and 6 kHz) and as the elderly participants had increased thresholds of hearing in this frequency range, the increase in latency of the ABR components was expected, as well as the difference between the sexes, because of the difference in thresholds of hearing observed in audiometry.

In terms of the P300 component, there was no statistically significant difference between the genders. This finding may also be explained by the thresholds of hearing as the mean thresholds for frequencies of up to 2 kHz for both genders did not exceed 40/50 dB HL. As the stimuli used for P300 capturing were at 1000 and 1500 Hz, the presence of hearing loss did not influence the breakdown of these stimuli, and therefore had no influence on the findings of P300.[22]

It is noteworthy that the P300 averages found for both genders are within the expected range for this age range.[23] Moreover, a difference between the genders is not expected for P300.[22]

When the groups were divided according to the mean thresholds of hearing for the frequencies from 3 to 6 kHz per ear, they were found to differ significantly. This finding was expected, aa the division of the groups used exactly this criterion, or in other words, the thresholds of hearing.

It was also observed that the groups exhibited a statistically significant difference with respect to age, with G1 being the youngest group, although G2 did not differ from G3. This suggests that, as the ages of G2 and G3 were similar, it was not this variable that determined the difference between thresholds of hearing for these two groups. Possibly other intrinsic and extrinsic variables, including exposure to noise, ototoxic agents, drug treatments, blood pressure, smoking, among others[4-6] may have influenced the determination of higher thresholds of hearing for G3.

In terms of ABR, it was observed that as hearing threshold declined (according to the division by groups), so the wave latencies and interpeaks intervals increased, with statistically significant differences for most comparisons. Taking into consideration the similar ages of G2 and G3, and the fact that even with similar ages the two groups showed significant differences in the ABR components, it can be suggested that the factor that determined this difference was in fact a higher auditory threshold in G3. Thus, it should be considered that age can have an influence on the wave latencies of ABR, but that the degree of hearing loss seems to have a larger impact on this characteristic.[22]

Similar results were found by Boettcher,[24] in a study of elderly persons with presbycusis, which observed increased absolute latencies for all ABR waves. Ulf et al.,[25] in a study of subjects from different age groups, also found an increase in absolute latencies of all ABR waves with increasing age.

With respect to P300, statistically significant differences were observed between the groups G1, G2 and G3. This finding shows that the differences in thresholds of hearing between the three groups did not influence P300 latency because, as it is likely that the stimuli used in the assessment can be heard and discriminated,[22] the degree of hearing loss does not interfere as much with P300 latency as with ABR.

Regarding age and P300 latency, as G1 was younger than G2 and G3, it can be considered that this variable was not decisive. The average latencies obtained in this study are close to those obtained by McPherson[23] among individuals aged 50-70 years (350-470 ms), which coincides with the average age of the three groups studied. Goodin[26] found, for an age group between 6 and 76 years, an increase of 1.8 ms per year in the latency of the P300 wave. A study by Syndulko[27] found a lower P300 wave latency for individuals younger than 45 years (mean of 330 ms) and an increase in this value for individuals older than this age (mean of 368 ms).

According to Verleger,[28] the increase in P300 latency may be related to a delay in information processing that can occur in elderly individuals, due to the decrease of cognitive functions observed in this age group.

In addition, it is worth mentioning that the P300 is a potential component with great inter-subject and lesser intra-subject latency variability. This may also have contributed to the great variability in the present study and the absence of a significant difference between groups.

In terms of perception of handicap according to HHIE, there was a statistically significant difference between the groups, with the score declining in accordance with the worsening of thresholds of hearing (according to the division by groups). In the comparison between G2 and G3,

this difference was not significant. It is important to note that the mean points obtained for the three groups fell within the classification of "mild to moderate handicap", indicating that despite the difference in thresholds of hearing between groups, most individuals exhibited handicap arising from hearing loss.

This data indicates that there is some agreement among most of the thresholds of hearing found (normal hearing and mild to moderate hearing loss) and the handicap (without handicap or mild to moderate handicap) presented in greater numbers in this population. These findings were also found in the study by Calviti and Pereira.[29]

It should be mentioned that 56.6% of 83 elderly subjects had some degree of handicap (according to HHIE), or in other words, had scores above 10, while 68.7% of 83 elderly subjects had some degree of hearing loss. For most of the elderly persons studied in this survey, we suggest that any degree of hearing loss generates some kind of negative social or emotional effect, detected through the *HHIE*.

As such the importance of using tools such as self-assessment questionnaires in clinical practice, as a form of initial screening to identify elderly persons who require a more complete audiological evaluation, including, in addition to the evaluation of the peripheral auditory pathway, the investigation of how acoustic stimulation is transmitted and processed along the central auditory pathway, should be stressed.

It should be noted that the present study has some limitations, especially with regard to the sample size. Being a relatively lengthy assessment, some individuals were not interested in participating. With a larger number of participants, the differences observed may be more robust. Nevertheless, the study results have clinical and scientific importance, as they describe the operation of the peripheral and central auditory pathways of the elderly, and correlate possible changes in the auditory system with the restrictions to daily life experienced by this population.

CONCLUSION

It can be concluded that the elderly persons exhibited damage to the auditory pathway as a whole (peripheral and central). The P300 was less sensitive to the changes arising from age. The HHIE questionnaire identified negative effects on the social life of the elderly, displaying agreement with the thresholds of hearing assessed. From these findings, the importance of using tools such as self-assessment questionnaires in clinical practice for screening purposes as well as a complete audiological evaluation (peripheral and central auditory pathways) in this population, can be seen.

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Home-based oral healthcare strategies of elderly people with Alzheimer's disease

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Abstract

Objective: To identify strategies used in the oral health care of elderly persons with Alzheimer's disease in the home. *Method:* an exploratory, descriptive study with a qualitative approach to collecting and analyzing data was performed. Data was collected through interviews with 30 caregivers and analyzed by the content analysis technique. *Results:* The majority of subjects were female, daughters of the elderly person, university graduates and aged 32-77 years. The strategies identified were grouped into categories according to the participation of the caregiver: does not participate in care actions or oral health assessments; reminds the elderly person about oral hygiene, demonstrates movements and assists with some procedures; directly carries out actions of care. *Conclusion:* The strategies employed are related to the degree of dependence of the elderly person, as the caregiver acts based on the need for oral health care and the difficulties in carrying out such care.

Keywords: Alzheimer Disease. Oral Health. Home Nursing.

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INTRODUCTION

Dementias are among some of the greatest challenges faced by public health. There are around 44 million people with dementia around the world, with this number expected to double by 2030.[1] It is a syndrome caused by a series of progressive illnesses that affect memory, thought, behavior and the capacity to carry out everyday activities, and is one of the main causes of dependency and disability among elderly persons. It mainly affects the elderly, although it is estimated that between 2 and 10% of all cases occur before 65 years of age.[1] Alzheimer's Disease (AD) is the most common type of dementia, and is responsible for approximately 50 to 75% of dementias in several countries. The symptoms generally include memory loss, communication difficulties, difficulties in performing domestic tasks, personality and mood disorders. As the disease progresses, AD sufferers experience limitations in looking after themselves and gradually come to require the help of others when performing basic activities of daily living.[1]

Studies have described how, due to functional and cognitive impairment, often combined with behavioral disturbances, elderly persons with AD have poor oral health conditions,[2,3] and represent an at risk group for the emergence of oral disease.[4-6] Other studies have described a high prevalence of dental caries in individuals in advanced stages of AD,[7] and found an association between the presence of dental caries in elderly persons in the initial stage of AD and a high risk of root caries.[8-10,12] Issues relating to the state of oral health of elderly persons with AD and the way in which oral care is provided to these patients have been considered in a number of studies.[9] Elderly persons that no longer have the capacity to feed themselves alone are in the majority of cases also unable to carry out oral health tasks.[10] Ideally, oral health tasks are carried out by the caregiver, as it is difficult for dementia sufferers to perform these activities.[8] In such cases, caregivers are the main providers of care for these patients, and therefore the planning of oral care should consider the perception of these caregivers and their knowledge of oral health and hygene.[8] Furthermore, according to some authors, oral health should be reinforced by focusing on the caregivers of elderly persons with AD, so that they can provide, in addition to daily oral health activities that maintain health and well-being, care aimed at the specific oral health care needs of elderly persons.[9,11]

In this context, it is important to identify the oral health strategies used by caregivers of elderly persons with AD, provided in the home, and to consider if these strategies differ according to the phase of the disease. The subject addressed in the present study is important due to the prevalence of AD and, above all, because of its impact on the quality of life of elderly persons. The results can add to existing literature by providing information about the daily difficulties experienced by caregivers, as well as the strategies used to overcome such difficulties. This knowledge can allow health professionals to contribute to care, valuing all those involved. Therefore, the aim of the present study was to identify the oral care strategies employed by caregivers, in the home, with elderly persons suffering from Alzheimer's Disease.

METHOD

An explorative, descriptive study was performed with a qualitative approach to the collection and analysis of data. A total of 30 caregivers of elderly persons with AD were included. The subjects were participants of a support group for caregivers and/or family members of people with AD or similar diseases. The selection of participants was intentional, or in other words, caregivers attending the meetings of the support group for caregivers and/or family members of people with Alzheimer's disease or similar diseases were invited to take part. The inclusion criteria of the participants were: be a caregiver, with or without a family relationship with the AD sufferer, and care for the patient in the home environment with or without financial compensation. Sampling was limited

by the data saturation criterion, with saturation identified when the content of the discourse of the caregivers became repetitive and did not add new, relevant information related to the fulfillment of the research objectives.

Following identification of the families, initial contact with the caregiver was made, inviting him or her to participate. No refusals to participate in the interviews were recorded. Following the agreement to contribute, an interview was scheduled at the location where the meetings of the support group took place. Data collection was carried out through interviews in the period June to December 2014, and was undertaken solely by the main author of this article – a Specialist Dental Surgeon with a Master's degree in Dentistry in Public and Family Health, and a doctoral student in the Graduate Program in Dentistry, specializing in Dentistry in Public Health. The principal researcher participated in meetings of the support group for 24 months in order to learn about Alzheimer's disease and also to assist the participants with any questions they might have regarding oral health. At the meetings, the participants were informed of the presence of the researcher, who explained her reasons for being present at the meetings.

The interviews were recorded with digital equipment and were divided into two parts. First, participants responded to a structured questionnaire, which aimed to characterize the caregivers. The interview then continued with the application of a script with guiding questions on "An average day caring for elderly persons with Alzheimer's disease" and "How is oral health care of the elderly provided and what does it involve."

The data obtained from the interviews relating to the discourse of caregivers involved in oral health actions and care provided to elderly patients with AD were transcribed and analyzed based on the assumptions of Analysis of Content.[12] Following the method, textual analysis was carried out in three steps: a) pre-analysis, b) exploration of and c) treatment of results, with inference and interpretation. During the pre-analysis, or data organization phase, a skim reading of the raw data was performed. The textual responses relevant to the aim of the study were then evaluated. At this stage of pre-analysis, the main themes to be used in the next stage emerged. The exploration phase of the material consisted of the coding and categorization of textual content. The data analysis process was conducted based on the identification of care strategies, which were grouped into categories according to the participation of the caregiver.[13] Finally, inferences and interpretations of the processed data were performed qualitatively, analyzing the categories and their interrelations.[12]

To meet ethical requirements, the recommendations of National Health Council Resolution No. 466/12, which guides ethics in human research in Brazil, were followed. The project was sent to the organizers of the support group, so that they were aware of its aims and could authorize it. The project was then submitted to the Human Research Ethics Committee, which also evaluated the Free and Informed Consent Form which was individually applied to all the participants, and was approved under consubstantiated opinion **Nº** 216.348.

RESULTS AND DISCUSSION

The data shown in Table 1 below originated from the analysis of the structured questionnaires and describes the characterization of the 30 participating caregivers.

Table 1. Characterization of caregivers. Florianópolis, Santa Catarina, Brazil, 2014.

Characterization of participants	N
Profile of caregiver	
Formal caregiver (hired to perform such function)	3
Informal caregiver (relative or close acquaintance)	27
Relationship	
Conjugal	8
Son/daughter	18
Friend	4
Gender	
Male	6
Female	24
Educational Level	
Incomplete Primary School	1
Complete Primary School	1
Incomplete High School	1
Complete High School	9
Incomplete Higher Education	5
Complete Higher Education	13
Performs concurrent paid activities	
Yes	11
No	19

Questionnaires created by researcher of present study.

It can be seen that the majority of the respondents in the present study were informal caregivers, or in other words, were family members or friends who were asked to assume responsibility for the care that the patient required in a family context. The majority were female, and the predominant relationship was daughters, with a complete higher level education, aged between 32 and 77, who were not involved in paid employment or activities. It should be noted that while the caregivers in the present study therefore complied with the profile described in literature, where the majority of respondents are female, mainly wives or daughters, aged between 40 and 60 and who did not work, they differed in terms of schooling, as studies have found that the majority of caregivers have a low level of formal education.[14-16]

Analysis of the content of the interviews allowed the strategies used to be grouped into three categories, according to the participation of oral care of the caregiver,[13] as can be seen in Chart 1.

Chart 1. Organization of strategies into categories according to the participation of the caregiver in home-based oral healthcare practices. Florianópolis, Santa Catarina, Brazil, 2014.

Categories	Strategies
"He does everything himself"	• Does not participate in oral care • Does not evaluate if oral hygiene is being performed correctly • Preserves the autonomy of the elderly person
"I help, but he does it himself"	• Reminds elderly person to carry out oral hygiene • Take the elderly person to the bathroom • Demonstrates the movements that should be carried out during oral hygiene through imitation in front of the mirror • Helps with the performance of movements, such as putting toothpaste on the brush, and taking out and putting in removable dentures • Monitor the performance and quality of oral hygiene
"I have to do everything, he can't manage anymore"	• Brush teeth and removable dentures with brush and toothpaste • Use gauze or wipes with antiseptic solution on teeth and mucous membranes

Interviews created by researcher of present study.

The results were presented in categories according to the participation of the caregiver in the home-based oral care practices of elderly persons with AD, reinforcing, in accordance with literature, the role of the caregiver to monitor and assist the cared-for person, doing only what he or she cannot accomplish alone.[17] It should be noted that this care is continuous and based on a single person.[18] Among the main tasks of the caregiver are activities such as helping with the hygiene of the person being cared for and encouraging occupational activities,[18] and in this case including oral hygiene as part of the various actions that include oral health care.

As such, when we talk about *Strategies for caring for the oral health of elderly persons with AD,* we will present and discuss the findings in each category, starting with "*He does everything alone".*

The 11 caregivers in this category said they did not participate in the oral health care of elderly persons with AD. In these cases, it is the elderly person, alone, who carries out his or her oral hygiene. Of the 11 caregivers, seven said their oral health activities involved the cleaning of removable dentures with the use of a brush and toothpaste. The other four also reported also brushing teeth with a brush and toothpaste. Oral hygiene takes place after meals and before bedtime, according to six caregivers; once a day, generally in the morning, according to four caregivers; and one caregiver reported that the elderly person brushed his or her teeth several times a day. Flossing was reported by only one caregiver, with the elderly person using it only in case of discomfort resulting in something stuck to the teeth. The dialogue below expresses the views of a large number of the caregivers:

> *[...] Oral hygiene is carried out after lunch, she brushes her teeth like she always did, she can still do this part alone ... at least three times a day, in the morning, in the afternoon after lunch and at night when taking a shower before sleeping. She uses a brush and toothpaste, as she has done all her life, but nothing has changed and she hasn't forgotten ... but she only flosses when she has something stuck in her teeth [...] (PW).*

It is notable that in this category the caregivers did not participate in oral hygiene at any time, either by performing care, by helping or reminding or even by checking if the hygiene has been performed correctly. Such situations often develop as a means of avoiding situations of conflict with the elderly and also in order to maintain their privacy, independence and autonomy.

In contrast, five caregivers said no assistance was provided at the time of performing oral hygiene, as the elderly person did not allow or accept help, as can be seen from the following extract:

> *[...] She finishes lunch and goes to the bathroom to brush her teeth, except she is no longer able to do it, nor able to tell if she has done it right and so on, I don't think she is able to perform the movements required to brush her teeth, and she can't tell if she's doing it right. But she goes alone, she goes to the bathroom and knows what she has to do, she won't let me go with her, she closes herself in the bathroom. And I let her, to avoid an argument [...] (SM).*

According to the reports, in these cases, in which the elderly person performs oral hygiene alone, he or she usually carries out such hygiene in the same manner as before the diagnosis of disease and in accordance with the guidelines of his or her Dental Surgeon.

> *[...] She still does it the way she did it her whole life, we learnt together, during visits to the dentist, and from the instructions that the dentist gave her about brushing her teeth and cleaning her mouth. I don't do it, I let her do it the way she has always done it, the way the dentist taught her, she's looked after the teeth of her five children, she's cared for them well since they were kids. I think that that's the best way, I think she does it the best way she can, every day [...] (RM).*

The analysis of the interviews showed limited awareness among caregivers of the need for specific oral health care aimed at elderly persons with AD. Caregivers must be aware that there is an ongoing need for oral care, even for elderly persons in the early stages of AD.

Oral health studies have identified issues related to the oral health status of elderly patients with AD and the way oral health care is administered to these patients.[8-11] They indicate issues such as the loss of capacity of elderly persons with AD to eat alone, relating this loss to the fact that they also fail to perform their dental hygiene[10]. Caregivers should be attentive to this issue, as the fact that the elderly person has lost the ability to feed himself or herself can be an indication of the loss of other capabilities, such as the ability to perform oral care. The caregiver is therefore required to perform this function.

Given the above, caregivers need to use other strategies to encourage the performance of suitable oral hygiene. One such approach found in this study is assistance, as described by the next category.

"I help, but he does it". In this category, seven caregivers reported that they participated in the oral care of elderly with AD. During such participation, the caregivers make use of strategies such as: reminding the elderly person to carry out oral hygiene, taking the elderly person to the bathroom, and demonstrating the movements that must be carried out to perform oral hygiene. In these cases, the elderly person carries out their oral hygiene and the caregiver accompanies them by monitoring the quality of the actions.

> *[...] We don't do it for her, but we always have to remind her, and ask her, let's clean our teeth, it's time to clean your teeth, so we ask her to do it and then monitor the brushing. She won't let us do it [...] (RE).*

The seven caregivers described how participating in oral care is based on the following strategies: reminding the elderly person to perform oral hygiene tasks; helping the elderly person to perform movements such as putting toothpaste on the toothbrush, taking out and putting in removable dentures; and showing the elderly person, by demonstration in front of the mirror, the steps to be carried out when performing oral hygiene.

> *[...] She brushes by herself, we just do the movements sometimes because she forgets. She brushes her teeth too, and puts the brush in every part of her mouth. Sometimes she spits and sometimes she doesn't. I think she swallows. She puts water in her mouth with her hand and doesn't know what to do. So I make the movement that she has to do in the mirror and she imitates me [...] (LF).*

This category includes caregivers who participate in oral care, not by carrying it out, but by helping, reminding and evaluating whether it is being done properly. This is because although the

elderly persons do not remember that they need to perform oral hygiene, when accompanied and guided they are able to perform such activities.

According to reports, in cases where the caregiver assists the elderly person to perform oral hygiene, he or she usually does so in the same way as before the diagnosis of disease and in accordance with the directions of his or her dental surgeon, and also by trial and error, due to not having received specific guidelines for the oral care of elderly persons with AD.

> *[...] We try... but she doesn't have teeth and she hasn't used dentures for a long time, so she eats baby food. I've never had any instructions, no one explained anything about brushing her teeth after she got sick [...] (AM).*

Studies show that the family caregiver of a dependent elderly person is overburdened from a physical and mental point of view by the accumulation of functions and types of tasks he or she assumes, which generally go beyond the simple monitoring of activities of daily living.[18]

The task of caring is complex, permeated by diverse and contradictory feelings and often given to individuals who are not prepared for such actions. Typically, this responsibility is transferred as an extra burden for the family, who, within their daily lives, are obliged to assume another function in addition to those they already perform.[19] According to literature, these caregivers may present situations of crises, due to carrying out sometimes tedious, repetitive and stressful functions.[20] The primary caregiver has the greatest overburden as he or she assumes greater or full responsibility for care, devoting most of his or her time to caring for the sick family member.[21] This situation can cause physical, psychological, emotional, social and financial problems, which ultimately affect both the well-being of the caregiver and the elderly person that he or she cares for. As a solution, literature points to the construction of a support network involving different family members, friends, neighbors and health services as a healthy and desirable strategy for assisting with home care.[22]

Due to the complexity of the tasks performed, caregivers end up developing care skills, which facilitate their daily activities and are aimed at preventing accidents and complications to the health of the elderly, promote their physical and mental well-being, organize the physical space around them, and develop and utilize care and feeding technologies.[23]

Another noteworthy finding in the present study was that when caregivers discuss using strategies such as reminding elderly persons to carry out oral hygiene, taking them to the bathroom and demonstrating movements by imitation, they describe these actions as oral care, as though oral health is exclusively related to oral hygiene. Oral health care is a day-to-day construction that goes beyond the present space and time and requires an integral vision of human beings and their relations with other beings, society and the environment. Oral healthcare guides practices that have a direct effect on improving oral health, and are not restricted to habits and behaviors. Oral health care should also be an inseparable and articulated component of any comprehensive care system for the health of the elderly.[24]

It is difficult for elderly persons with AD to perform proper oral hygiene. Ideally, such procedures should be performed by the caregiver. Where this happens the main provider of oral care should therefore be responsible for planning these procedures, inserted within a broader oral care plan, which should include periodic assessments of oral health conditions in the home, as well as verification of the need for dental appointments and facilitating access to the dentist.[10]

At the same time, with the advancement of AD, the caregiver becomes the main provider of oral care, which is often a causer of worry and stress, as it is not an easy task to accomplish. The category below describes part of this reality and the efforts of caregivers to try to maintain suitable oral hygiene in elderly persons with dementia.

"I have to do everything, he can't do it anymore". In this category 12 caregivers said that they performed oral care, as the elderly person could no longer carry out his or her oral hygiene alone. Among these 12 caregivers, eight said that the oral care they performed was brushing of teeth and removable

dentures with a brush and toothpaste. And the other four said that oral hygiene was carried out with wipes or gauze and some type of antiseptic solution that was spread on the teeth and gums, usually once or twice a day.

> *[...] He can't carry out his oral hygiene tasks. He's like a baby. He doesn't like to floss, but sometimes I do it. He uses mouthwash, but sometimes he swallows it, or spits it on the floor or over the tap, I say, "here, here in the sink," but he misses a lot, he can't hit it, I'm always with him. As he sometimes swallows it I just use a little liquid. And when I notice that he is swallowing a lot I give him water [...] (MD).*

In this category, the caregivers reported difficulties in performing oral hygiene, because of the non-cooperation of the elderly, who bite, clamp their teeth closed or simply refuse to allow oral hygiene to take place.

> *[...] It's very hard to brush his teeth these days, sometimes we roll gauze around our finger to spread antiseptic solution. One of the caregivers who helps me doesn't do oral hygiene tasks because he bit her twice, while the other carries out oral hygiene with gauze wrapped around the toothbrush [...] (ZA).*

The issue of caregivers performing oral care, without the participation of the elderly, appears in this category. This is because the elderly persons are no longer able to carry out their oral hygiene and cannot remember what needs to be done nor how it should be done.

According to the reports, in cases where the caregiver performs oral hygiene, he or she often does so by trial and error, experimenting with what works as specific guidelines for the oral care of the elderly persons with AD have not been provided, or based on the guidelines of the dental surgeon, or instructions received in hospitals, if the elderly person has been hospitalized at some point.

As can be seen, several care strategies may be used by caregivers, because their work goes beyond the desire to take care of a family member, given the complexity of care required. It involves knowledge, the development of skills, initiatives for the prevention and treatment of disease and the promotion and recovery of elderly health.[22] Factors related to poor oral health, such as dental caries, periodontal diseases, along with xerostomia inducing drugs, reduced fine motor skills and cognitive decline, can lead to an increase in morbidity and mortality and impact the quality of life of the elderly with AD.[25]

While the data collected from the interviews was focused on the oral care strategies performed by a group of caregivers, the methodology used also allowed information to be obtained relating to the perception of the caregivers of the care they provide. This information is important for the healthcare of AD patients, including the oral health of those in this situation.

Providing care at home involves a number of activities that must be planned together with health professionals. The role of the dentist is important, as his or her partnership with the caregiver can enable the systematization of oral care to be carried out in this context, prioritizing actions related to health promotion, the prevention of oral diseases and the maintenance of oral health.

It is also important to emphasize the need for dentists who are more prepared to communicate with and treat elderly patients with AD and their caregivers in both the private and public services, and who can contribute to the care of dependent elderly persons in the home. Care and instruction for elderly persons and caregivers in the home environment is also important.

CONCLUSION

A limitation of this study is the fact that data was obtained through a purposive sample, which prevents the wider use of its results. Despite this, the findings provide useful benefits in the practical field, as it identified the strategies used in the home-based oral health care of elderly people with Alzheimer's Disease. The strategies identified were grouped into categories based on the participation of the caregiver, which is related to the degree of dependence of the elderly person with AD.

The results have practical implications, especially for home dentistry, highlighting the need for specific protocols related to oral health care performed in this context. These protocols should be developed not only to facilitate the day to day life of caregivers, helping them to overcome the daily obstacles of spending time with an elderly person with AD, but also to carry out actions of scientifically based care that allows good oral health conditions to be maintained for such individuals.

The oral health care strategies identified can serve as a guide and assist in the consolidation of the professional practice of home care within the Primary Health Care system. In this way, health professionals will become closer to the population and, therefore, can potentially contribute more directly to care through consultations at health centers and in the home and by guiding caregivers in groups and/or individually. In this way, they can get to know the reality of each family and plan together the most appropriate strategies for the specific care of each elderly individual with AD.

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The exercise of sexuality among the elderly and associated factors

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Abstract

Objective: To analyze factors that interfere with the exercise of sexuality among the elderly. *Methods*: A cross-sectional study of 235 elderly persons enrolled at the Open University of the Third Age of the Federal University of Pernambuco was carried out. The dependent variable was the exercise of sexuality, which was investigated in terms of perception of sexuality, thinking about sex, what the elderly person does when he or she has the desire for sex, sexual activity and auto-eroticism. The independent variables were sociodemographic data, health status and self-perception of body image. Statistical analysis involved bivariate correlation by the Kendall and Spearman coefficients. All variables with $p \leq 0.20$ in bivariate analysis were included in the generalized linear regression, with $p=0.05$ considered for the rejection of the null hypothesis. *Result:* The conception of sexuality was most closely related to genitality (67.2%), 51.5% of the sample reported thinking about sex, while 71.1% of the elderly persons said they were indifferent to sexual desire; 32.3% claimed to be sexually active; and 23% auto-eroticized. The variables age, years of education, religion, physical exercise and dissatisfaction with body image were significant in bivariate correlation analysis. The desire for sex and sexual activity were less likely to be present among elderly persons who performed exercise. *Conclusion:* The sexuality of the elderly is based on several factors that may interfere with their experience and should be considered in educational strategies employed by health professionals who promote actions for the sexual health of the elderly.

Keywords: Aging. Sexuality. Health Education.

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INTRODUCTION

Old age is often marked by negative stereotypes related to decline and the loss of function, meaning it is important for health professionals to visualize all the features of elderly persons, including their sexuality. Such a term goes beyond the sexual act and expresses itself in a number of ways. Caresses and touching play a key role in the exercise of sexuality.[1]

Sexuality among the elderly is a continuation of a process begun in childhood. It is an inherent part of the individual, present in every act of his or her life. Each person determines, in a particular and individual manner, how sexuality is manifested, communicated, felt and expressed.[2]

Based on the perspective that sexuality is a continuation of the existence of the individual and that even if the practice of sex is reduced or the elderly individuals themselves internalize negative stereotypes about their sexuality, the subject in question should be addressed by health services, using health education as a means of constructing new concepts about the sexuality of the elderly. The objective of the present study was therefore to analyze factors that interfere in the exercise of sexuality among elderly persons.

METHOD

An analytical, cross-sectional study with a quantitative approach was carried out at the Universidade Aberta à Terceira Idade (University of the Third Age) (UnATI) of the Universidade Federal de Pernambuco (Pernambuco Federal University) (UFPE) and is part of a dissertation work.-

A sample error of 0.05%, prevalence of sexually active elderly persons of 0.5% (based on data taken from a pilot study), and a level of confidence of 95% were used to calculate the sample. The population was elderly persons (n=605) enrolled on courses offered by UnATI in the 1st semester of 2012, resulting in a sample of 224 women and 11 men. There was a significant predominance of women, who make up the majority of the students of the courses offered, resulting in a disparity in the sample, of which only 4.7% were men. For this reason, the sample design was stratified by gender, in order to qualify the evaluation of the results.

Those eligible for the study were all elderly persons enrolled on the courses offered during the investigation period, excluding those with impaired communication and/or cognition which would interfere with data collection during the realization of the interviews.

The exercise of sexuality was investigated using the following aspects: conception of sexuality: an open question, with answers subsequently grouped into six categories: sexuality is not just sex (n=10); it involves feelings and touching between a couple (n=7); it is part of life, promoting happiness for the elderly person/couple (n=31); sexuality is having sex (n=138); pleasure/desire in the sexual act (n=10); bodily needs (n=10). For statistical analysis the categories found were organized into two blocks: perception of sexuality from a holistic perception and sexuality based on genitality.

In the holistic vision, sexuality is understood through the expression and experience of *being a woman* and *being a man*, not simply through the sexual act, and is characterized by love, affection, and giving, with the valuing of feelings such as companionship, partnership, hugs, caresses and kisses. Sexuality is part of the life of a human being, and is present in every phase of growth, from birth until death.[3-7]

In a vision based on genitality, sexuality is related to sex and reduced to the genitals and coitus. When the meaning of sexuality relates only to having sex, it implies that when the elderly stop having sex, they become asexual.[6, 8, 9]

The independent variables were represented by socio-demographic data (gender, age, marital status, education and religion), health status (self-perceived health), morbidities, medical diagnosis, physical exercise and self-perceived body image, which was evaluated using the Stunkard, Sorensen and Sunkard questionnaire.[10]

Data was collected between May and June 2012, when the elderly persons were recruited in UnATI by a researcher who informed them about the study and its objectives, based on their interest. The interview took place in an individual room, allowing privacy between the researcher and the interviewee. Four previously trained graduate students took part in the data collection. To adjust for possible inconsistencies in the data collection protocol, a pilot study was carried out, and three questions were reformulated. Interviews were chosen as a data collection technique, with the application of a semi-structured instrument.

At the end of data collection, a database was constructed using the *EpiInfo 3.5.2* program, with data entered using the double entry system. This database was then transferred to the *R* program version 2.15.0 for statistical analysis. The Spearman and Kendall coefficients were employed in bivariate analysis.

The generalized linear regression model included all variables that achieved $p \leq 0.20$ in bivariate analysis. The Student's t-test was applied to each of the parameters to verify significance, adopting a $p \leq 0.05$ value for the rejection of the null hypothesis of the study.

The present study was carried out in accordance with the ethical precepts of Resolution nº 196/96 and was approved by the UFPE Ethics Committee under CAAE nº 01651112.5.0000.5208. The participants were fully informed about the aims of the study as well as its risks and benefits. At the end of the interviews, the elderly persons signed a Free and Informed Consent Form and later received educational material regarding sexuality.

RESULTS

Of the 235 elderly persons interviewed, 95.3% were female. A total of 54% of the sample was aged between 60 and 69 years. In terms of marital status, 36.6% were single, while 34% were married. A total of 64.7% had nine years of schooling or more, while 3.8%, all of whom were women, had no education; 97% said they were religious, of whom 66.4% were catholic, 16% were evangelical protestants, 13.6% were spiritualists and 0.9% had other religious beliefs.

In terms of the self-perception of health, 42.1% described their health as *good* and 41.3% said it was *fair*. Systemic arterial hypertension (61.3%) and diabetes (14.9%) were the most commonly cited morbidities. A total of 64.7% performed physical exercise, defined as a minimum of three times a week with a minimum duration of 30 minutes for each session, with walking the most frequently cited activity. Regarding body image, 53.6% considered themselves dissatisfied due to body fat and 6.8% due to thinness.

Genitality (67.2%) was significant as a conception of sexuality. Of the total sample, 51.5% described thinking spontaneously about sex, while in terms of sexual desire, 71.1% reported indifference, 20% sought sexual relations with their partner, 6.8% auto-eroticized and 2.1% did not respond. A total of 32.3% of those interviewed were sexually active while auto-eroticization was described by 23%.

Table 1. Characterization of elderly persons interviewed based on sociodemographic variables, health conditions and self-image scale. Recife, Pernambuco, 2012.

Variable	n (%)	Women(%)	Men(%)
Sample	235(100)	224(95.31)	11(4.69)
Age Range (years)			
60 to 69	127(54.0)	119(53.1)	6(54.5)
70 to 79	87(37.0)	83(37.1)	4(36.4)
80 or more	21(9.0)	20(8.9)	1(9.1)
Marital Status			
Married	80(34.0)	73(32.6)	7(63.6)
Widowed	29(12.3)	29(12.9)	0(0.0)
Single	86(36.6)	86(38.4)	0(0.0)
Separated	40(17.0)	36(16.1)	4(36.4)
Schooling (years)			
None	9(3.8)	9(4.0)	0(0.0)
1 to 4	19(8.1)	18(8.0)	1(9.1)
5 to 8	55(23.4)	52(23.2)	327.3)
≥ 9 years	152(64.7)	145(64.7)	7(63.6)
Religion			
Yes	228(97.0)	220(98.2)	8(72.7)
No	7(3.0)	4(1.8)	3(27.3)
Self-perception of health			
Excellent	27(11.5)	26(11.6)	1(9.1)
Good	99(42.1)	92(41.1)	7(63.6)
Fair	97(41.3)	94(42.0)	3(27.3)
Poor	12(5.1)	12(5.4)	0(0.0)
Performs Physical Exercise			
Yes	152(64.7)	143(63.8)	9(81.8)
No	83(35.3)	81(36.2)	2(18.2)
Satisfaction with body image			
Satisfied	97(41.3)	91(40.6)	6(54.5)
Dissatisfied due to overweight	122(51.9)	120(53.6)	2(18.2)
Dissatisfied due to thinness	16(6.8)	13(5.8)	3(27.3)

Table 2. Exercise of sexuality as described by elderly persons, with regard to conception of sexuality, thinking about sex, what to do when experiencing sexual desire, sexual practices and auto-eroticization. Recife, Pernambuco, 2012.

Variable	n (%)	Women(%)	Men(%)
Sample	235(100)	224(95.31)	11(4.69)
Conception of sexuality:			
Holistic	48 (20.4)	45 (20.1)	3 (27.3)
Genitility	158 (67.2)	150 (67.0)	8 (72.7)
Did not respond	29 (12.3)	29 (12.9)	0 (0.0)
Think about sex			
Yes	121 (51.5)	114 (50.9)	7 (63.6)
No	114 (48.5)	110 (49.1)	4 (36.4)
What do you do when you experience desire			
Indifferent	167 (71.1)	158 (70.5)	9 (81.8)
Seek sexual relations	47 (20.0)	45 (20.1)	2 (18.2)
Auto-eroticization	16 (6.8)	16 (7.1)	0 (0.0)
Did not respond	5 (2.1)	5 (2.2)	0 (0.0)
Practices sex			
Yes	76 (32.3)	73 (32.6)	3 (27.3)
No	159 (67.7)	151 (68.4)	8 (72.7)
Auto-eroticization			
Yes	54 (23.0)	54 (24.1)	4 (36.4)
No	177 (75.3)	170 (75.9)	7 (63.6)

The variables that crossed with the variables of exercise of sexuality and which were significant in terms of the Spearman and Kendall correlations were analyzed using bivariate correlation (Table 3). They were later analyzed in the multiple regression model, in which only variables with $p \leq 0.05$ were considered.

In generalized linear regression, the logit link function was used for all significant bivariate analyzes of the parameters of the exercise of sexuality with the independent variables. There was a statistically significant link between conception of sexuality and years of study ($p=0.012$), with elderly persons with nine or more years of study being more likely (85.08%) to have a holistic conception of sexuality.

In terms of the analysis of thinking about sex and sexual activity, there was a significant relationship with the performance of physical exercise. The parameter calculated indicates that the probability of elderly persons thinking about sex and engaging in sexual activity is lower (55.11% and 63.98%, respectively) among those who performed exercise. No statistical significance was observed with respect to auto-eroticization.

Table 3. Binary correlation of exercise of sexuality variable with independent variables. Recife, Pernambuco, 2012.

Independent variables	Dependent variable	Correlation
Age Range	Conception of sexuality	p < 0.05b
Years of Schooling	Conception of sexuality	p<0.02a
-	Think about sex	p< 0.09b
Religion	Practices sex	p<0.15b
Perform Physical Exercise	Think about sex	p<0.04b
-	Practices sex	p<0.03b
Disatisfaction with Body Image		
-	Think about sex	p<0.10b

a: Kendall correlation; b: Spearman correlation

Table 4. Generalized linear regression of exercise of sexuality variable with significant variables from binary correlation. Recife, Pernambuco, 2012.

Independent variables	Dependent variable	Parameter	*p* value
Years of Schooling	Conception of sexuality	0.8545	0.012
Perform Physical Exercise	Think about sex	-0.5511	0.048
	Practices sex	-0.6398	0.027

DISCUSSION

Sexuality in old age remains permeated by taboos that describe it as an embarrassing subject to talk about, which remains little discussed in health services and in social contexts. While the elderly people interviewed were willing to take part, some refused to participate as they considered themselves ineligible due to no longer being sexually active. Everyone, however, irrespective of whether they have a sexual relationship or not, maintains their sexuality.

To understand the sexuality of the elderly, it is necessary to consider how factors such as culture, religion and education influence the sexual behavior of elderly persons and determine how sexuality will be experienced during this stage of life.[6] Sexuality in aging should not be viewed as incompatible, as it is present in all stages of human development, even though sexual activity may decrease or be absent among the elderly.[11]

The exercise of sexuality during the aging process needs to be understood as a positive experience from the viewpoint of both health professionals and the elderly, provided he or she desires it. Whether through campaigns, educational activities or routine medical appointments, the issue needs to be incorporated and present in the health care of the elderly.[12]

In general, the elderly persons investigated in this study felt dissatisfied with their body image in relation to overweight, especially females. The *body image* variable was significant in the binary correlation of the study, and *body satisfaction* was related to the *has sex*. Dissatisfaction could be related to changes associated with aging, with waist circumference the measurement most frequently related to this negative perception.[13]

Although sexual practice is part of the expression of sexuality, the conception of the elderly is still rooted in genitality, even though it is not the only form. Only 20.4% reported that sexuality involves more than sex, being linked with well-being, affection, companionship and the relationship of the individual with themselves and others.

The sense that sexuality represents the sexual act remains common among the elderly, as well as the denial of other forms of sexuality, such as eroticism, affection and prazer.[14] Therefore, knowledge about the fullness of the sexual experience is necessary for health professionals involved in the sexual education of the elderly, through strategies that allow dialogue and discussion on the topic.

Using the sexual quotient questionnaire – female version with 38 elderly women, Polizer and Alves[15] observed that interest in sex and sexual desire continue in this age range, with 29% and 34.2% of those interviewed describing their sexual satisfaction as *good* to *excellent* and *fair* to *good,* respectively. In the present study, although 67.7% of respondents did not engage in sexual activity, thinking about sex was present in 51.5% of those interviewed, showing that even in the aging phase the presence or absence of a partner does not prevent the occurrence of sexual desire.

In this study, although 67.7% of respondents did not have sex, thinking about sex was present in 51.5%, showing that even in the aging phase the presence or absence of a partner does not prevent the occurrence of sexual desire.

Recognizing that sex continues in old age means considering that elderly persons are also exposed to diseases related to unprotected sex. In a study by Bezerra et al.[16], however, the elderly persons themselves did not recognize this scenario of vulnerability, indicating the need for public policies that meet this demand among older persons, as well as treating chronic diseases such as hypertension and diabetes.

Often the regularity of sexual intercourse is related to the presence of a fixed partner[17], corroborating the study of Ferreira et al.[18] where the investigated elderly persons said that sex with a partner was an obligation, or was only performed to satisfy the other, or for no reason at all. The disappointments and resentments experienced in the life of a couple have also been described as factors that interfere with sexual practice, and were found in greater numbers among women.[8]

Lindau et al.[19] reported that the prevalence of sexual activity declines with age, and that women are less likely to have intercourse than men at all ages, with those who continued sexual practice indicating at least one problem that interfered with sex. The women described vaginal dryness and decreased sexual desire, while men mentioned difficulty with erections as factors that interfered with sexual activity. The elderly persons described an interest in continuing sex, which they considered an aspect of satisfaction with life[20], meaning that health professionals should include issues involving sexuality in their clinical activities with the elderly.

No scientific evidence was found that discussed the relationship between physical exercise and the reduction of thinking about sex or sexual activity. Although in the final analysis the holistic conception of sexuality was significant among elderly persons who had nine years or more of study and those who practiced physical exercise, exhibiting a lower probability of thinking about sex and sexual activity, the bivariate correlations should be noted, as they infer that other factors may influence the experience of sexuality of elderly persons.

CONCLUSION

Studies on sexuality in old age are of paramount importance in the field of Gerontology and Geriatrics, allowing new spaces to be opened in the clinical practice of health professionals to discuss the health of the elderly, considering that sexuality is part of the promotion of the well-being and quality of life of the elderly.

Further studies that address the issue of sexuality in old age should be considered, with a view to promoting the health of older people in a more holistic and less biologistic sense, where individuals should be viewed in their entirety and not be reduced to chronic diseases, to which people are more vulnerable in their advancing years.

It can be concluded from the present study that a range of factors interfere with the exercise of sexuality among the elderly, including social, cultural and physiological issues. These should be considered in the promotion of the sexual education of older persons within a health education strategy.

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Identification of inappropiate prescribing in a Geriatric outpatient clinic using the Criteria Stopp Start

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Abstract

Identified the inappropriate prescription of drugs in elderly assisted geriatric outpatient clinic in the region of Vale do Rio Pardo in Rio Grande do Sul according to the criteria of STOPP and START. Cross-sectional study of 221 elderly, based on retrospective analysis of medical records using comprehensive geriatric assessment data held in the first visit. Descriptive variables were age, sex, number of pathologies and number of medications in use. And the study variables were potentially inappropriate medications (MPI) and potentially omitted medications (MPO), according to the STOPP and START criteria. Descriptive statistics were performed with frequencies, means and standard deviations where appropriate. It was observed 157 (71%) female patients. The average age was 75 (±8.26) years, 49.8% in the range of 75-84 years. The average number of drugs was 3 (±2.27), with 22.63% using 5 or more medications. The average pathologies was 3.45 (±2.02). They identified 194 prescriptions of MPI and observed 93 MPO. The most identified were the MPI for the cardiovascular system, especially β noncardioselective blockers and acetylsalicylic acid. Also MPO were found most of the cardiovascular system, with emphasis on acetylsalicylic acid and inhibitors of angiotensin converting enzyme. This is sample of elderly with significant prevalence of inappropriate prescribing of drugs. Studies using the STOPP criteria and START in different health care settings can qualify the care provided to the elderly.

Keywords: Drug utilization. Health of the elderly. Polypharmacy. Ambulatory care.

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INTRODUCTION

The combination of the growth of the elderly population and increased life expectancy means health professionals must apply great care when prescribing medication. A greater prevalence of chronic diseases, which sometimes require treatment with a combination of drugs, has increased the risk of adverse reactions, drug interactions, toxicity and reduced adherence to treatment.[1] The elderly constitute 50% of multiple drug users and inadequate information and possibly harmful drug interactions are often found in their prescriptions.[2]

It is therefore important to know which medications can be used, taking into consideration the characteristics of each patient and of the medications themselves, which should always be consistent with the diagnosis provided.[3-5] It is important to remember that a drug becomes potentially inappropriate when the risk of its use outweighs its benefit.[6-8]

Some studies have demonstrated that the use of a variety of medications reduces adhesion to the proposed treatment, with a greater risk of adverse reactions, drug interactions and associated morbidity and mortality.[1,9-12]

One attempt to reduce the occurrence of medication iatrogenesis among elderly persons involves the use of standard lists of drugs classified according to the risks and benefits generated, which are created to guide physicians when choosing treatment for their patients. Among these lists are the Beers and the STOPP and START criteria.[6,7]

The Beers criteria is a list of regularly updated pharmaceuticals, comprising potentially inappropriate medication (PIM) for elderly persons due to their ineffectiveness or the high risk of adverse effects.[13]

The STOPP (Screening Tool of Older Person's Prescriptions) and START (Screening Tool to Alert Doctors to Right Treatment) criteria were created in 2003 with the aim of overcoming the possible deficiencies of the Beers criteria. They are composed of potentially inappropriate medications (PIMs), described by STOPP, and potential prescribing omissions (PPOs), described by START. Potential prescribing omissions are those considered essential for the success of the treatment and the preservation of the health of the elderly person.[6,14,15]

The presence of comorbidities in the elderly population and a greater focus on prevention in medicine has increased the need for rationality when prescribing of multiple drugs. The identification of omitted medications, in addition to those that are inappropriate, becomes a delicate task, and the use of STOPP and START criteria may be considered an auxiliary tool. It should be noted that some hypotheses should be considered when identifying the omission of a drug: prior medical suspension, problems in adherence due to cost or an adverse reaction caused by the drug.[1,16,17] In other words, there are many determinants for the inadequate use of medication.

Studies have shown that the STOPP and START criteria detect a greater number of patients with potentially inappropriate prescriptions than the Beers criteria among the population studied.[18,19]

It has been observed that studies using the STOPP and START criteria as a guide for the identification of potential problems in the prescription of medication, which can characterize medication iatrogenesis, can be useful and contribute to improvements in the care provided to the elderly population. Brazilian studies have addressed this issue, indicating a need for further research to enable greater understanding of the health care provided to the elderly in our society. Thus, the aim of the present study was to identify the inappropriate prescription of medication to elderly persons receiving care at a geriatric outpatient clinic in a teaching center in the central region of Rio Grande do Sul. The study to sought to identify the presence of potentially inappropriate medications (PIMs) and potential prescribing omissions (PPOs), in accordance with the STOPP and START criteria.

METHOD

A cross-sectional descriptive study of a retrospective nature was undertaken based on the analysis of the medical records of patients of a geriatric outpatient clinic in the Vale do Rio Pardo region of Rio Grande do Sul. This outpatient clinic has received elderly persons on a spontaneous demand basis since March 2011. Data collection took place at the first appointments of all the patients receiving care at the outpatient clinic, from March 2011 to March 2013, who represented the study population. Data collection was performed between April and June 2013, and the records of 264 patients were studied. The exclusion criteria were patients receiving care who were aged less than 65 years of age, as the STOPP and START criteria are valid only for people aged 65 years or more.

A form especially created for the purpose was used to collect the data from the first appointments. A comprehensive geriatric assessment (CGA) is routinely carried out during this appointment, and includes: identification data, reason for appointment, pathologies present, medications used, review of systems, living habits, family history, preventive measures, physical examination, functional evaluation, list of problems and plans. The data collection instrument was created from the CGA, and comprised: age, gender, number of pathologies and number of medications used, which were considered the descriptive variables. The PIMs and PPOs, which were considered the study variables, were defined based on the first version of the STOPP and START criteria which considers 65 PIM indicators (STOP) and 22 PPO indicators (START).[15]

A PIM was considered any medication which represented an increased risk for the elderly person developing adverse effects, when there is another medication with greater effectiveness for the prescription. A PPO was considered the omission of a drug considered essential for the treatment of the elderly person.[15-17]

The medications were analyzed by the geriatrician responsible for the clinic and by trainees under his supervision, based on these indicators. First, the presence or absence of a relationship between the pathology present and the medications was observed, with the medications divided into systems and classes. Subsequently, the medications were identified as PIMs or PPOs.

After the completion of the data collection instrument, following prior training, the data was entered in a spreadsheet. Descriptive statistics were subsequently performed, verifying the mean, standard deviation and frequencies where appropriate. The realization of the present study followed the ethical principles of Conselho Nacional de Saúde (the Brazilian National Health Council) (CNS) Resolution 466/12 which governs research with human beings in Brazil. Each patient receiving care signed a Free and Informed Consent Form. The study was part of the Promotion of Healthy Ageing: continuous monitoring of chronic illnesses project, approved by the Ethics Committee of the Universidade de Santa Cruz do Sul.

RESULTS

Of 264 patients, 43 were excluded as were younger than 65 years. Of the 221 patients analyzed, 157 (71%) were female. The mean age of the patients was 75 (±8.26) years, of whom 49.8% were in the 75-84 age range. The mean number of medications per patient was 3 (±2.77) with 22.63% of patients using five or more medications. The mean number of illnesses per patient was 3.45 (±2.02).

In terms of the inappropriate prescription of medications, 194 prescriptions with PIMs were identified, as listed in table 1, and 93 PPOs were found, as described in table 2.

Table 1. Potentially inappropriate medications (PIMs) according to STOPP criteria. Santa Cruz do Sul, Rio Grande do Sul, 2015.

Classes	n	%
Cardiovascular system*	68	30.80%
Loop diuretic	1	0.50%
Thiazide diuretic	2	0.90%
Non-cardioselective beta blocker	19	8.60%
Calcium channel blockers	2	0.90%
Acetylsalicylic acid	17	7.70%
Respiratory system	5	2.30%
Theophylline	2	0.90%
Systemic corticosteroids	1	0.50%
Nebulized ipratropium	0	0%
Musculoskeletal system †	28	12.70%
Nonsteroidal anti-inflammatory drugs‡	19	8.60%
Long-term corticosteroid	3	1.40%
Gastrointestinal system §	21	9.50%
Prochlorperazine or metoclopramide with Parkinsonism	1	0.50%
Proton pump inhibitor	13	5.90%
Anticholinergic/antispasmodic	1	0.50%
Central nervous system	54	24.40%
Tricyclic antidepressants	6	2.70%
Benzodiazepine	22	10%
Neuroleptic	6	2.70%
Phenothiazines	0	0%
Anticholinergics	1	0.50%
Selective serotonin reuptake inhibitors £	2	0.90%
Endocrine system	17	7.70%
Glibenclamide or chlorpropamide	9	4.10%
Beta blockers	0	0%
Estrogens	0	0%
Estrogen without progestin	1	0.50%

Developed by authors using study data; * No patients used digoxin, warfarin, clopidogrel or dipyridamole; † No patients used colchicine or warfarin and NSAIDs in combination; ‡Non-steroid anti-inflammatory drugs; § No patient used diphenoxylate, loperamide or codeine phosphate; £ Selective serotonin reuptake inhibitor; +One patient used PIM for the urogenital system – alpha-blocker.

Table 2. Potential prescription omissions (PPOs), according to START criteria. Santa Cruz do Sul, Rio Grande do Sul, 2015.

Classes	Potential prescription omissions	
	n	%
Cardiovascular system	44	25.40%
Warfarin	0	0%
Acetylsalicylic acid	14	6.30%
Clopidogrel	0	0%
Antihypertensive therapy	15	6.70%
Statin	9	4%
Angiotensin converting enzyme inhibitor*	21	9.50%
Beta-blocker	1	0.45%
Respiratory System†	2	0.90%
Beta-agonist inhaler	2	0.90%
Anticholinergic	0	0%
Corticosteroid inhaler	0	0%
Home based oxygen	0	0%
Musculoskeletal system	21	9.50%
Antirheumatic	1	0.45%
Misphosphonates	0	0%
Calcium + vitamin D	20	9%
Gastrointestinal system	4	1.80%
Proton pump inhibitor	4	1.80%
Fibers	0	0%
Central nervous system	9	4%
Levodopa	0	0%
Antidepressants	9	4%
Endocrine system	13	5.80%
Metformin	4	1.80%
Angiotensin converting enzyme inhibitor	1	0.45%
Angiotensin receptor blocker II‡	0	0%
Antiplatelet therapy	11	4.90%
Statins	2	0.90%

Developed by authors using study data; *ACEI: Angiotensin Converting Enzyme Inhibitor; †The omission of anticholinergic agents, inhaled corticosteroids and home oxygen was not observed in the population studied; ‡ Angiotensin Receptor Blocker; + There were no PPOs relating to the urogenital system.

The majority of PIMs (table 1) were in relation to the cardiovascular system. Of these, the most commonly used were non-cardioselective beta blockers and acetylsalicylic acid. The use of PIMs for the central nervous system (CNS) was also significant, with benzodiazepines standing out. The most frequently used PIMs for the musculoskeletal system were nonsteroidal anti-inflammatory drugs (NSAIDs).

In terms of PPOs (Table 2), medications related to the cardiovascular system were also a significant presence, especially the omission of the prescription of acetylsalicylic acid and angiotensin converting enzyme inhibitors. There were also PPOs for medicines of the musculoskeletal system and the omission of the prescription of calcium and vitamin D.

DISCUSSION

The majority of the sample of the present study was female (71 %). This finding was expected as women experience greater longevity in Brazil than men, due to lower female mortality.[14] This finding was also observed in other studies using the STOPP and START criteria.[8,20,21]

Around half the patients (49.8%) were aged between 75-84 years, which reflects a national and global tendency of increasing life expectancy. The sample of a study by Periquito (2014) included ages from 67 to 97 years, with a mean age of 84.81 years. Such findings were higher than those of the present study, perhaps because the study was carried out in Portugal, a country with a greater life expectancy.[8]

The mean number of medications used by elderly persons was 3±2.77 per patient, with 22.63% of individuals using five or more medications, indicating a significant prevalence of polymedication in the sample studied, a finding shared by other Brazilian studies.[21,22] It is worth noting that polymedication is considered the use of five of more medications, but also the use of medications without genuine need.[2,3]

When the STOPP criteria were applied, it was found that the most frequently used PIMs were taken for cardiovascular disorders (30.8%), corroborating the results of other studies.[14,21] The prescribing of non-cardioselective beta blockers (8.6%) and acetylsalicylic acid (7.7%) was especially notable. One of the possible reasons for this is the unavailability, or the limited availability, of cardioselective beta blockers through the Sistema Único de Saúde (the Brazilian National Health Service), as well as a need to review the prescriptions of elderly persons, for whom acetylsalicylic acid should only be recommended as a primary and secondary intervention when the benefits for the individual outweigh the risks.[23, 24] A study that evaluated the medication consumption of elderly patients also found that the main drug used was acetylsalicylic acid.[2]

The second most commonly used PIMs were those that acted against the central nervous system (24.4%). This was also found by another study, which revealed that the pharmaceuticals most frequently used by the elderly population were those for the central nervous and cardiovascular systems.[8,23] In the present study benzodiazepines were the most commonly misused medications, representing 10%, while selective serotonin re-uptake inhibitors were used by 0.9% of patients. Benzodiazepines, available since 1960, are psychoactive drugs used to treat anxiety and sleep disorders. The inappropriate use of these medications demonstrates a lack of information about their action and collateral effects, as well as the lack of a correct diagnostic for their use.[25] It is well known that selective serotonin reuptake inhibitors have many side effects such as nausea, vomiting, diarrhea, insomnia, anxiety, agitation and sexual dysfunction among others, which may be the reason for the reduced prescription of these drugs, which are considered potentially inappropriate for use with elderly persons.[26]

Medications for the skeletal system were frequently used inappropriately, with 12.7% of the sample taking such drugs. Nonsteroidal anti-inflammatory drugs (NSAIDs) were the most frequently used (8.6%). Other studies have

corroborated this finding.[27] Control of the use of this drug remains precarious, as a prescription is not required for its acquisition. While self-medication is always discouraged, it is even more dangerous in relation to these medications, as it is associated with a high incidence of cardiovascular and thromboembolic events in chronic medication users. NSAIDs can also induce acute kidney injury (AKI). It can also, through more rarely, result in lung problems such as bronchospasm (in individuals sensitive to aspirin) and pulmonary infiltration with eosinophilia.

The present study identified 93 omissions of medication, which was similar to the findings of another study, in which 90 omitted medications were detected.[5]

The prescription omissions detected were mainly in relation to medications for the cardiovascular system. This finding corroborates the thesis of Borges and Verdorn,[14,16] while differing from the results of the study by Periquito,[8] in which the most frequent medication omissions were related to the endocrine system, followed by the musculoskeletal system. The incidence of hypertension increases with age, with lifestyle changes recommended as method for its control. When these measures are insufficient, additional pharmacological therapy is employed. There were a total of 15 (6.7%) omissions of the prescription of antihypertensive medications. The most frequent PPO was for ACE (Angiotensin Converting Enzyme) inhibitors, totaling 21 patients. Other studies have found that statin drugs feature more frequently as PPOs.[8,14] In addition to ACE inhibitors, another PPO observed was acetylsalicylic acid. The use of acetylsalicylic acid has produced controversial results in different studies, although it continues to be used as an important antiplatelet, preventing thrombus formation and possible ischemia. The use of angiotensin converting enzyme (ACE) inhibitors is recommended by the START criteria as, by lowering blood pressure, these drugs prevent the appearance of very common diseases such as heart failure, and delay the progression of retinopathy and diabetic nephropathy.[28]

The most frequently omitted medications for the musculoskeletal system were calcium and vitamin D, with 20 omissions, similar to that found in other studies.[8,14] Supplementation with these compounds is very important, as it is difficult for the required amount of vitamin D to be obtained through the diet. However, calcium supplementation by capsules may be linked to increased cardiovascular risk. Ideally, calcium and vitamin D are acquired through diet and exposure to the sun, and should be supplemented only when insufficient amounts are received in these ways.[29]

From the PIMs and PPOs described, therefore, it was observed that the sample of elderly persons is exposed to inappropriate medication prescription, with a potential risk of increased morbidity and mortality associated with the use of PIMs and the loss of potential benefits due to PPOs.

The present study has some limitations. The first is the use of a cross-sectional delineation, which does not allow a temporal relationship to be established between the inappropriate prescription of medications and the presence of adverse reactions and the use of health services, for example.

Another limitation is that the data refers to the period between 2011 and 2013, with the analysis of medical records that were completed in 2013. In the last three years, modifications have taken place in treatment conduct that may result in differences in the frequencies found. Furthermore, new STOPP and START criteria emerged in 2015, with a more extensive list of PIMs and PPOs, making the comparison of data with studies using this new version difficult.[6]

Another limitation of the present study, which should be considered for comparisons with studies based on home-based surveys, is that it deals with community-dwelling elderly persons seeking medical care in a geriatric outpatient clinic on a spontaneous basis. However, careful analysis of medical records and prescriptions, from the first appointment and based on a comprehensive geriatric assessment, helped identify the disease and comorbidity conditions that explained the prescribing or non-prescribing of medications identified as inappropriate or omitted. This characteristic allows the use of all the STOPP and START criteria, reducing restrictions on comparisons with other studies, as well as

minimizing the possibility that the outcomes studied have been underestimated.

CONCLUSION

The results of the present study reveal a significant prevalence of the inappropriate prescription of medications and demonstrate the need for further studies that incorporate and adapt the STOPP and START criteria to different scenarios of health care for the elderly.

Therefore, additional studies are recommended that use the STOPP and START criteria as a strategy for the optimization of established pharmacological treatments, qualifying the care provided to the elderly population in question.

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