RISK FACTORS FOR CARDIOVASCULAR DISEASES AND COGNITIVE STATUS IN ELDERLY OF THE SOUTHWESTERN PARANA

FATORES DE RISCO PARA DOENÇAS CARDIOVASCULARES E ESTADO COGNITIVO EM IDOSOS DO SUDOESTE DO PARANÁ

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ABSTRACT

The aging process causes miscellaneous changes in the human body, including neurological changes, such as the decline in cognitive capacity. Studies report a probable relationship between cardiovascular disease (hereinafter, CVD) and dementia, as both share common risk factors. This study aimed to evaluate the frequency of risk factors for cardiovascular diseases and cognitive status in elderly people of the southwestern Parana. Cross-sectional, quantitative study carried out with elderly people, both sexes, aged 60 or over, residing in three municipalities of the Southwest Region of Parana. Sociodemographic and clinical statistical data were realized through interviews. Cognitive assessment was measured using the Mini Mental State Examination – (hereinafter, MMSE) and the functional capacity of the research participants was assessed using the Pfeffer questionnaire – (QPAF). The risk of cardiovascular diseases was assessed by factors as: lifestyle, medical history and waist circumference (WC). The research data was composed by 82 elderly people, being 74.4% of them female, with a prevalence of age between 60 and 70 years. Of the interviewees, were 7.3% smokers, were 68.3% sedentary and 48.8% reported having cardiovascular disease. The presence of cognitive decline was present in 20.7% of the elderly and the frequency of risk for cardiovascular diseases, assessed by WC, was observed in 87.8% of the sample. This frequency of risk factors for cardiovascular diseases was elevated in the studied sample, however there was no association with the presence of cognitive decline.

Keywords: Aging. Cognition. Waist circumference.

RESUMO

O processo de envelhecimento provoca diversas alterações no organismo humano, dentre elas, modificações neurológicas, como o declínio da capacidade cognitiva. Estudos relatam provável relação entre doenças cardiovasculares (doravante, DCVs) e demência, pois as duas compartilham fatores de risco comuns. Este estudo teve como objetivo avaliar a frequência de fatores de risco para doenças cardiovasculares e estado cognitivo em idosos do sudoeste do Paraná. A metodologia utilizada foi um estudo quantitativo transversal realizado com idosos de ambos os sexos, com 60 anos ou mais, residentes em três municípios do Sudoeste do Paraná. Avaliou-se dados sociodemográficos e clínicos por meio de entrevista. A avaliação cognitiva foi medida por meio de Mini Exame do Estado Mental – (doravante, MEEM) e a capacidade funcional dos participantes da pesquisa foi avaliada pelo questionário de Pfeffer – (QPAF). O risco para doenças cardiovasculares foi avaliado pelos fatores: estilo de vida, história clínica e circunferência da cintura (CC). Participaram da pesquisa 82 idosos, sendo 74,4% do sexo feminino, com a prevalência de idade entre 60 e 70 anos. Dos entrevistados, 7,3% eram tabagistas, 68,3% eram sedentários e 48,8% referiram apresentar doença cardiovascular. A presença de declínio cognitivo esteve presente em 20,7% dos idosos e a frequência de risco para doenças cardiovasculares, avaliada pela CC, foi observada em 87,8% da amostra. Essa frequência de fatores de risco para doenças cardiovasculares foi elevada na amostra estudada, contudo não se observou associação com a presença de declínio cognitivo.

Palavras-chave: Circunferência da cintura. Cognição. Envelhecimento.

INTRODUCTION

The aging process is natural and occurs according to the personal characteristics and lifestyle of each individual. In addition, several progressive anatomical and functional changes occur in the body, causing effective reductions in the functional and sensory capacity and even in the body's metabolic processes (CAMPOS; MONTEIRO; ORNELAS, 2000). Nevertheless, there are changes in the body composition, such as progressive loss of lean mass and increased proportion of body fat (HOFFMANN *et al.*, 2010). It is also important to highlight the occurrence of neurological changes, including cognitive ability (CALIL, 2017).

Cognition involves all mental functioning; ability to think, perceive, remember, feel, reason and respond to external stimuli. With the changes in cognitive performance with aging, some domains are impaired and can affect the daily lives of the elderly and their families (RABELO, 2009).

Elderly people represent approximately 13% of the Brazilian population, equivalent to 28 million people (IBGE, 2018). In future projections, research carried out by scholars estimate that, in 2043, this amount could reach 25% (IBGE, 2018).

Studies report a probable relationship between cardiovascular disease (CVD) and dementia, since these pathologies share common risk factors, including age, obesity, physical inactivity, smoking, arterial hypertension and high cholesterol (CONFORTIN *et al.*, 2019). The association between overweight/obesity and dementia remains to be elucidated due to its multifactorial determinants. It is postulated that the negative influence of excess body and/or visceral adiposity in the brain predates the onset of dementia symptoms. This brain alteration would result from oxidative stress, hormonal dysregulation and inflammatory mediators produced by the adipose tissue (CONFORTIN *et al.*, 2019).

Data from Vigitel (BRAZIL, 2019) demonstrates that the frequency of obese elderly people is 20.9%, with higher percentage in women, representing 22.7%, than men, representing 18%.

Considering the factors related to the development of dementia, obesity and CVD, nutrition is an important modifiable risk factor (BERENDSEN *et al.*, 2015). For this research, the objective was to evaluate the frequency of risk factors for CVDs and cognitive status in the elderly of the southwestern Parana.

MATERIAL AND METHODS

This research was of cross-sectional quantitative nature with primary data collection. Data were collected in three municipalities in the Southwest Region of Parana: Planalto, Realeza and Capanema. These municipalities were selected for convenience. A total of 82 elderly people participated in the research. As inclusion criteria, were: individuals of both sexes, aged over 60 years, residing in the urban or rural areas of the mentioned cities. The exclusion criteria were: illiterate elderly people with severe dementia. The elderlies were invited to participate in the research from the community and health groups of the municipalities. The research was approved by the Research Ethics Committee of the Universidade Federal da Fronteira Sul - UFFS under protocol n.º 67329517.3.0000.5564 and all participants signed the "Informed Consent Term".

To obtain sociodemographic data, a form was constructed to be applied during the interview. The main variables analyzed were: gender, age, education, home arrangement, income, work, retiree, smoking, physical activity, cardiovascular disease, history of head trauma, diabetes, stroke history, cognitive state, functional capacity.

Cognitive assessment was measured using the MMSE, developed by Folstein, Folstein and McHugh (1975), which assesses seven categories: temporal orientation, local orientation, three-word record, attention and calculation, remembrance or recall memory, language and visual constructive capacity. The cutoff points suggested by Bertolucci *et al.* (1994) were used, considering the participants' education to determine the scores, which determines the presence of cognitive decline

when the score is: below 18 points for low (1 to 4 years) and medium education (4 to 8 years), and below 26 points for high education (over 8 years).

The functional capacity of the research participants was assessed by the Pfeffer – QPAF questionnaire (PFEFFER *et al*., 1982), using the cutoff point of a score greater than or equal to five points as indicator of dependence to carry out activities of daily living.

The nutritional status of the elderly people was assessed by measuring their weight, which was performed with the aid of a portable electronic scale from the "Quanta" brand, accurate to 100 g, with capacity of 150 kg. The individual should remove shoes and any heavy objects close to the body and then stand in the center of the scale (NACIF; VIEGIB, 2011).

Height measurement was collected using Arktus inextensible anthropometric tape, with variation in millimeters, attached to the wall without a baseboard. The participant should be standing, barefoot, without hair ornaments, with five points of the body in contact with the wall, namely: heels, calves, buttocks, shoulders and head (NACIF; VIEGIB, 2011).

Data collection was performed by the previously trained research team and lasted approximately 15 minutes.

After collecting data on weight and height, the Body Mass Index (BMI) was calculated with the following formula: $BMI = W/H^2$ (weight in kilograms and height in meters). The classification criteria used to assess nutritional status by BMI were those proposed by Lipschitz *et al*. (1994).

Waist circumference (WC) was collected using Arktus inextensible anthropometric tape, with variation in millimeters, in the smallest circumference observed between the last rib and the iliac crest (NACIF; VIEBIG, 2011). The isolated WC measure was used to classify individuals as to the risk of cardiovascular diseases, and its classification was in accordance with the specifications of the WHO 1997 (BRASIL, 2006).

Regarding the triceps skinfold (TCP), it was measured on the posterior surface of the arm, parallel to the longitudinal axis, at half the distance between the superolateral edge of the acromion and the olecranon, measured in the vertical direction with the arm freely extended along the body, with the aid of scientific Cescorf® brand adipometer (NACIF; VIEBIG, 2011). TCP was evaluated according to the SABE project (BARBOSA *et al*., 2005).

As for the calf circumference (CP), this was performed with the aid of the same anthropometric tape, this measurement being determined around the maximum perimeter of the calf muscle, measured in the horizontal direction. For evaluation, the classification criteria of Najas and Yamatto (2008) were used.

The results were described in a Microsoft Excel® 2010 spreadsheet software for further statistical treatment. Data were analyzed using descriptive statistics and the comparison between the group of elderly people with cognitive decline and without cognitive decline was performed using the chi-square test using the GraphPad Prism 7 program.

RESULTS AND DISCUSSION

Eighty-two elderly people participated in the research, most of them female (74.4%), with prevalence of age between 60 and 70 years (64.7%). Regarding education, most of the sample presented low level of education, ranging from 1 to 4 years of schooling (64.6%). The predominance of women in the studied sample was also observed in a study carried out by Bennemann (2009), with 214 elderly people in Maringá-PR (69.2%). In addition, were 43.9% of the elderly aged between 60 and 69 years and the majority presented low level of education (59.4%), from 1 to 4 years.

With regard to income, more than half of the evaluated elderly presented income of up to 2 minimum wages. Regarding the living arrangements of the elderly, the majority lived with spouse or family member (65.8%) and in relation to work, the majority reported not working (85.4%) and being retired (92.7%) (Table 1). Similar results were found in a study that carried out an assessment of cognitive capacity in 216 elderly people treated at a specialty outpatient clinic of teaching hospital in the region of Campos Gerais-PR, which found that 40.7% of the elderly lived with spouse and

presented a monthly income between 1 to 2 minimum wages (81%), similar to the present study (GADENS; BENVEGNÚ, 2013). Nevertheless, in an investigation carried out with 40 elderly people participating in extension projects at Universidade de São Paulo - SP, it showed that the majority of those evaluated had a family income between 1 to 3 minimum wages and were retired (72.5%), 15.0% of retired seniors had complementary professional activity (PERUCHA, 2013).

Table 1 - Sociodemographic characteristics of elderly people residing in Southwest Parana, Brazil.

Variables	n.	(%)
Gender		
Feminine	61	74.4
Masculine	21	25.6
Age		
60-70 years	53	64.7
71-80 years	22	26.8
≥81 years	07	8.5
Education		
1 to 4 years	53	64.6
5 to 8 years	15	18.3
9 years or more	08	17.1
Home arrangement		
Alone	28	34.2
With spouse	36	43.9
With other family members	18	21.9
Income		
1 minimum wage	32	39.0
2 minimum wages	46	56.1
3 or more minimum wages	04	4.9
Work		
Yes	12	14.6
No	70	85.4
Retirement		
Yes	76	92.7
No	06	7.3

Note: *National minimum wage at the time of data collection (2017-2018): R$937.00-R$954.00.
Source: The authors.

Table 2 shows the assessment of the elderly cognitive status, showing that 20.7% presented impairment and 12.2% presented dependence in performing activities of daily living, related to the variable functional capacity.

The prevalence of cognitive decline found in this study was similar to other studies that used the MMSE as instrument to assess cognitive status. In a study carried out by Danielewicz (2017) with 1.197 non-institutionalized elderly people in the urban area of Florianópolis-SC, it showed that the frequency of cognitive decline was 26.1%. On the other hand, in a sample consisting of 310 elderly residents of the Ibicuí-BA city, there were 18.7% of cognitive decline (NASCIMENTO *et al.*, 2015). Still, in another study with 85 elderly people participating in social groups in the city of Palmeiras das Missões-RS, it was found that 23.5% of the elderly have cognitive decline (LEITE *et al.*, 2012).

The analysis of clinical characteristics of the elderly are risk factors for cognitive decline in individuals with a history of head trauma and a history of stroke was uncommon in the sample evaluated, with 7.3% and 4.9% respectively. The analysis of the history of head trauma and stroke

compared to other studies showed results that coincide with those of the present study. In the study by Oliveira, Barros and Souza (2007) that evaluated the cognitive status of 48 elderly people in a hospital in Recife-PE, it was identified that the occurrence of a personal history of stroke was 6.2% and that of traumatic brain injury was 2.1%. In another study carried out by Dantas (2014) with 109 outpatients diagnosed with a first episode of stroke, it was found that depending on the stage of involvement of the stroke, the degree of neurological impairment may vary, with cognitive deficit being more common in elderly individuals in the acute phase of stroke.

Table 2 - Cognitive status, functional capacity and risk factors for dementia in the elderly of the southwestern Parana, Brazil.

Variables	n.	%
Cognitive state		
With cognitive decline	17	20.7
Without cognitive decline	65	79.3
Functional capacity		
Without dependency	72	87.8
With dependency	10	12.2
History of head trauma		
Yes	06	7.3
No	76	92.7
History of stroke		
Yes	04	4.9
No	78	95.1

Source: The authors.

Regarding cognitive ability and gender, a study by Dantas *et al*. (2014) with 180 elderly people in Porto Rico-PR showed that the frequency of cognitive decline was higher in females (64.96%), as in the present study (Table 3). The analysis of risk factors for CVD and CVD history, which are common factors for cognitive decline, showed that there were few reports regarding smoking, as most elderly people (92.7%) reported not having the smoking habit. On the other hand, were 68.3% of respondents that reported not practicing physical activity (Table 3).

Among the risk factors for the CVD development, other studies also identified that most elderly people were not smokers (LEITE *et al*., 2012; NASCIMENTO *et al*., 2015). However, regarding the practice of activity, there were varied results, the study carried out by Leite *et al*. (2012) in Santa Maria-RS found that 64.7% of the elderly practiced physical activity, while the study by Nascimento *et al*. (2015) in Ibicuí-BA found that 68.7% were sedentary, similar to the present study.

Considering the CVD and diabetes presence, reported having these pathologies 48.8% of the sample and 12.2%, respectively, but a higher frequency of any predictor factor or previous history of CVDs was not detected in the elderly with cognitive decline (Table 3). Regarding the CVD presence, other investigations showed mixed results. The CVD frequency ranged from 19% in the study by Nascimento *et al*. (2015) to 62% in the study by Castro-Costa *et al*. (2013). The diabetes frequency observed in other studies was similar to that found in the study by Castro-Costa *et al*. (2013), with 15.1%, and 18% in the study by Machado *et al*. (2011).

Observing the nutritional status of the elderly evaluated, exhibited in table 4, according to the BMI, there was a high frequency of overweight (54.9%). It was not possible to verify an association between the anthropometric indicators predicting risk for CVD in the studied sample and the presence of cognitive decline. However, other investigations have also shown a high frequency of overweight in elderly people with cognitive decline 46.72% (CASTRO-COSTA *et al*., 2013). A study carried out in São Paulo with 96 elderly people showed that 47.9% of the elderly were overweight, 50% of them had Alzheimer's disease and 40% had mild cognitive impairment (CALIL, 2017).

Table 3 - Factors associated with CVD risk and CVD history according to the cognitive status of elderly people in southwestern Parana, Brazil.

Variables	Total n°	Total %	With cognitive decline n°	With cognitive decline %	Without cognitive decline n°	Without cognitive decline %	p
Gender*							
Feminine			15	88.2	46	70.8	0.2139
Masculine			02	11.8	19	29.2	
Smoking							
Yes	06	7.3	01	5.9	05	7.7	1.0000
No	76	92.7	16	94.1	60	92.3	
Physical activity							
Yes	26	31.7	05	29.4	21	32.3	1.0000
No	56	68.3	12	70.6	44	67.7	
Cardiovascular disease							
Yes	40	48.8	09	52.9	31	47.7	
No	42	51.2	08	47.1	34	52.3	0.7884
Diabetes							
Yes	10	12.2	03	17.6	07	10.8	0.4251
No	72	87.8	14	82.4	58	89.2	
History of stroke*							
Yes			01	5.9	03	4.6	1.0000
No			16	94.1	62	95.4	

Notes: *Data for the total sample were described in Table 2.
Source: The authors.

Regarding the WC assessment, were 87.8% of the elderly people evaluated that presented risk for CVD. The WC assessment is an indicator of visceral fat accumulation and increased risk for CVD (ALMEIDA, ALMEIDA, ARAÚJO, 2009). A study carried out in Coimbra, Portugal, with 40 elderly people diagnosed with dementia, showed lower results than the present study, with 59.1% of the elderly being classified as at risk for CVD (DIAS, 2012).

The assessment of PCT presented high frequency of body adiposity (63.4%), but the frequency of risk for CVD through all these indicators did not significantly differ with the presence of cognitive decline. The assessment of fat-free mass, measured by means of calf circumference (LC) showed that most elderly people were eutrophic (93.1%). Research carried out by Perucha (2013) found that 2.5% had malnutrition, through this indicator, results similar to the present study.

A study carried out by Confortin *et al*. (2019) with 1197 elderly people from Florianópolis found an independent association between dementia and the highest tertiles of anthropometric risk indicators for CVD, BMI, WC and waist/height ratio. It is important to highlight that in our study, the assessment of cognitive decline was carried out and the sample was small.

The use of different classification instruments and criteria to verify cognitive impairment or the diagnosis of dementia in the studies, as well as the sampling and data collection methods (measured or self-reported) can explain the differences in prevalence and the verification of association between the variables.

Table 4 - Anthropometric indicators according to the cognitive status of elderly people in Southwestern Parana, Brazil.

Variables	Total		With cognitive decline		Without cognitive decline		p
	nº	%	nº	%	nº	%	
Body Mass Index (BMI)							
Low weight	06	7.3	02	11.8	04	6.1	0.7297
Eutrophy	31	37.8	06	35.3	25	38.5	
Overweight	45	54.9	09	52.9	36	55.4	
Waist circumference (WC)							
Without risk	10	12.2	03	17.6	07	10.8	0.4251
With risk	72	87.8	14	82.4	58	89.2	
Triceps Skin Fold (PCT)							
Risk for malnutrition and eutrophy	30	36.6	08	47.1	22	33.8	0.3984
Overweight and obesity	52	63.4	09	52.9	43	66.2	
Circumference of the Calf (CP)							
Malnutrition	05	6.1	02	11.8	03	4.6	
Eutrophy	77	93.1	15	88.2	62	95.4	0.2755

Source: The authors.

CONCLUSION

There was a high frequency of risk factors for cardiovascular diseases in the studied sample, however, no association was found with the presence of cognitive decline. The importance of considering dietary and anthropometric aspects in dietary care for the elderly is highlighted, with the aim of reducing cardiovascular risk factors.

The necessity of investigations with a larger number of elderly people is highlighted, as well as other methods and indicators of total and central adiposity, in order to contribute to elucidate the probable association between adiposity and cognitive decline. Studies on this topic are relevant, considering the growing number of elderly people and the risk of cognitive changes in this population, in order to elucidate factors that may predispose to their development and progression.

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