

Physical activity of older adults and factors associated with pre-frailty

Atividade física de idosos e fatores associados à pré-fragilidade

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Keywords

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Descritores

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Abstract

Objective: To investigate pre-frailty and factors associated with this condition, considering the levels of physical activity of the elderly.

Methods: Cross-sectional quantitative study. The sample was calculated based on the estimated population proportion and comprised 195 older adults receiving care at a Basic Health Unit. Data were collected by means of a sociodemographic/clinical profile questionnaire and a second questionnaire regarding physical activity.

Results: Among the 195 subjects participating in the study, 73 had a decreased level of physical activity and were classified as being in a condition of pre-frailty for this component.

Conclusion: Pre-frailty for physical activity presented a moderate prevalence and was associated with the age range and the use of medication, such as antihypertensive and anti-inflammatory drugs.

Resumo

Objetivo: Investigar a pré-fragilidade e os fatores associados a essa condição, considerando o nível de atividade física dos idosos.

Métodos: Estudo quantitativo transversal. A amostra foi calculada com base na estimativa da proporção populacional e constituída por 195 idosos usuários de uma Unidade Básica de Saúde. Os dados foram coletados mediante questionário sociodemográfico/clínico e nível de atividade física.

Resultados: Dos 195 sujeitos participantes da pesquisa, 73 possuíam diminuição do nível de atividade física, sendo classificados em condição de pré-fragilidade para esse componente.

Conclusão: A pré-fragilidade para atividade física possui moderada prevalência e associou-se à faixa etária e ao uso de medicamentos, entre eles anti-hipertensivos e anti-inflamatórios.

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Introduction

The purpose of gerontological nursing care is to prolong the life of the elderly and, fundamentally, to minimize possible limitations in functional capability according to the years lived. For individuals who reach 100 years of age, a significant decline in functional capability is expected in comparison to the capabilities of younger older adults; however, it is observed that over 25% of centenarians are independent. This means that not all older adults are frail, but there is a subgroup of this population that is inclined to develop the frailty syndrome.⁽¹⁾

According to North-American authors, the frailty syndrome may be characterized utilizing five measurable biological components: unintentional weight loss, decreased walking speed, self-report of fatigue/exhaustion, reduction in grip strength and reduction in the level of physical activity. Hence, individuals who do not present these markers are considered non-frail older adults; those who present one or two components are considered pre-frail, and those who present three or more characteristics are frail.⁽²⁾

The presence of frailty syndrome in the elderly represents a vulnerable health condition, as well as a low tolerance for physical and psychological stressors, which increases the risk of falls, functional incapability, dependence in activities of daily living and, within five years, may also lead to a prognosis of anticipated death.⁽²⁾

The low tolerance for physical and psychological stressors may affect engagement in physical activities, and its reduction plays an important role in the frailty syndrome. For some authors, physical activity is associated with quality of life and better health indicators, being considered a determining factor in the aging process.⁽³⁾ Therefore, physical activity may contribute to preserving motor function and psychological well-being of the older adult, assist in the prevention and treatment of some diseases and promote the maintenance of independence in activities of daily living.⁽⁴⁾

The need for the elderly to engage in physical activities has been a theme of interest for researchers, due to the importance of mobility in the

maintenance of the individual's independence and autonomy. Considering that the reduction of physical activities is an indicator of frailty and that the existence of this phenotype component suggests an early condition within the syndrome, it becomes necessary to study the prevalence of this marker in the elderly community.

In light of this and the lack of national studies evaluating the frailty syndrome according to the phenotype of Fried and collaborators, the purpose of the present study was to investigate pre-frailty and the factors associated with this condition, considering the level of physical activity of the elderly.

Methods

This is a cross-sectional quantitative study, developed in a basic health care unit in the city of Curitiba, state of Paraná, in the southern region of Brazil. Inclusion criteria were: (a) 60 years of age or older; (b) obtaining a score higher than the cutoff point in cognitive testing using the Mini-Mental State Examination (MMSE), which considered a cutoff point of 13 points for illiterate individuals, 18 points for average and low education level, and 26 points for high education level.^(5,6) The exclusion criterion was applied to older adults with a previous diagnosis of severe mental deficit or a disease that would hinder their participation in the interviews.

The sample size was determined based on the estimate of population proportion. The calculation considered a level of confidence of 95% ($\alpha=0.05$) a variance of 0.12. The sampling error was fixed at five percentage points. The sample size was also padded with an additional 10% to counter the possibility of losses and refusals to participate, which resulted in a sample size consisting of 203 older adults.

The sample was selected by convenience and the individuals were invited to participate in the study in the order of arrival at the service. The test to identify cognitive alterations in the elderly participants was performed in a private area.

The following stage was the completion of the sociodemographic and clinical questionnaire, which was specially designed for the present study, and the Level of Physical Activity for the Elderly Curitiba questionnaire,⁽⁷⁾ validated in 2009.

The studied sociodemographic variables included: gender, age range, marital status, living arrangement, education and financial situation. The clinical variables consisted of: health conditions, use of medication, type of medications used, reported feelings of loneliness, prior fall history, hospitalization, tobacco use, alcoholism, use of a cane and use of corrective lenses.

The Level of Physical Activity for the Elderly Curitiba questionnaire is comprised of 20 questions as follows: seven regarding regular physical activities; seven in the domain of housekeeping activities or hard physical labor; and six regarding social and leisure activities.⁽⁷⁾ The questions refer to the frequency and duration of activities engaged in within the last week, and the accuracy of the questionnaire is given by a score, as per the following classification: inactive (zero to 32); infrequently active (33 to 82); reasonably active (83 to 108); active (109 to 133); and very active (≥ 134). Classifications compatible with the inactive and infrequently active groups were considered as markers of frailty.

Data were collected in the period between September 2010 and March 2011. The collected data were then organized and stored utilizing Excel® 2007 software. Epi-Info version 6.04 software was used for data analysis. Descriptive statistics were described by means of the distribution of the absolute and relative frequency, mean and standard deviation, and non-parametrical tests (chi-square) for association of variables. Results were considered to be statistically significant at $p < 0.05$.

The development of this study complied with national and international ethical guidelines for research involving human beings.

Results

After the application of the inclusion and exclusion criteria, the final sample consisted of 195 subjects.

Among these, 73 (37.4%) subjects presented a decreased level of physical activity, classified as being in a condition of pre-frailty for this component.

Table 1 shows a greater number of women ($n=39$), prevalence of the age range between 60 and 69 years ($n=33$), married subjects ($n=36$) and incomplete elementary school education ($n=50$). The variable "age" was found to be significant in terms of a decrease in physical activity ($p=0.007$).

In table 2, it is possible to observe an increased number of older adults with health problems ($n=67$) who use medication ($n=70$), variables that were found to be significant in this study ($p=0.026$). The most common disease mentioned by the older adults was cardiovascular ($n=55$), followed by musculoskeletal disease ($n=30$).

Table 3 presents the main classes of medications used by the elderly, with emphasis to antihypertensive ($n=59$) and anti-inflammatory drugs ($n=32$), which were significant in the study with values of $p=0.025$ and $p=0.023$, respectively. Regarding the quantity of medications used, it was possible to observe a high index of older adults who used five or more medications ($n=20$).

Discussion

The limitations of the results of this study concern: 1) the characteristics of the instrument used to measure the level of physical activity engaged in by the older adult, as this activity level is self-reported and hence subject to bias; and 2) the cross-sectional study design, which does not allow for the establishment of causal relationships.

Identifying older adults who are in the stage prior to frailty increases the possibilities of reducing risk factors for this condition. It is also possible that interventions in gerontological nursing care may minimize the rate of decline of functional capability and broaden the options regarding technological resources for health care.

There was a prevalence of women among the 73 older adults who were assessed as being pre-frail. A similar result was observed in a study that aimed to investigate the relationship between frailty and phys-

Table 1. Sociodemographic profile of older adults with frailty for physical activity component

Variable	Classification	Frail for PA n(%)	Non-frail for PA n(%)	Total n(%)	p-value*
Gender	Female	39(20.0)	73(37.4)	12(57.4)	0.467
	Male	34(17.4)	49(25.2)	83(42.6)	
Age range (years)	60 to 69	33(17)	74(38)	107(55)	0.007**
	70 to 79	26(13.2)	41(21)	67(34.2)	
	80 or older	14(7.2)	7(3.6)	21(10.8)	
Marital status	Married	36(18.5)	62(31.8)	98(50.3)	0.083
	Widowed	27(13.8)	32(16.4)	59(30.2)	
	Single	7(3.6)	10(5.2)	17(8.8)	
	Divorced	3(1.5)	18(9.2)	21(10.7)	
Living arrangement	Relative	46(23.5)	78(40.0)	124(63.5)	0.869
	Spouse	17(8.7)	25(12.9)	42(21.6)	
	Alone	10(5.2)	19(9.7)	29(14.9)	
Education	Illiterate	12(6.1)	18(9.3)	30(15.4)	0.478
	Incomplete primary education	50(25.6)	71(36.4)	121(62)	
	Complete primary education	4(2.0)	11(5.6)	15(7.6)	
	Complete secondary education	5(2.5)	16(8.2)	21(10.7)	
	Incomplete secondary education	1(0.6)	5(2.5)	6(3.1)	
	Higher education	1(0.6)	1(0.6)	2(1.2)	
Financial situation	Average	34(17.5)	46(23.6)	80(41.1)	0.318
	Satisfactory	21(10.7)	39(20.0)	60(30.7)	
	Dissatisfactory	17(8.7)	37(19.0)	54(27.7)	
	Not answered	1(0.5)	0(0)	1(0.5)	
Total		73(37.4)	122(62.6)	195(100)	

Legend: * Chi-square test; ** value of $p < 0.05$; PA – Physical activity**Table 2.** Clinical profile of the older adults with frailty for physical activity component

Variable	Classification	Frail for PA n(%)	Non-frail for PA n(%)	Total n(%)	p-value*
Health condition	Yes	67(34.4)	109(55.9)	176(90.3)	0.759
	No	6(3.0)	13(6.7)	19(9.7)	
Medication use	Yes	70(35.9)	103(52.9)	173(88.7)	0.026**
	No	3(1.5)	19(9.7)	22(11.3)	
Feelings of loneliness	Yes	27(13.8)	31(15.9)	58(29.7)	0.121
	No	46(23.6)	91(46.7)	137(70.3)	
Prior history of fall	Yes	18(9.2)	37(19)	55(28.2)	0.491
	No	55(28.2)	85(43.6)	140(71.8)	
Hospitalization	Yes	17(8.7)	19(9.7)	36(18.4)	0.248
	No	56(28.7)	103(52.9)	159(81.6)	
Tobacco use	Yes	7(3.6)	11(5.7)	18(9.3)	0.902
	No	63(33.8)	111(56.9)	177(90.7)	
Alcoholism	Yes	6(3.0)	19(9.7)	25(12.7)	0.205
	No	67(34.4)	103(52.9)	170(87.3)	
Use of cane	Yes	3(1.6)	5(2.6)	8(4.2)	0.711
	No	70(35.8)	117(60)	187(95.8)	
Use of corrective lenses	Yes	62(31.8)	60(30.8)	122(62.6)	0.631
	No	11(5.6)	62(31.8)	73(37.4)	
Total		73(37.4)	122(62.6)	195(100)	

Legend: * Chi-square test; ** value of $p < 0.05$; PA – Physical activity

Table 3. Medications used by the older adults with frailty for physical activity component

Medication	Classification	Frail for PA n(%)	Non-frail for PA n(%)	Total n(%)	p-value*
Antihypertensive	Yes	59(30.2)	78(40.0)	137(70.2)	0.025**
	No	14(7.2)	40(20.6)	54(27.8)	
	NA	0(0)	4(2.0)	4(2.0)	
Anti-inflammatory	Yes	32(16.4)	33(16.9)	65(33.3)	0.023**
	No	41(21.0)	85(43.6)	126(64.6)	
	NA	0(0)	4(2.0)	4(2.0)	
Antidiabetic	Yes	26(13.3)	34(17.4)	60(30.7)	0.180
	No	47(24.1)	84(43.0)	131(67.1)	
	NA	0(0)	4(2.0)	4(2.0)	
Antilipemic	Yes	22(11.3)	28(14.4)	50(25.7)	0.345
	No	51(26.1)	94(48.2)	145(74.3)	
	NA	0(0)	4(2.0)	4(2.0)	
Antidepressive	Yes	14(7.2)	14(7.2)	28(14.4)	0.111
	No	59(30.2)	104(53.3)	163(83.5)	
	NA	0(0)	4(2.0)	4(2.0)	
Analgesic	Yes	11(5.6)	20(10.2)	31(15.9)	0.277
	No	62(31.8)	98(50.2)	60(81.9)	
	NA	0(0)	4(2.0)	4(2.0)	
Other	Yes	23(11.8)	31(15.9)	54(27.7)	0.449
	No	50(25.6)	91(46.7)	141(72.3)	
Total		73(37.4)	122(62.6)	195(100)	

Legend: * Chi-square test; ** value of $p < 0.05$; PA – Physical activity; NA – not answered

ical activities.⁽⁸⁾ In this study, men (50.68%) were found to be more active than women (42.74%).

The practice of physical activity may be connected to a series of external and not merely physiological factors, such as the opportunities and values culturally associated with gender, motivation and options, among others.⁽⁸⁾

Regarding age, among the 195 study subjects, 33 (16.9 %) of those who were in the age range between 60 and 69 years presented a reduction in the level of physical activity, whereas 74 subjects from the same age range routinely performed physical activities. The number of subjects in the oldest group (80 years or older) with pre-frailty for physical activity (n=14) corresponded to twice the number of older adults who did not present with this condition in the group (n=7). This means that the more advanced the age, the greater the probability of the

elderly individual becoming pre-frail for the physical activity component ($p=0.007$).

As individuals grow older, there is a progressive decline in cellular metabolism and the function of the main physiological systems. The musculoskeletal system is affected by sarcopenia, a process of muscle mass reduction that reduces muscle strength, mobility, balance and tolerance to exercise. This process predisposes the elderly to falls and physical inactivity.⁽⁹⁾

Similar results to the clinical profile of the pre-frail older adults (Table 2) were found in a study developed in the city of Campinas, state of São Paulo, in the southeast region of Brazil, the purpose of which was to investigate the relationship between frailty and measurements of physical activity.⁽⁸⁾ In this study, 84.02% of the men and 91.04% of the women reported they had at least one disease.

Health problems may be a risk factor associated with the loss of functional capability, and they may also create limitations for the older adult, resulting in complications or in the development of new problems.⁽¹⁰⁾ The practice of physical activity preserves independence in activities of daily living and contributes to reducing and controlling risk factors for cardiovascular and ischemic heart disease.⁽¹¹⁾

Therefore, it is possible to explain the high number of older adults presenting with pre-frailty for physical activity associated with health problems. The increased presence of cardiovascular and musculoskeletal diseases may represent an impeding factor for the practice of physical activities on the part of the elderly. However, the cross-sectional design used in this study does not allow the establishment of a causal relationship between pre-frailty for physical activity and health problems.

Most of the pre-frail subjects ($n=70$) used medication, and this variable was significantly associated with the level of physical activity ($p=0.026$). Although there are national and international studies evaluating physical activity in the context of the frailty syndrome, they are limited to showing the relationships between the components of the phenotype, revealing the number of older adults who perform physical activities in the different domains (leisure, work, sport and housekeeping activity), and to determine the differential between the positive and negative aspects of aerobic and strength training.^(8,12-14) Hence, it is difficult to compare these results with the data available in the literature, and to justify the significant result obtained between the two variables.

It is suggested that these positive relationships may be partially explained by the adverse effects of the medications used by the elderly (drowsiness, lack of motivation and blood pressure alterations), which may interfere in the activities performed or in the willingness to perform them. As a consequence, the individual may not feel inclined to perform daily activities or those that require greater motivation.

Moreover, polypharmacy was present in 20 older adults in this study. The increased use of medications results from the increased number of chronic diseases and complications that occur as a result of

advanced age.⁽¹⁵⁾ Hence, the higher the number of medications ingested by the older adult, the greater the risk of interaction among these medications, in addition to the fact that adverse effects also become stronger, suggesting that both reasons influence physical activity in the elderly.

Regarding the most commonly used types of medication, 59 subjects used antihypertensive and 32 used anti-inflammatory drugs. The use of these medications reached significance for this study, with values of $p=0.025$ and $p=0.023$, respectively.

Sedentarism may be considered as one of the main factors affecting blood pressure levels. It is known that the practice of physical activity may contribute to controlling blood pressure, and it may also be useful in the implementation of non-pharmacological treatment of arterial hypertension. As long as it is supervised, physical activity may maintain basal blood pressure levels under non-pharmacological treatment.⁽¹⁶⁾

According to an international literature review, the purpose of which was to evaluate the relationship between physical activity and cardiovascular and inflammatory diseases, sedentary people have a greater risk of developing cardiac problems when compared to active individuals.⁽¹⁷⁾ They may also present a greater quantity of inflammatory markers, partially justifying the significant value obtained in the present study. Furthermore, it is understood that the presence of inflammatory diseases, which are almost always associated with the presence of pain, makes it difficult for the elderly to engage in physical activities.

Conclusion

It is inferred that pre-frailty for physical activity, in the present study, presents a moderate prevalence (37.4%) and is related with age and use of medication. The more advanced the age of the older adult, the greater the probability of becoming pre-frail for this component. The use of drugs deserves further analysis in terms of the posology and period of treatment, in an attempt to minimize the rate of functional decline and the outcome of frailty. Therefore, there are enough el-

ements to deduce that it is fundamental to encourage physical activity, from the early ages throughout the continuum of the aging process.

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Collaborations

Lenardt MH; Sousa JR; Carneiro NHK; Betiulli SE and Ribeiro DKMN contributed with the conception of the project, analysis and interpretation of data. They also contributed with the composition of the article, critical relevant review of its intellectual content and final approval of the version to be published.

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