ORIGINAL ARTICLE

RELATIONSHIP BETWEEN PHYSICAL EXERCISE WITH CLINICAL CONDITIONS AND FUNCTIONAL CAPACITY IN OLDER ADULTS

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Highlights: (1) Sedentary behavior among older adults increases the likelihood of developing hypertension and multiple comorbidities. (2) Sedentary older adults have a higher probability of experiencing functional disability and falls. (3) Women, adults aged 80 years or older, and those without a partner are more likely to be sedentary.

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ABSTRACT

This study's objective was to relate physical exercise practice with clinical conditions and functional capacity in community-dwelling older adults. This is a cross-sectional study whose population consisted of older adults registered in Primary Health Care Units in the urban area of Ijuí, Rio Grande do Sul, Brazil. The inclusion criteria considered older adults of both sexes who agreed to participate in the research. Those who were unable to respond or had caregivers hired less than 30 days prior to the study were excluded. Sociodemographic data, as well as information on physical exercise practice and health conditions, were collected through structured interviews. Functional capacity of community-dwelling older adults was assessed using the Clinical-Functional Vulnerability Index-20. Data were analyzed using appropriate statistical procedures, including the nonparametric mean comparison test and Pearson's chi-square test, to evaluate differences and associations among the studied variables. It was found that the likelihood of an older adult being hypertensive increased by 63%, while the probability of presenting multimorbidities increased by 83% among sedentary individuals compared to those who regularly engaged in physical exercise. Additionally, sedentary older adults showed an increased probability of 168% for impaired functional capacity, 79% for a history of falls, 274% for inability to shop, 251% for inability to manage finances, 126% for inability to perform household chores, and 168% for inability to bathe independently. It was also observed that women, older adults aged 80 years or older, and those without partners were more sedentary. It is concluded that the practice of physical exercise is associated with the clinical and functional condition of older adults.

Keywords: Physical exercise; Functional status; Older adults; Primary Health Care; Disease prevention.

RELATIONSHIP BETWEEN PHYSICAL EXERCISE WITH CLINICAL CONDITIONS AND FUNCTIONAL CAPACITY IN OLDER ADULTS

1. INTRODUCTION

Physical exercise corresponds to a planned, structured, and repetitive physical activity performed with the objective of improving or maintaining physical fitness [1]. In this context, the regular practice of physical exercise is associated with a significant reduction in the risk of developing chronic non-communicable diseases, such as type 2 diabetes mellitus and systemic arterial hypertension, in addition to promoting benefits in the physical and social domains [2]. In the case of the older population, this relationship remains valid: the higher the level of physical activity, the lower the likelihood of developing frailty syndrome, resulting in better functional performance in daily activities [3]. Furthermore, the aforementioned study demonstrated that only three months of regular physical exercise were sufficient to increase the physical-locomotor capacity of the older adults evaluated.

On the other hand, it is essential to define functional capacity as the ability to perform activities that allow individuals to take care of themselves and maintain independence [4]. The cited article highlights that, over the years, the assessment of functional capacity has become central in the geriatric approach, being mainly measured by two domains: (1) Basic Activities of Daily Living (BADL), which include essential self-care tasks such as feeding, personal hygiene, dressing, and mobility, and (2) Instrumental Activities of Daily Living (IADL), which involve more complex actions necessary for independent living, such as financial management, use of transportation, meal preparation, and social participation. The analysis proposed by the article identifies that the main factors responsible for the loss of these functions in older adults are individual factors, including demographic characteristics, socioeconomic conditions, and health status and, among these, only health conditions present the potential for effective modification through the systematized practice of physical activity.

From this perspective, among older adults, regular physical activity is associated with increased longevity, improved levels of functional health, reduced risk of falls, enhanced cognitive function, and greater social integration [5]. These benefits directly contribute to healthy aging and are essential for promoting better quality of life and reducing potential threats to the health of this population [6].

From this perspective, even in cases of frail older adults, physical exercise contributes to functional and cognitive aspects, quality of life, and overall health status [5]. Furthermore, physical exercise is a low-cost and easily applicable intervention, with no harmful effects on the health of older adults [6]. In view of the above, the scientific literature provides a significant amount of evidence supporting the importance of physical exercise during the aging process, especially regarding chronic health conditions, in addition to favoring muscle strengthening and providing greater functional capacity.

Therefore, the importance of discussing how physical exercise impacts the quality of life of the population, especially older adults, becomes evident. This issue aims to foster discussion on the topic, providing justification that supports the relationship between increased well-being and independence and the regular practice of physical activity among older adults. The article aims to relate the practice of physical exercise with clinical conditions and functional capacity in community-dwelling older adults.

2. METHODOLOGY

This is a cross-sectional study with quantitative analysis, linked to the institutional research "*Avaliação do risco de vulnerabilidade clínico-funcional de idosos do município de Ijuí*", approved by the Research Ethics Committee of the Universidade Regional do Noroeste do Estado do Rio Grande do Sul (UNIJUÍ), under Opinion No. 6,671,562 and CAAE: 76983424.9.0000.5350. The study population consisted of older adults registered in Health Units located in the urban area of Ijuí, Rio Grande do Sul.

For this study, a convenience sample was selected from eight Health Units. Data collection took place during the year 2024, through home visits. As inclusion criteria, individuals aged 60 years or older, of both sexes, who were registered in the Health Units and agreed to participate in the study were considered. In situations in which older adults were not able to respond to the questionnaire, the caregiver or a family member was invited to respond; however, older adults who had hired caregivers for less than 30 days were excluded.

To collect information on personal, sociodemographic, and health condition data, a structured interview developed by the researchers was used, including the following variables: age, sex, marital status, education level, family income, clinical diagnoses, and medications used continuously. Moreover, the same questionnaire included information on exercise practice, including type, weekly frequency, and average session duration, with sessions considered regular at least 150 minutes per week, according to the recommendations of the World Health Organization (WHO) [7].

Participants were divided into two groups: “active” and “sedentary”. “Active” older adults were those who reported performing at least 150 minutes of moderate-to-vigorous physical activity, distributed over at least 3 days per week [7]. “Sedentary” individuals were those who did not reach this minimum time or reported no regular exercise practice.

Furthermore, functional capacity was assessed through the application of the Clinical-Functional Vulnerability Index-20 (IVCF-20), which contains 20 questions and is a rapid assessment instrument. It evaluates eight dimensions considered predictors of functional decline and mortality in older adults. These dimensions include age, self-perceived health, activities of daily living, instrumental activities of daily living, cognition, mood/behavior, mobility (including reach, grip, pinch, aerobic/muscular capacity, gait, and sphincter continence), communication (including vision and hearing), and the presence of multiple comorbidities, which may be represented by multipathology, polypharmacy, and/or recent hospitalizations [8].

The IVCF-20 is an instrument for assessing the main dimensions of older adults and was developed and validated in Brazil by Professor Edgar Nunes de Moraes [9]. Risk stratification in the IVCF-20 is carried out based on the evaluation of the eight dimensions mentioned above, which are considered predictors of functional decline and mortality in older adults. Each dimension has a specific score, which together total a maximum of forty points, and the results are classified as follows: low risk (0–6 points), indicating absence of functional decline; moderate risk (7–14 points), indicating possible functional decline; and high risk (≥15 points), indicating presence of functional decline [10]. Furthermore, impaired functional capacity was considered in those older adults who presented inability to perform at least one of the activities assessed in the instrument, such as shopping, managing finances, performing small household tasks, and bathing independently.

The quantitative variables analyzed included age, family income, number of self-reported diagnoses, number of medications in continuous use, and average weekly time of physical activity practice (in minutes). The qualitative variables included sex, marital status, education level, presence of comorbidities, classification regarding exercise practice (sedentary/active), and stratification of functional vulnerability (low, moderate, and high risk).

Data analysis was performed using the Statistical Program for Social Sciences software, version 22.0 (SPSS). For quantitative variables, mean and standard deviation were used, as well as a nonparametric test for comparison of means for independent samples (Mann-Whitney test). For qualitative variables, relative and absolute frequency measures were used, along with an association test (Pearson’s chi-square test) to verify the dependence between variables. A confidence level of 95% was used in all cases.

The probability of one group compared to another was defined by the association measure Prevalence Ratio (PR), an indicator that allows identification of the magnitude of the association between exposure and outcome. Thus, it enables quantification of the strength of the association between the analyzed variables, with PR values > 1 indicating a significant increase in the prevalence of the event among exposed individuals (risk factor), while values < 1 suggest a protective effect.

3. RESULTS

The sample consisted of 804 older adults, with a mean age of 73.07 ± 7.73 years. Among the participants, 62.7% (504) were women and 37.3% (300) were men. For analytical purposes, the sample was divided into two groups: sedentary older adults, who represented 68.2% (548) of the population, and those who reported practicing physical exercise for at least 150 minutes per week, corresponding to 31.8% (256). Table 1 illustrates the relationship between sociodemographic data and the practice of physical exercise. It was observed that women, older adults aged 80 years or over, and those without a partner showed higher rates of sedentary behavior.

Table 1- Relationship between sociodemographic conditions and physical exercise practice

Comparison Variables		Sedentary N(%)	Physical exercise N(%)	Significance N(%)	Confidence Interval N(%)
Sex	Female	361 (71.6)	143 (28.4)	**0.006***	1.53 (1.13-2.07)
	Male	187 (62.3)	113 (37.7)		
Age Group	80 or more	129 (78.2)	36 (21.8)	**0.002***	1.89 (1.26-2.82)
	60 to 79 years	419 (65.6)	220 (34.4)		
Marital Status	Without a partner	246 (72.8)	92 (27.2)	**0.017***	1.45 (1.07-1.97)
	With a partner	302 (64.8)	164 (35.2)		
Education	From 0 to 4 years	300 (70.8)	124 (29.2)	0.095	1.29 (0.96-1.73)
	5 years or more	248 (65.3)	132 (34.7)		
Family Income	< 3 minimum wages	458 (69.0)	296 (31.0)	0.146	1.35 (0.901-2.010)
	> 3 minimum wages	76 (62.3)	46 (37.7)		

Notes: *Pearson's chi-square test value, p <0.05.

Source: Prepared by the author (2025)

Table 2 shows the correlation between clinical conditions and physical exercise practice. The presence of statistically significant differences was observed between hypertensive older adults and those presenting multiple comorbidities. In particular, it was found that the likelihood of an older adult being hypertensive increased by 63%, while the likelihood of presenting multiple comorbidities increased by 83% among sedentary individuals compared to those who engage in regular physical exercise.

Table 2 - Relationship between clinical conditions and physical exercise practice

Comparison Variables		Sedentary N(%)	Physical exercise N(%)	Significance N(%)	Confidence Interval N(%)
SAH	Yes	432 (70.8)	178 (29.2)	**0.004***	1.63 (1.17-2.28)
	No	116 (59.8)	78 (40.2)		
DM	Yes	187 (69.3)	83 (30.7)	0.634	1.08 (0.787-1.481)
	No	361 (67.6)	173 (32.4)		
Multiple Comorbidities	Yes	56 (78.9)	15 (21.1)	**0.042***	1.83 (1.013-3.300)
	No	492 (67.1)	241 (32.9)		
Polypharmacy	Yes	214 (70.4)	90 (29.6)	0.289	1.18 (0.868-1.609)
	No	334 (66.8)	166 (33.2)		

Notes: DM – Diabetes mellitus; SAH – Systemic arterial hypertension. * $p < 0.05$ in Pearson's chi-square test.

Source: Prepared by the author (2025).

Table 3 presents the relationship between functional capacity and physical exercise practice. It was possible to observe statistically significant differences in all analyzed variables. Sedentary older adults showed an increased probability of 168% of presenting impaired functional capacity, 79% for a history of recent falls, 274% for the inability to shop independently, 251% for the inability to manage their finances, 126% for the inability to perform household tasks, and 168% for the inability to bathe independently.

Table 3 - Relationship between functional capacity and physical exercise practice

Comparison Variables		Sedentary N(%)	Physical exercise N(%)	Significance N(%)	Confidence Interval N(%)
Functional Capacity	Yes	189 (81.8)	42 (18.2)	<0.001*	2.68 (1.84-3.90)
	No	359 (62.7)	214 (37.3)		
History of falls	Yes	118 (77.6)	34 (22.4)	0.005*	1.79 (1.18-2.71)
	No	430 (66.0)	222 (34.0)		
Shopping independently	Yes	148 (86.5)	23 (13.5)	<0.001*	3.74 (2.34-5.98)
	No	400 (73.2)	233 (36.8)		
Manage finances independently	Yes	104 (86.7)	16 (13.3)	<0.001*	3.51 (2.02-6.08)
	No	444 (64.9)	240 (35.1)		
household tasks independently	Yes	108 (81.2)	25 (18.8)	<0.001*	2.26 (1.42-3.60)
	No	440 (65.6)	231 (34.4)		
Bathe independently	Yes	54 (84.4)	10 (15.6)	0.004*	2.68 (1.34 – 5.37)
	No	494 (66.8)	246 (33.2)		

Notes: * *p < 0,05* in Pearson's chi-square test. sign: significance level

Source: Prepared by the author (2025).

A comparison of mean IVCF-20 scores was also performed, in which the sedentary group presented a mean of 11.11 ± 8.31 points (95% CI 10.40–11.80), while older adults who practiced physical exercise presented a mean of 7.33 ± 6.32 points (95% CI 6.55–8.11), with a statistically significant difference observed (p<0.001). Despite this difference, both groups were classified as having moderate risk of clinical-functional vulnerability according to the scale classification.

4. DISCUSSION

This study's results allow us to state that physical exercise practice is related to clinical-functional condition. A significant relationship was observed between sedentary behavior and the diagnosis of SAH, presence of multiple comorbidities, functional incapacity (both for IADL and BADL), and higher occurrence of falls. Moreover, it was identified that women, older adults aged 80 years or over, and those without partners presented higher levels of sedentary behavior.

A study involving 14,761 volunteers from countries such as the United Kingdom, Australia, Denmark, Finland, and the Netherlands showed that replacing only five minutes per day of sedentary behavior with physical activities — such as running or cycling — can modestly reduce blood pressure [11]. Longer sessions, between 10 and 20 minutes daily, were associated with a reduction of approximately 10% in the risk of cardiovascular diseases. In this study, this association was also observed, since physically active older adults showed a 63% lower likelihood of being hypertensive compared to sedentary individuals, reinforcing the protective role of exercise on the cardiovascular system.

In the Brazilian context, the Brazilian Guidelines on Arterial Hypertension of 2025 [12] highlight that encouraging regular physical exercise is essential for the control and prevention of arterial hypertension. According to the Brazilian Society of Hypertension, aerobic activities such as walking, cycling, swimming, or dancing, performed for about 30 minutes at moderate intensity on most days of the week, promote average reductions of 2 to 5 mmHg in systolic blood pressure and 1 to 4 mmHg in diastolic blood pressure, in addition to reducing cardiovascular risk by up to 30%. This benefit also extends to risk groups, such as obese and pre-hypertensive individuals, reinforcing the role of physical exercise as an essential public health strategy. The Brazilian Guideline on Cardiovascular Rehabilitation [13] complements that performing 150 minutes of aerobic activity per week, combined with resistance exercises, contributes to blood pressure control and improvement of functional capacity. Similarly, in this study, active participants presented better functional performance in the IVCF-20, which demonstrates that regular exercise, even at moderate intensity, is directly associated with the preservation of functionality.

Physical exercise practice also proved to be important for the management of multimorbidity, especially among older adults, contributing significantly to quality of life, physical function, and mental health. Structured exercise programs, with an average duration of 13 weeks, promote significant improvements in quality of life and physical function, in addition to reducing depressive symptoms, without an increase in adverse events, which highlights the safety and benefits of this intervention [14]. These data are directly related to this study's results, in which sedentary behavior increased the probability of multimorbidities by 83%, showing that the regular practice of physical activity acts as a protective clinical factor. At the population level, it is known that 75.3% of older adults with multimorbidities do not practice physical activities, with emphasis on the associations between hypertension and high cholesterol (31.3%), hypertension and stroke (30.9%), and hypertension and diabetes (23.3%) [14]. Therefore, these results reinforce the urgency of encouraging exercise in this population for better management of chronic conditions.

Functional incapacity, one of the main consequences of sedentary behavior, constitutes one of the greatest challenges of population aging [14]. Experimental studies have shown that regular physical exercise improves muscle strength, balance, and mobility, preventing falls and loss of functional independence. In one of these studies, core muscle training in older adults aged between 65 and 70 years resulted in a significant improvement in strength and postural stability [15]. Similarly, the data from this study showed that sedentary older adults had nearly three times greater likelihood of functional decline and a 79% higher likelihood of a history of falls, confirming that regular exercise is a determinant for maintaining autonomy and balance in older adults.

Experimental data confirmed that this type of training can substantially improve static balance capacity on uneven surfaces, reducing the incidence of accidental falls. The core muscles involved in balance and postural stability include the pelvic girdle complex, hips, abdominal muscles, spinal muscles, quadriceps femoris, and biceps femoris, which were strengthened by the exercises proposed in the study. These findings corroborate that core training can correct imbalance resulting from instability of the center of gravity in older adults. Thus, the effectiveness of core training in improving functional fitness and balance in older adults reinforces the relevance of physical exercise in mitigating the negative effects of aging, such as functional impairment [15,16].

RELATIONSHIP BETWEEN PHYSICAL EXERCISE WITH CLINICAL CONDITIONS AND FUNCTIONAL CAPACITY IN OLDER ADULTS

Functional capacity of older adults who practice physical exercise is visibly superior compared to those who do not. Thus, it is important to highlight that the findings show a strong relationship between physical exercise, good physical fitness, and the functional capacity of older adults. In this context, these results have also been observed in other studies through cross-sectional and longitudinal analyses; the study demonstrated that higher levels of physical activity are associated with better performance in (BADL) [17]. These BADL include essential and basic tasks that older adults perform to take care of themselves on a daily basis, such as bathing independently, dressing, eating independently, brushing their teeth, and moving without external assistance. Furthermore, the same study found that physical exercise also contributes to the performance of IADL. These activities, which are more complex, require greater cognitive and organizational ability, including tasks such as shopping and managing finances.

In this sense, the relationship between improved quality of life in older adults who practice physical exercise compared to sedentary individuals becomes evident. Furthermore, this inability to perform daily activities may further reduce the mobility of older adults, decreasing their muscle mass and leading to conditions of sarcopenia, which, in addition to affecting patient mobility, are also responsible for producing psychological problems, as observed in a study conducted in 2020 with Thai older adults [18].

Furthermore, an important difference was observed between profiles of physical activity practice according to sex, age, and marital status. Women showed a higher prevalence of sedentary behavior, which may be related to social and cultural factors that hinder access to spaces for exercise practice [19]. Among older adults aged 80 years or over, inactivity was more frequent, probably due to the presence of chronic diseases, sarcopenia, and mobility limitations [20]. Among older adults without a partner, sedentary behavior may be explained by the lack of encouragement, companionship, or perceived safety [21]. These factors are consistent with the results observed in the present sample, in which these three groups showed the highest rates of physical inactivity.

On the other hand, it is important to consider methodological aspects that may influence the internal validity of the results. The cross-sectional design, although appropriate for identifying associations, does not allow the establishment of cause-and-effect relationships between variables. Another relevant point concerns the use of self-reported information regarding physical exercise practice, which may be subject to recall bias or social desirability bias. However, these potential biases were minimized through in-person data collection and the standardization of questionnaires, conducted by trained researchers. The use of validated instruments, such as the Clinical-Functional Vulnerability Index-20 (IVCF-20), also contributes to the consistency and reproducibility of the information obtained, strengthening the reliability of the analyses.

In summary, the results obtained confirm that physical exercise plays a central role in maintaining the clinical and functional health of older adults, preventing chronic diseases, preserving independence, and reducing the risk of falls. Considering that sedentary behavior was more frequent among vulnerable groups, such as women, older adults, and those without partners, it is essential that primary health care develops actions targeted at these profiles, promoting the safe and regular practice of physical activities. Finally, although the cross-sectional design limits causal inferences, this study contributes by demonstrating, based on local data, that physical exercise is strongly associated with the preservation of functionality and the reduction of unfavorable clinical conditions in the older population.

5. CONCLUSION

In conclusion, this study provides evidence that the physical exercise practice is related to clinical-functional condition. This relationship reinforces the role of physical exercise as an essential non-pharmacological strategy in promoting health and preventing functional decline related to aging. It was observed that physically active individuals showed less impairment in clinical parameters and greater independence in activities of daily living. These findings corroborate the literature that identifies sedentary behavior as a risk factor for chronic diseases and functional decline in older adults. From this perspective, it is recommended that future research include larger samples and longitudinal analyses to investigate the specific effects of different modalities and intensities of exercise on clinical and functional conditions in this population.

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RELATIONSHIP BETWEEN PHYSICAL EXERCISE WITH CLINICAL CONDITIONS AND FUNCTIONAL CAPACITY IN OLDER ADULTS

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