POSTURAL BALANCE, MUSCLE STRENGTH, AND FALL RISK IN ELDERLY WITH CHRONIC OSTEOMYARTICULAR DISEASE OSTEOMUSCULOSKELETAL

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SUMMARY

Longevity brings new challenges that demonstrate the importance of healthy aging and the inclusion of the elderly in society. However, many elderly people find it difficult to maintain their ability to move autonomously and safely, thus, the restriction of mobility can cause various undesirable consequences, such as an increased risk of falls and loss of independence. Thus, the objective of the study is to verify the relationship between lower limb muscle strength, postural balance, and the risk of falls in elderly individuals with osteomyoarticular diseases. This is a cross-sectional analytical observational study. The study population consisted of 106 elderly individuals regularly enrolled at UniAPI, of which only 60 met the inclusion criteria. Sociodemographic information was collected and assessments were conducted on the incidence of falls, muscle strength, and static balance. In addition, the sit-to-stand test was used to assess lower limb muscle strength, and the Sway protocol on the force platform was used to verify static balance. The study demonstrated that those without knee osteomyoarticular disease perform more repetitions in the sit-to-stand test than those with osteomyoarticular disease, concluding that the risk of falls in the elderly with osteomyoarticular diseases is a concerning factor, and should be addressed through preventive measures aimed at improving bodily instability.

Keywords: Elderly; falls; postural balance; osteoarthritis.

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Introduction

Population aging is on the rise globally, with a 57.4% increase in the number of elderly people in Brazil since 2010. Longevity brings new challenges, highlighting the importance of healthy aging and the social inclusion of the elderly. Mobility restrictions can result in risks such as falls and loss of independence, highlighting the need to ensure the autonomy and safety of the elderly. (SCOTT, 2021, MITCHELL; WALKER, 2020, LIMA et al., 2022).

In this way, along with senility, several changes occur in the osteomioarticular system, including loss of mineral density, reduction of muscle mass, and joint degeneration. Thus, increasing the risk of developing osteomioarticular diseases, such as osteoporosis, osteoarthritis, and other debilitating conditions, which result in chronic pain, movement limitation, and functional incapacity (FECHINE; TROMPIERI, 2012, PREVIATO et al., 2021).

The risk of falls in the elderly is influenced by the reduction of muscle strength and loss of balance (DUARTE et al., 2019), being even higher in the elderly with osteomyoarticular diseases. This can lead to fractures and loss of autonomy, negatively impacting the quality of life (TOLEDO; BARRETO; MAGNANI, 2018, PAIVA; LIMA; BARROS, 2021).

The relevance of this research lies in identifying potential risk factors for balance loss, as well as the possibility of providing valuable insights for the development of more effective interventions. Thus, the objective of the study is to verify the relationship between lower limb muscle strength, postural balance, and the risk of falls in elderly individuals with osteomyoarticular diseases.

Methodology

Analytical observational cross-sectional study conducted with elderly participants from UniAPI, at the Aquatic Park of UniEVANGÉLICA, in March 2024. The study population consisted of 106 elderly individuals regularly enrolled at UniAPI, of

which only 60 met the inclusion and exclusion criteria, elderly individuals aged 60 and above, of both sexes, who agreed to participate in the study. Elderly individuals who had amputations of lower and upper limbs above the level of the metatarsophalangeal and metacarpophalangeal joints, respectively; those using prostheses for lower and upper limbs; and those unable to walk independently and exclusively using a wheelchair were excluded from the study. Sociodemographic information, assessments on the incidence of falls and cognitive level, and a physical test of lower limb muscle strength (sit/stand) and static balance were collected. The Sit-to-Stand Test consists of the participant standing up and sitting down from a chair as many times as possible within 30 seconds, without using their upper limbs (RIKLI; JONES, 1999). For static balance, a variation of the Sway protocol on the force platform was used, which consists of standing in an orthostatic position with feet parallel and 10 cm apart, with eyes open and remaining for 30 seconds on a layer of foam on the platform (PARREIRA, 2022).

Results and discussion

The results indicate a heterogeneous sample in relation to the variables of sex and age group. The average age of the participants was 68.9 years, with a minimum of 60 years and a maximum of 88 years. Married elderly predominated (n=22; 36.6%), followed by widows (n=19; 31.7%) and those with more than 7 years of education (n=40; 66.7%). Table 1 relates lower limb strength (LLS) and fall risk in elderly individuals with osteomyoarticular diseases.

Table 1 - Relationship between lower limb strength and fall risk in elderly individuals with osteomyoarticular diseases

	Osteomyoarticular Disease	N (average)	Standard Deviation	p
Sit Stand	Yes	29 (8,76)	2,923 (0,543)	0,005
	No	31 (11,00)	3,044 (0,547)	

Data expressed in absolute numbers (mean), standard deviation (standard error). The Chi-square test was used to compare continuous data.

The independent T-test showed a significant difference in the sit-to-stand test for those with any osteomyoarticular disease (M = 8.76 ± 3) compared to those without (M = 11 ± 3; t (58) = 2.905, p = .005).

Table 1 shows that elderly individuals without osteomyoarticular diseases perform more repetitions in the sit-to-stand test than those with osteomyoarticular diseases. This sit-to-stand movement is used as an indicator of functional capacity, as it is one of the most common actions in daily life, regardless of the type of pathology. In this case, the elderly without osteomyoarticular diseases performed better on the test. According to Melo et al. (2018), this tool can complement other resources to identify walking capacity, fall risk, and recovery of functional independence in these types of conditions.

Table 2 - Relationship between age and static balance

COP VEL	AGE	N	Average (DP)	P
	≤ 66	22	11,18 (3,32)	
	67 – 72	19	10,28 (2,98)	0,203
	+ 73	19	12,01 (2,41)	

Data expressed as mean (standard deviation). The ANOVA test was used to compare the groups.

The one-way ANOVA test was conducted to explore the impact of age on static balance measured through the force platform. The elderly were divided into three age groups: Group 1 - =< 66 years; 67-72 years; >73 years. For the total COP displacement, no statistical difference was observed (F (2, 57) = 1.011, p = .37) between the groups (Group 1: M = 332.46±102; Group 2: M = 301.1±71.1; Group 3: M = 338.3±82.3), as well as for the COP velocity (F (2, 57) = 1.638, p = .2; Group 1: M = 11.18±3; Group 2: M = 10.28±3; Group 3: M = 12.01±2.4).

Contradicting our results, Table 2 showed us that advanced age did not influence static balance. The study by Ferreira et al. (2019) demonstrates that body balance in the elderly becomes more compromised with age, a higher number of diseases, more falls, worse gait performance, decreased lower limb strength and mobility, presence of stroke and musculoskeletal system diseases, complaints of pain, use of walking aids, fear of falling, and lack of physical activity.

Conclusion

In this research, elderly individuals affected by some osteomyoarticular disease in the lower limb showed poorer performance in the sit-to-stand test. This deterioration reflects a reduction in the muscle strength of the lower limbs, consequently influencing postural balance and contributing to an increased risk of falls.

Acknowledgements

I thank the Evangelical University of Goiás for the encouragement of the PIBIC/UniEVANGÉLICA scholarship and for all the support during the research. Your contribution was essential for the success of our project, and we are grateful for the support provided.

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