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FUNCTIONAL CAPACITY AMONG OLDER WOMEN PRACTICING SOLO PILATES METHOD

CAPACIDADE FUNCIONAL ENTRE MULHERES IDOSAS PRATICANTES DO MÉTODO PILATES NO SOLO

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ABSTRACT: **Aim**: This study compared the functional capacity of older women practicing solo Pilates in Maringá-PR according to sociodemographic profile. **Methodology**: It was a cross-sectional study conducted with 50 older women, with an average age of 65.9±5.2 years, practicing solo Pilates at one of the city's sports centers. Functional capacity assessment was performed using the Functional Autonomy Battery from the Latin American Development Group for Maturity (GDLAM). Data analysis was conducted using Shapiro-Wilk, Mann-Whitney U, and One-Way ANOVA tests. Significance was set at $p < 0.05$. **Results**: The median functional capacity index was 29.77, indicating weak functional capacity. It was found that older women with partners performed the chair rise and house move test in less time compared to those without partners ($p = 0.025$). White older women performed the dress and undress T-shirt test in less time compared to black older women ($p = 0.010$). **Conclusions**: In conclusion, the functional capacity of the evaluated older women practicing solo Pilates exercises was considered weak. Marital status and skin color may be intervening factors in the functional capacity of these older women.
KEYWORDS: Aging. Motor activity. Pilates Method.

RESUMO: **Objetivo**: Comparar a capacidade funcional de idosas praticantes do Método Pilates solo da cidade de Maringá-PR em razão do perfil sociodemográfico. **Metodologia**: Trata-se de um estudo transversal realizado com 50 mulheres com média de idade de 65,9±5,2 anos praticantes do Método Pilates solo em um dos centros esportivos do município. A avaliação da capacidade funcional foi realizada pela bateria de testes de autonomia funcional do Grupo de Desenvolvimento Latino Americano para a maturidade (GDLAM). A análise de dados foi realizada pelos testes Shapiro-Wilk, "U" de Mann-Whitney e Anova One-Way. Foi adotada a significância de $p < 0,05$. **Resultados**: A mediana do índice de capacidade funcional foi 29,77, indicando capacidade funcional fraca. Encontrou-se que as idosas com companheiro realizaram o teste de levantar-se da cadeira e mover-se pela casa em menor tempo quando comparadas às idosas sem companheiro ($p = 0,025$). As idosas da cor branca realizaram o teste de vestir e tirar a camiseta em menor tempo quando comparadas às idosas da cor negra ($p = 0,010$). **Conclusões**: Conclui-se que a capacidade funcional das idosas avaliadas, praticantes de exercícios do Método Pilates solo, foi considerada como fraca o estado conjugal e a cor podem ser fatores intervenientes na capacidade funcional dessas idosas.
PALAVRAS-CHAVE: Envelhecimento. Atividade motora. Método Pilates.

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INTRODUCTION

Aging is an inevitable and irreversible biological process in humans, which changes cognitive and physical functions due to the degeneration of structures in the nervous and musculoskeletal systems, resulting in decreased muscle strength, balance, and motor coordination[1]. According to Coradduzza et al.[2], this process is influenced by various biopsychosocial factors. These factors are associated with age-related diseases such as neurodegenerative, cardiovascular, and metabolic diseases, among others, which negatively impact the functional capacity of older adults.

Functional capacity is related to the level of independence of older adults in performing activities of daily living (ADLs), such as preparing meals, eating, dressing, bathing, moving around, and self-care[3]. Environmental conditions and social participation also interfere with functional capacity and can affect an individual's health, partially linking to quality of life[4,5]. Additionally, physical functions such as muscle strength, mobility, balance, flexibility, and cardiovascular conditioning contribute to functional capacity; negative changes in these functions can lead to limitations in performing ADLs, increasing the risk of disability and frailty in older adults[6].

Therefore, the meta-analysis published by Lin et al.[6] highlights the importance of physical activities for "successful aging," indicating that exercise is associated with preventing the onset of age-related chronic diseases such as osteoporosis, hypertension, diabetes, stroke, and cancer. It also contributes to increased life expectancy, reduced mortality, and preservation of functional capacity, ensuring greater independence for older adults.

One form of physical exercise is the Pilates method (PM), which can be performed using equipment or on the mat. By incorporating exercises that engage both the body and mind, PM offers physical, emotional, and cognitive benefits, aiding in the prevention and treatment of musculoskeletal conditions. Significant outcomes of PM have been found to improve balance, flexibility, muscle strength, mobility, and functional capacity in older adults[7,8]. Additionally, Curi et al.[9] evaluated the effects of PM on satisfaction, happiness, and functional performance, including upper and lower body strength and mobility, respiratory function, and dynamic balance, confirming its effectiveness across all assessed indicators.

It is noteworthy that PM has gained significant popularity, especially among older adults. However, scientifically analyzing the profile of practitioners regarding functional capacity is crucial. Each individual is unique, and sociodemographic factors such as marital status and skin color may influence older adults' responses to PM. Moreover, maintaining functional capacity is critical to the quality of life in old age. Understanding how PM relates to the sociodemographic profile of older women can assist in promoting healthy and active aging.

The study seeks to fill a specific gap in the literature related to the functional capacity profile of older women who practice Pilates exercises on the mat, as few studies investigate this profile in detail. Thus, this study aimed to compare the time taken to perform functional capacity tests among older women practicing PM based on their sociodemographic profile.

The results of this study may contribute to the maintenance and improvement of functional capacity in the older population. They provide valuable evidence for implementing effective exercise programs that promote physical health and the mental and emotional well-being of older women, contributing to a more active and healthy aging process.

METHODOLOGY

The Human Research Ethics Committee of Faculdade Metropolitana de Maringá (UNIFAMMA) approved this quantitative, analytical, observational, and cross-sectional study under approval number 2.305.312.

The sample was selected through non-probabilistic convenience sampling and comprised 50 women with a mean age of 65.9±5.2 years. Older women aged 60 years and older, capable of expressing, speaking, and understanding, who practiced solo Pilates at one of the sports centers in Maringá, PR, were included. Men were not included in the study due to the predominance of women practicing this modality at the sports centers in Maringá.

The Mini-Mental State Examination (MMSE) excluded older women with possible cognitive deficits. The MMSE consists of questions grouped into seven categories: orientation to time, orientation to space, registration of three words, attention, and calculation, recall of three words, language, and visuospatial ability[10]. Cut-off scores used for exclusion by MMSE were 17 for illiterate individuals, 22 for older adults with 1-4 years of education, 24 for those with 5-8 years of education, and 26 for those with nine or more years of education. These cut-off points were based on Brucki et al.[11] criteria. Three older women scoring below the specific cut-off point for their education level were excluded.

To characterize older women, a semi-structured questionnaire consisting of questions regarding marital status, monthly income, skin color, occupational status, retirement, color, and education was used.

Functional capacity assessment was performed using the Functional Autonomy Battery from the Latin American Development Group for Maturity (GDLAM)[12], which includes the following tests: walking 10 meters (W10m), rising from a sitting position (RSP), rising from a prone position (RPP) dressing and undressing a T-shirt (DUT) and rising from a chair and moving around the house (RCMH). Each test is evaluated based on the time and seconds taken to complete it. A shorter completion time indicates better results (weak, fair, good, excellent). All tests were used to calculate the GDLAM Autonomy Index (GAI). Lower scores indicate better levels of functional capacity. The GAI was calculated as follows:

$$GAI = \frac{[(W10m + RSP + RPP + DUT \times 2] + RCMH}{4}$$

Firstly, contact was made with the Secretary of Sports (SESP) of Maringá, Paraná, to obtain authorization to conduct the research. The study followed the guidelines for research involving human subjects as outlined in Resolution 466/12 of the National Health Council. All older women signed the Informed Consent Form.

Frequency and percentage were used for categorical variables in data analysis. For numerical variables, the normality of data distribution was initially assessed using the Shapiro-Wilk test. As the data did not show a normal distribution, Median (Md) and Interquartile Range (IQR, Q1; Q3) were used to measure central tendency and dispersion. The Mann-Whitney U test (for two groups) and One-Way ANOVA (for more than two groups) were employed to compare the time taken to perform functional capacity tests across sociodemographic variables. A significance level of $p < 0.05$ was adopted.

RESULTS

The study included 50 older women practicing solo Pilates, aged between 60 and 83 years (M = 65.94; SD = 5.28). According to the results in Table 1, it was found that the majority of the older women did not have a partner (60.0%), had a monthly income of 1 to 2 minimum wages (58.0%), were of white skin color (80.0%), had inactive occupational status (64.0%), and were retired (72.0%). It was also observed that most older women had completed elementary education (58.0%).

Table1. Profile of socio-demographic characteristics of older women practicing solo Pilates in Maringá, Paraná, Brazil.

VARIABLES	*f*	%
Marital status		
With partner	20	40.0
Without partner	30	60.0
Monthly income		
Less than one minimum wage	21	42.0
1 to 2 minimum wages	29	58.0
Education		
Incomplete Elementary School	9	18.0
Complete Elementary School	29	58.0
Complete High School	12	24.0
Skin color		
White	40	80.0
Black	10	20.0
Occupational status		
Active	18	36.0
Inactive	32	64.0
Retirement		
No	14	28.0
Yes	36	72.0

Table 2 presents the descriptive analysis of the functional capacity of older women practicing solo Pilates. The median completion times for the tests were as follows: W10m = 8.36 seconds; RSP = 10.96 seconds; RCMH = 50.60 seconds; RPP = 7.63 seconds; and DUT = 8.14 seconds. The median functional capacity index was 29.77, indicating weak functional capacity.

Table 2. Descriptive analysis of the time taken to perform functional capacity tests by older women practicing solo Pilates in Maringá, Paraná, Brazil.

Functional capacity tests	Md	Q1-Q3
W10m (seconds)	8.36	7.96-9.31
RSP (seconds)	10.96	9.57-12.28
RPP (seconds)	50.60	48.15-52.97
RCMH (seconds)	7.63	6.55-8.93
DUT (seconds)	8.14	6.40-9.28
GAI (score)	29.77	28.37-31.81

Md = Median; Q1 = Quartile 1; Q3 = Quartile 3.
W10m: walking 10 meters; RSP: rising from a sitting position; RPP: rising from a prone position; DUT: dressing and undressing a T-shirt; RCMH: rising from a chair and moving around the house; GAI: GDLAM Autonomy Index.

When comparing the functional capacity tests of older women based on marital status (Table 3), a significant difference was found between the groups only in the RCMH test ($p = 0.025$). Older women with partners completed the test in less time (Md = 48.84 seconds) than those without partners (Md = 51.77 seconds). There was no significant difference between the groups in the other functional capacity tests ($p > 0.05$).

Table 3. Comparison of the time taken to perform functional capacity tests among older women practicing the solo Pilates method, according to marital status. Maringá, Paraná, Brazil.

Functional capacity tests	Marital status		*p*
	With partner	Without partner	
	Md (Q1-Q3)	Md (Q1-Q3)	
W10m (seconds)	8.49 (8.13-9.22)	8.33 (7.61-9.35)	0.692
RSP (seconds)	10.53 (8.94-12.32)	10.98 (10.11-12.35)	0.357
RPP (seconds)	48.84 (47.46-51.79)	51.77 (49.67-53.43)	0.025*
RCMH (seconds)	6.97 (5.69-8.60)	7.68 (6.75-9.24)	0.209
DUT (seconds)	7.49 (5.73-9.54)	8.29 (6.47-9.28)	0.593
GAI (score)	28.90 (28.16-31.34)	30.22 (28.97-32.08)	0.072

Md = Median; Q1 = Quartile 1; Q3 = Quartile 3.
W10m: walking 10 meters; RSP: rising from a sitting position; RPP: rising from a prone position; DUT: dressing and undressing a T-shirt; RCMH: rising from a chair and moving around the house; GAI: GDLAM Autonomy Index.

In comparing the functional capacity tests of older women based on skin color (Table 4), a significant difference was observed between the groups only in the DUT test ($p = 0.010$). This finding indicates that white older women completed the test in less time (Md = 7.49 seconds) than black older women (Md = 9.76 seconds). There was no significant difference between the groups in the other functional capacity tests ($p > 0.05$).

Table 4. Comparison of the time to perform functional capacity tests among older women practicing the solo Pilates method based on skin color. Maringá, Paraná, Brazil.

Functional Capacity Tests	Skin Color		*p*
	White	Black	
	Md (Q1-Q3)	Md (Q1-Q3)	
W10m (seconds)	8.36 (7.63-9.27)	8.74 (8.29-9.33)	0.436
RSP (seconds)	10.82 (9.52-12.26)	11.32 (10.11-12.43)	0.558
RPP (seconds)	50.32 (47.81-52.72)	52.22 (47.69-53.43)	0.451
RCMH (seconds)	7.26 (6.39-9.15)	8.19 (7.09-8.59)	0.511
DUT (seconds)	7.49 (6.21-8.67)	9.76 (8.43-10.53)	0.010*
GAI (score)	29.17 (28.22-31.67)	31.45 (29.53-32.33)	0.087

Md = Median; Q1 = Quartile 1; Q3 = Quartile 3.
W10m: walking 10 meters; RSP: rising from a sitting position; RPP: rising from a prone position; DUT: dressing and undressing a T-shirt; RCMH: rising from a chair and moving around the house; GAI: GDLAM Autonomy Index.

No significant difference ($p > 0.05$) was found in the completion times of functional capacity tests among older women practicing solo Pilates based on monthly income, occupational status, retirement, and education level.

DISCUSSION

The main findings of this study indicate that the functional capacity of older women was considered weak. Older women with partners demonstrated better functional capacity in the RCMH test, while white older women showed better functional capacity in the DUT test. No significant differences were found in the completion times of functional capacity tests based on monthly income, occupational status, retirement, and education level.

The weak functional capacity score (29.77) is similar to that found in the study by Mello et al.[13], which reported a score of 28.54. This low functional capacity among older women practicing solo Pilates raises concerns about unsatisfactory outcomes attributed to the method, though various hypotheses can explain this.

Solo Pilates is known for being a low-impact exercise that emphasizes body technique and control[14]. However, this intensity may not be sufficient to improve functional capacity in some older women with a reasonable physical fitness level.

Moreover, solo Pilates tends to focus on a limited range of movements and positions[15,16], which may not adequately address all aspects of functional capacity, such as strength, cardiovascular endurance, and flexibility. Additionally, each person has unique needs and levels of physical conditioning. Solo Pilates may not be personalized enough to meet the specific needs of each older woman, resulting in limitations in their functional capacity.

It is important to note that health status, age, and medical conditions can vary significantly among older women. Some may face health challenges that impact their functional capacity regardless of the type of exercise they practice.

It was found that older women with partners completed the RCMH test in less time compared to those without partners, indicating better performance. Single or widowed older individuals are often associated with moderate to severe family dysfunction, with the absence of a partner potentially leading to higher risks of comorbidities and falls, thereby impacting their functional capacity[17,18]. This underscores the idea that having a partner can provide moral support and motivation for older people, encouraging them with incredible determination and confidence throughout the day. Loneliness and social isolation can also hurt a person's health and well-being. The presence of a partner can provide companionship and a sense of belonging, which can improve the older adult's disposition.

In the DUT test, white older women completed the test in less time than black older women. A variety of complex factors can influence differences in physical performance between ethnicities. There may be economic disparities among different ethnic groups, with White older women having greater access to financial resources[19,20]. This could result in easier-to-wear clothing, such as higher-quality garments or those specifically designed to facilitate dressing and undressing.

Differences in physical activity levels and active aging practices can also affect functional capacity. Older women from different ethnic groups may have varying levels of participation in exercise programs or physical activities that influence their agility and mobility[21]. Disparities in access to healthcare and quality can also affect health and mobility[22], influencing performance in the test.

In a review conducted by Gomes et al.[23], it was found that white older individuals have greater autonomy compared to non-White individuals, particularly concerning decision-making regarding their health, which was associated with cultural aspects. Autonomy is indirectly related to the older adult's ability to perform ADLs, influencing their independence.

Finally, no significant differences were found in the time to complete the functional capacity tests based on monthly income, occupational status, retirement, and education. Older individuals often develop adaptive skills to cope with the loss of strength and flexibility of aging. This may allow them to perform functional capacity tests with similar performance, regardless of their income, occupational status, retirement, or education. The desire to maintain good functional capacity can be a powerful motivator for older individuals, irrespective of their income or occupation[24]. Intrinsic motivation to maintain independence and quality of life can outweigh other socioeconomic factors[25].

We emphasize that the sample of older individuals may be heterogeneous concerning these socioeconomic variables, which could reduce statistical power to detect significant differences. In other

words, wide variation within each category may make detecting differences challenging. Functional capacity tests may not be sensitive enough to detect slight variations related to income, occupation, retirement, or education. Furthermore, other uncontrolled factors in statistical analysis, such as lifestyle, underlying medical conditions, and social support, may play a significant role in functional capacity and mask any differences related to income, occupation, retirement, or education.

This study can motivate further research to investigate the underlying causes of differences in functional capacity related to marital status and ethnicity, providing additional insights to develop more effective intervention strategies.

CONCLUSION

Consequently, the functional capacity of the evaluated older women who practice solo Pilates exercises was considered weak. Marital status and ethnicity may be intervening factors in these older women's functional capacity.

The study findings may encourage healthcare professionals and physical trainers to offer more personalized exercise interventions for older women, taking into account their marital status and specific characteristics. Recognizing that skin color may influence functional capacity could lead to approaches more sensitive to ethnic diversity in promoting physical activity and Pilates exercises. This may include culturally adapted or ethnically sensitive programs.

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