Sociodemographic profile, index of functional autonomy and physical activity level of elderly women[1]

Perfil sociodemográfico, índice de autonomía funcional y nivel de actividad física de las ancianas

Perfil sociodemográfico, índice de autonomia funcional e nível de atividade física de idosas

[Research Article]

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Abstract

To analyze the sociodemographic profile, functional autonomy index and level of physical activity of elderly women participating in an exercise program. 372 elderly women participating in the *MASTERFITTS* program and completed questionnaires regarding medical history and the adapted Baecke questionnaire to assess the level of physical activity in elderly. Tests from the GDLAM protocol were performed to evaluate functional autonomy. 51.61% were physically active ($\overline{X} = 2.68 \pm 0.49$; $\Delta\% = 1.09$), and the majority achieved a good classification in the tests and overall functional autonomy index. A significant difference was found in the W10m test ($p= 0.041$; $\Delta\% = -0.89$), RSP ($p= 0.024$; $\Delta\% = -1.90$), and RVDP ($p= 0.032$; $\Delta\% = -1.20$) between the active and sedentary groups. An increase in the level of physical activity will also lead to a decrease in the completion times of the functional autonomy assessment tests, contributing to improved health.

Keywords: personal autonomy, aged, physical exercise, health profile, functional physical performance.

Resumen

Analizar el perfil sociodemográfico, el índice de autonomía funcional y el nivel de actividad física de ancianas participantes de un programa de ejercicio. 372 ancianas participantes del programa MASTERFITTS respondieron cuestionarios sobre antecedentes médicos y un cuestionario de Baecke adaptado para evaluar el nivel de actividad física en ancianas. Se realizaron pruebas del protocolo GDLAM para evaluar la autonomía funcional. El 51.1% eran físicamente activos ($\bar{X} = 2.68 \pm 0.49$; $\Delta\% = 1.09$), y la mayoría obtuvo una buena clasificación en las pruebas y en el índice general de autonomía funcional. Se encontró diferencia significativa en la prueba C10m ($p= 0.041$; $\Delta\% = -0.89$), LPS ($p= 0.024$; $\Delta\% = -1.90$) y LPDV ($p= 0.032$; $\Delta\% = -1.20$) entre activos y sedentarios grupos. El aumento del nivel de actividad física también puede conducir a la disminución de los tiempos de realización de las pruebas de evaluación de la autonomía funcional, contribuyendo para la mejora de la salud.

Palabras clave: autonomía personal, anciano, ejercicio físico, perfil de salud, rendimiento físico funcional.

Resumo

Analisar o perfil sociodemográfico, índice de autonomia funcional e nível de atividade física de idosas participantes de programa de exercícios. 372 idosas participaram do programa MASTERFITTS e responderam ao questionário sobre histórico médico e o questionário Baecke adaptado para avaliar o nível de atividade física em idosos. Foram realizados testes do protocolo GDLAM para avaliar a autonomia funcional. 51.61% eram fisicamente ativos ($\bar{X}$= 2.68±0.49; Δ% = 1.09), e a maioria obteve boa classificação nos testes e índice geral de autonomia funcional. Foi encontrada diferença significativa no teste C10m (p= 0.041; Δ% = -0.89), LPS (p= 0.024; Δ% = -1.90) e LPDV (p= 0.032; Δ% = -1.20) entre os ativos e sedentários. O aumento do nível de atividade física levará também à diminuição dos tempos de realização dos testes de avaliação da autonomia funcional, contribuindo para a melhoria da saúde.

Palavras-chave: autonomia pessoal, idoso, exercício físico, perfil de saúde, desempenho físico funcional.

Introduction

With the aging of the population and the increase in global life expectancy, the elderly segment has become the fastest-growing age subgroup in the world. However, this fact raises concerns about the increasing prevalence of frailty and functional dependence, as well as rising healthcare costs. Additionally, there are several age-related changes in the body that contribute to this phase of life (Mendonça et al., 2020).

Aging is a natural process associated with numerous changes in different biological systems, such as reduced muscle strength, decreased lean mass and bone mineral density, and concomitant increases in body fat, which collectively can negatively affect the health and physical fitness functioning of older individuals, regardless of the presence or absence of diseases (Graça et al., 2022; Palencia-Flórez et al., 2021; Sousa et al., 2021).

Neuromuscular, cardiovascular, and metabolic impairments are some examples of changes that can lead to a scenario conducive to the development of diseases, lower quality of life, and increased risk factors for mortality (Graça et al., 2022; Palencia-Flórez et al., 2021; Rodríguez y Barón, 2019).

In this context, physical activity programs have been prioritized and implemented in the Unified Health System, with the aim of expanding and improving primary healthcare, contributing to the promotion of health and quality of life, as well as increasing levels of physical activity and socialization, and being associated with balance control benefits (Vieira et al., 2022).

However, despite the existence of programs that contribute to improving the quality of life of this population, some elderly individuals still face difficulties in performing activities, as other factors take priority in addition to functional and psychological difficulties. Factors such as stress and symptoms of chronic diseases are directly associated with these difficulties. It is worth noting that some of these chronic diseases are more prevalent in elderly women and contribute to higher rates of disability (Sousa et al., 2021; Souza et al., 2022; Palencia-Flórez et al., 2021; Rodríguez y Barón, 2019).

Given this, it is considered important to define the health profile of these elderly individuals, including sociodemographic characteristics, activity level, and functional capacity. Therefore, the objective of this research was to analyze the sociodemographic profile, functional autonomy and level of physical activity of elderly women participating in

an exercise program, while also comparing functional autonomy between active and sedentary individuals.

Methods

This is a cross-sectional study with a descriptive and quantitative approach (Thomas, Nelson & Silverman, 2012).

The data used in this study were obtained from the diagnostic evaluation of the *MASTERFITTS* project, which aims to provide a supervised physical exercise program for health and well-being.

The participants were elderly individuals recruited during visits to the Basic Health Units in the following neighborhoods of Aracaju, Sergipe, Brazil: Aeroporto, Atalaia, Coroa do Meio, Farolândia, Inácio Barbosa, and Jardins.

The participants were asked to come to the Laboratory of Human Motor Biociences with the following documents: 1) Medical certificate authorizing them to engage in physical exercise; 2) Referral from their respective Basic Health Unit; 3) Identification and Individual Taxpayer Registry (CPF) documents.

The selection criteria were: being 60 years old or older and committing to participate in a physical exercise program by signing an informed consent form, having the ability to walk, and not having motor limitations or comorbidities that would prevent participation in the exercises.

After applying these criteria, 372 elderly women participated in the study.

Data collection took place in August 2022. Initially, a medical history was taken to characterize the participants' sociodemographic profile. The physical activity level questionnaire was also administered, followed by tests to assess functional autonomy.

To determine the physical activity level of the participants, the adapted Baecke questionnaire for habitual physical activity in older adults was used. This instrument consists of questions that should be answered considering the past 12 months, in relation to three domains: household activities, sports, and leisure activities (Ueno, 2013).

To analyze the total score of the physical activity level calculated by the questionnaire, the second quartile, or median, of the sample was used as the dividing point,

identified as 2.01 (score). Thus, all scores below this value were classified as sedentary, while equal to or above this value were classified as active.

To assess functional autonomy, the protocol developed by the Latin American Development Group for Maturity (GDLAM) was used. This protocol evaluates the functional autonomy of older adults through a battery of five tests: walking 10 meters (W10m), rising from the sitting position (RSP), Rising from ventral decubitus position (RVDP), putting on and taking off a t-shirt (PTTs), and sitting and rising from a chair and walking around the house (SRCW). These tests are combined in the following formula to calculate the general index of functional autonomy (GI) (Dantas et al., 2014):

$$GI: \frac{[(W10m+RSP+RVDP+PTTs) *2] +SRCW}{4}$$

All tests are measured in seconds, and there are reference times for each test, appropriate for each age group, as well as for the GI (score). Table 1 presents the age classification for each test and the GI (Dantas et al., 2014).

Table 1. Classification of the functional autonomy of elderly people (≥ 60 years).

Tests	Age (years)	Very Good	Good	Regular	Insufficient
W10m (s)	(60-64)	< 5.52	5.52 - 7.04	7.05 - 8.92	> 8.92
	(65-69)	< 5.67	5.67 - 7.21	7.22 - 9.04	> 9.04
	(70-74)	< 5.83	5.83 - 7.38	7.39 - 9.16	> 9.16
	(75-79)	< 5.98	5.98 - 7.56	7.57 - 9.28	> 9.28
	(≥ 80)	< 6.14	6.14 - 7.73	7.74 - 9.40	> 9.40
RSP (s)	(60-64)	< 6.84	6.84 - 10.12	10.13 - 13.62	> 13.62
	(65-69)	< 6.91	6.91 - 10.19	10.20 - 13.72	> 13.72
	(70-74)	< 6.97	6.97 - 10.26	10.27 - 13.81	> 13.81
	(75-79)	< 7.04	7.04 - 10.33	10.34 - 13.91	> 13.91
	(≥ 80)	< 7.11	7.11 - 10.40	10.41 - 14.01	> 14.01
RVDP (s)	(60-64)	< 2.30	2.30 - 3.52	3.53 - 5.41	> 5.41
	(65-69)	< 2.47	2.47 - 3.81	3.82 - 5.80	> 5.80
	(70-74)	< 2.63	2.63 - 4.11	4.12 - 6.20	> 6.20
	(75-79)	< 2.80	2.80 - 4.40	4.41 - 6.60	> 6.60
	(≥ 80)	< 2.96	2.96 - 4.70	4.71 - 6.99	> 6.99
PTTs (s)	(60-64)	< 8.22	8.22 - 11.45	11.46 - 15.51	> 15.51
	(65-69)	< 8.75	8.75 - 12.00	12.01 - 16.04	> 16.04

	(70-74)	< 9.29	9.29 - 12.54	12.55 - 16.56	> 16.56
	(75-79)	< 9.83	9.83 - 13.08	13.09 - 17.08	> 17.08
	(≥ 80)	< 10.36	10.36 - 13.63	13.64 - 17.60	> 17.60
SRCW (s)	(60-64)	< 35.17	35.17 - 42.37	42.38 - 49.68	> 49.68
	(65-69)	< 35.96	35.96 - 43.28	43.29 - 50.81	> 50.81
	(70-74)	< 36.76	36.76 - 44.19	44.20 - 51.94	> 51.94
	(75-79)	< 37.55	37.55 - 45.11	45.12 - 53.06	> 53.06
	(≥ 80)	< 38.35	38.35 - 46.02	46.03 - 54.19	> 54.19
GI (score)	(60-64)	< 22.28	22.28 - 27.43	27.44 - 33.01	> 33.01
	(65-69)	< 22.82	22.82 - 28.10	28.11 - 33.71	> 33.71
	(70-74)	< 23.37	23.37 - 28.77	28.78 - 34.41	> 34.41
	(75-79)	< 23.91	23.91 - 29.45	29.46 - 35.11	> 35.11
	(≥ 80)	< 24.46	24.46 - 30.12	30.13 -35.81	> 35.81

Subtitle: W10m= walking 10 meters; RSP= rising from the sitting position; RVDP= Rising from ventral decubitus position; PTTs= putting on and taking off a t-shirt; SRCW= sitting and rising from a chair and walking around the house; GI= functional autonomy index. Source: Dantas et al. (2014).

The *Microsoft Office Excel 2016*® software was used for data tabulation, as well as for presenting percentages, mean, standard deviation, maximum and minimum values of the results, and calculation of body mass index and IG from the GDLAM protocol.

The research also utilized the *BioStat 5.3*® software, adopting a significance level of $p<0.05$ with a 5% error rate. Descriptive statistics were performed using mean, standard deviation, maximum and minimum values. Normality of the data was assessed using the Kolmogorov-Smirnov test, and the independent samples t-test was used to compare the variables of the GDLAM protocol between the active and sedentary groups.

The study complied with Resolution 466/12 of the National Health Council, dated December 12, 2012, which establishes the guidelines for conducting Research with Human Subjects. As a preliminary measure, approval was obtained from the Coordination of the Center for Continuing Health Education to allow access to the Basic Health Units. Subsequently, each unit received an Institutional Information Statement, specifying all procedures, risks, and precautions.

Each participant voluntarily expressed their consent by signing the Informed Consent Form, which included a thorough explanation of the risks and benefits, as well as the social

relevance of the research with advantages for the study subjects, particularly the elderly individuals.

The research was preliminarily approved by the Ethics Committee on Research with Human Subjects of Tiradentes University on March 26, 2020, according to legal opinion nº 3,936,886 - CAAE: 26524719.4.0000.5371.

Results

Table 2 presents the descriptive data for the variables age, weight, height, body mass index (BMI), and functional autonomy index (GI) of the participants, including mean values, standard deviations, maximum and minimum numbers.

Table 2. Descriptive data of age, weight, height, body mass index and GI of functional autonomy of the volunteers.

VARIABLES	MEAN	SD	N MAX.	N MIN.
Age (years)	68.45	6.44	84.00	60.00
Weight (kg)	63.88	12.36	89.00	40.00
Height (m)	1.51	0.07	1.71	1.41
BMI (kg/m^2)	28.12	4.98	41.85	19.84
GI (score)	28.83	3.82	41.04	23.62

Subtitle: BMI – body mass index; GI – general index of functional autonomy; kg- kilograms; m- meters; SD- standard deviation; N- number; MAX.- maximum; MIN. - minimum. Source: own authorship.

Table 3 displays the sociodemographic data of the participants collected through anamnesis, presented as absolute numbers and corresponding percentages.

Table 3. Sociodemographic data of the volunteers.

SOCIODEMOGRAPHIC DATA	n = 372	
AGE GROUP	**N**	**%**
60 – 69 years	240	64.51
70 – 79 years	120	32.26
80 years or older	12	3.23
RACE		
White	132	35.48
Black	48	12.90
Mixed	192	51.62

MARITAL STATUS		
Single	168	45.16
Married	120	32.26
Widow	84	22.58
EDUCATION LEVEL		
Never studied / Incomplete Elementary School	120	32.26
Complete Primary Education	84	22.58
Complete High School	132	35.48
Graduated	36	9.68
DAILY ACTIVITY		
Take care of the family	156	41.94
Works and takes care of the family	96	35.48
Retired	132	22.58
MONTHLY FAMILY INCOME		
Up to 2 minimum wages	216	58.06
2 a 4	60	16.13
4 a 10	12	3.23
Prefer not to say	84	22.58
HISTORY OF CHRONIC DISEASES IN THE FAMILY		
Yes	288	77.42
No	84	22.58
PRE-EXISTING CHRONIC DISEASES AND USE OF CONTROLLED MEDICATION		
Have illnesses or use controlled medicine	324	87.10
Does not have illnesses or uses prescription drugs	48	12.90
STRESS SELF-CONTROL		
Terrible / Bad	72	19.35
Regular	168	45.17
Good / Excellent	132	35.48
SMOKER		
Do not smoke	348	93.55
Up to 10 cigarettes/day	24	6.45
ALCOHOLIC DRINKS / WEEK		
Do not drink	312	83.87
Up to 5 per week	60	16.13
From 5 to 9 per week	0	0,00

Subtitle: N- number of participants; %- percentage. Source: own authorship.

By analyzing the results of the GDLAM protocol tests for functional autonomy, it was possible to classify the participants for each test and for the overall IG based on the execution time of the tests and the age range. These data can be observed in Table 4, showing absolute numbers and respective percentages.

Table 4. Classification of the volunteers' functional autonomy.

GDLAM Tests	Classification	N	%
W10M (s)	Insufficient	36	9.68
	Regular	132	35.48
	Good	204	54.84
	Very Good	0	0.00
RSP (s)	Insufficient	72	19.35
	Regular	120	32.26
	Good	180	48.39
	Very Good	0	0.00
RVDP (s)	Insufficient	48	12.91
	Regular	96	25.80
	Good	192	51.61
	Very Good	36	9.68
SRCW (s)	Insufficient	36	9.68
	Regular	72	19.35
	Good	204	54.84
	Very Good	60	16.13
PTTs (s)	Insufficient	84	22.59
	Regular	96	25.80
	Good	192	51.61
	Very Good	0	0.00
GI (score)	Insufficient	24	6.45
	Regular	168	45.16
	Good	180	48.39
	Very Good	0	0.00

Subtitle: GDLAM- Latin American Development Group for Maturity; N- number of participants; %- percentage; s – seconds; W10m= walking 10 meters; RSP= rising from the sitting position; RVDP= Rising from ventral decubitus position; PTTs= putting on and taking off a t-shirt; SRCW= sitting and rising from a chair and walking around the house; GI= functional autonomy index. Source: own authorship.

The data on the division of the group based on the total score calculation for the level of physical activity indicated that 192 volunteers were active ($\overline{X}$ = 2.68±0.49) and 180 were sedentary ($\overline{X}$= 1.59±0.27), Δ% = 1.09, p = 0.0001.

Table 5 presents the results for the comparison of functional autonomy between the groups of active and sedentary elderly participants.

Table 5. Comparative assessment of functional autonomy between groups of active and sedentary volunteers.

Variables	**Active Group (n=192)**		**Sedentary Group (n=180)**		
	Mean	**SD**	**Mean**	**SD**	***p-value***
W10 m (s)	6.92	0.60	7.87	0.80	**0.041**
RSP (s)	10.11	1.81	12.01	2.10	**0.024**
RVDP (s)	3.19	0.61	4.39	0.71	**0.032**
SRCW (s)	43.42	3.54	47.41	5.20	0.088
PTTs (s)	10.72	1.69	11.05	1.78	0.667
GI (score)	27.98	2.85	29.52	3.20	0.261

Subtitle: N- number of participants; SD – standard deviation; s – seconds; W10m= walking 10 meters; RSP= rising from the sitting position; RVDP= Rising from ventral decubitus position; PTTs= putting on and taking off a t-shirt; SRCW= sitting and rising from a chair and walking around the house; GI= functional autonomy index. Bold numbers indicate a p-value <0.05. Source: own authorship.

Discussion

Table 3, which refers to the data collected in the anamnesis, shows that the highest concentration of participants was in the age group of 60 to 69 years (64.51%). It is common for younger older adults to be the majority in physical activity programs or to be more physically active, as older individuals are more likely to be affected by physical limitations due to chronic pain, for example, which diminishes their possibilities for practice (Ferretti et al., 2019; Sousa et al., 2022). Another variable that showed predominance was self-reported mixed race with 48.39%, justified by Brazil's miscegenation, where the majority (47.00%) of people in Brazil self-declare as mixed race (Instituto Brasileiro de Geografia e Estatística [IBGE], 2022a).

Regarding marital status, in the present study, the majority of the sample identified as single (45.16%). These data can be corroborated by civil registration statistics, which not only show that people, in general, are getting married less, but also that when they are

married, the duration of marriages is shorter, indicating an increase in divorce rates (IBGE, 2019).

In terms of the participants' educational attainment in the research, the majority had completed high school (35.48%), which aligns with data from the National Continuous Household Sample Survey - Education, which demonstrates that as individuals get older, their educational attainment decreases. Older adults account for 18% of the illiteracy rate in Brazil, although this percentage has been decreasing since 2016 (IBGE, 2020).

It was found that 41.94% of the evaluated sample had the occupation of taking care of the house and family on a daily basis, a common scenario among older adults, as they are represented in lower percentages in the workforce, as recorded, for example, in 2021, where older adults accounted for only 8.7% of the overall workforce. Additionally, 42.6% of the population outside the workforce in 2021 (unemployed) were older adults (IBGE, 2021). Therefore, this percentage of older adults of working age who are out of the workforce may indicate that a portion of them is likely engaged in their daily household tasks and family care.

Another point observed in the present study was the monthly family income, indicated by the majority (58.06%) as being up to 2 minimum wages, which aligns with the average monthly household income in Brazil, which is US$ 283.00 (IBGE, 2022b). This average monthly family income is concerning, as only 14.9% of households have only one resident, meaning that this average income in other households is divided among other individuals (IBGE, 2022a). Furthermore, an interesting fact is that in 2018, it was reported that 20.6% of households had at least 50% of their income coming from older adults, which corresponded on average to a 69.8% financial contribution within the household. Of these, 56.3% were pension and/or retirement income, meaning that even though older adults are out of the workforce, they still contribute significantly to monthly household income (IBGE, 2018).

Regarding chronic diseases, 77.42% reported having a family history, and 87.10% had pre-existing conditions requiring medication use. This presented scenario is justifiable, as 52% of the population aged 18 years and older have some type of chronic disease, and 74.9% of older adults have at least one chronic disease requiring continuous medication for treatment (Camarano, 2022).

Aging can lead to an increase in stress levels, which can be caused by trauma, threats, difficulty in adaptation, tragedies, or other internal and external factors that can trigger stress and its associated health implications, such as anxiety and depression. In this sense, it is important for older adults to work on their self-control so that they can reduce or mitigate the emotional impact caused by stress-inducing situations (Moura, 2021). In relation to this, in the present study, the majority of older women reported that they considered their level of stress self-control to be regular (45.16%), followed by good/excellent (35.48%). However, there is still room for improvement, as controlling stress, through practices such as regular physical activity, is important for the prevention, promotion, and/or maintenance of various health variables.

Regarding smoking and alcoholism, it was found that 93.55% were non-smokers and 83.87% did not consume alcoholic beverages, data supported by a study (Barbosa et al., 2018) that also identified a low prevalence of these types of consumption among the evaluated older adults, which is relevant considering that the use of these substances, especially when combined, is associated with health problems and a lower quality of life.

Regarding the assessment of functional autonomy, it was possible to observe that the majority of participants had a good classification in the tests (C10M - 54.84%; LPS - 48.39%; LPDV - 51.61%; LCLC - 54.84%; VTC - 51.61%) and IG (48.39%). Participants in a study (Sousa et al., 2022) also underwent an evaluation of functional performance, revealing that 43.7% of older adults showed low functional physical performance, which contradicts the findings of the present study and may be associated with the more active lifestyle of the population surveyed.

Although the level of physical activity was found to be higher among active older women (51.61%), this percentage is not significant when compared to sedentary individuals (48.39%). However, these results are organized in this way because the median of the calculated scores was used as a cutoff point. Furthermore, since this evaluation was conducted prior to the start of an exercise program, some volunteers had no prior practice, while others had already participated in the program in the previous semester. In this regard, studies (Sousa et al., 2022; Vieira et al., 2022; Christoph et al., 2017; Grace et al., 2021; L'Gamiz-Matuk et al., 2014) affirm that the level of physical activity is directly related to the level of functional physical performance.

In the comparison between the variables of the GDLAM protocol for the groups of active and sedentary older women (Table 5), it was found that the C10m test ($p= 0.041$; $\Delta\% = -0.89$), LPS test ($p= 0.024$; $\Delta\% = -1.90$), and LPDV test ($p= 0.032$; $\Delta\% = -1.20$) showed statistically significant differences, indicating that more active individuals have better performance in activities of daily living that rely on lower limb strength, which is the most demanding physical capacity among these tests. However, these three tests in the protocol rely less on coordination, balance, and agility. Higher levels of physical activity will also lead to better functional physical performance, highlighting the importance of regular participation of older adults in physical activity programs (Sousa et al., 2022; Vieira et al., 2022; Christoph et al., 2017; Grace et al., 2021; L'Gamiz-Matuk et al., 2014).

Limitations of this study include the lack of inclusion of more health variables to be evaluated, which could contribute to the generalization of the presented data and the characterization of the health profile of older women participating in the exercise program. Therefore, it is suggested that future research includes the evaluation of additional variables.

Conclusion

The participants in this study were mostly in the age range of 60 to 69 years old, self-reported mixed-race ethnicity, single, with a high school education, engaged in daily household and family care, with a monthly family income of up to 2 minimum wages, having a family history of chronic diseases and pre-existing conditions, using medications, reporting regular levels of stress self-control, being non-smokers and non-alcohol consumers. Additionally, the majority had good classification in all tests and the functional autonomy index (IG). In terms of comparing the variables of the GDLAM protocol, only the C10m, LPS, and LPDV tests showed statistically significant differences in favor of the active group.

Overall, the obtained data suggest that with an increase in the level of physical activity, variables such as stress control and reduced completion times in the GDLAM protocol tests tend to undergo significant positive changes, converging towards the maintenance and/or improvement of multiple health variables. Therefore, the importance of regular participation of this population in physical activity programs is emphasized.

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