SOCIODEMOGRAPHIC AND HEALTH FACTORS ASSOCIATED WITH FUNCTIONAL FITNESS IN OLDER WOMEN FROM A PHYSICAL ACTIVITY PROGRAM IN SOUTHERN BRAZIL

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abstract

Aim: The purpose of the present study was to investigate the association of sociodemographic (skin color, socioeconomic level, educational level, occupational and marital status) and health (high blood pressure, self-reported health problems, use of medicines and health perception), with the functional fitness in older women from a physical activity program. Methods: This cross-sectional study investigates sociodemographic and health variables assessed by questionnaires and the association with functional fitness measured with the "Senior Fitness Test". Statistical analysis used the Kruskal-Wallis test to check for differences among age groups, chi-square tests and logistic regression analyses to investigate associations between each component of functional fitness and independent variables. Results: The final sample consisted of 1,806 older women, mean age 68.93 years (SD 6.6). Sociodemographic (skin color, socioeconomic class and educational level) and health variables (high blood pressure, self-reported health problems and health perception) were associated with different components of functional fitness and the overall score of functional capacity. Conclusion: Among all the independent variables, educational level and health perception were those most correlated to functional fitness.

keywords

Aging. Functional fitness. Health in the elderly.

1 Introduction

The aging process is characterized by a series of changes in the nervous, cardiovascular and musculoskeletal system (LACOURT; MARINI, 2006). These physical changes can affect strength, range of motion and balance, and cause limitations to the individual's walking capacity, greatly affecting their capacity to perform basic everyday physical tasks independently and safely (i.e., functional fitness) (RIKLI; JONES, 1999b). These limitations are not an inevitable consequence of aging, since some people are able to keep adequate functional fitness even at old age (SULANDER et al., 2012).

Functional fitness is used as a health reference in the elderly (RIKLI; JONES, 1999a) as it is positively associated with health perception (SCHNEIDER et al., 2004; EURENIUS; STENSTRÖM, 2005), level of physical activity

(GOUVEIA et al., 2013), cardiovascular risk (OLAFIRANYE et al., 2012) and mortality (SUI et al., 2007). It has often been evaluated in population studies with the elderly (RIKLI; JONES, 1999b; FIEDLER; PERES, 2008), as well as in various environments, such as nursing homes (GOUVEIA et al., 2013; ARIAS--MERINO et al. 2012), hospitals and health centers (EURENIUS; STENSTRÖM, 2005; SANTOS; GRIEP, 2013).

Previous studies have found that sociodemographic aspects, such as economic status (SULANDER et al., 2012; ARIAS-MERINO et al. 2012; LAAKSONEN et al., 2009), educational level (SANTOS; GRIEP, 2013; ROSA et al., 2003), occupational status (ARIAS-MERINO et al. 2012; LAAKSONEN et al., 2009; ROSA et al., 2003), marital status (ARIAS-MERINO et al. 2012; VIRTUOSO JÚNIOR; GUERRA, 2008), skin color (DEL DUCA; SILVA; HALLAL, 2009), and health factors, such as high blood pressure (ROSA et al., 2003; VIRTUOSO JÚNIOR; GUERRA, 2008), self-reported health problems (SANTOS; GRIEP, 2013; VIRTUOSO JÚNIOR; GUERRA, 2008), regular use of medications (VIRTUOSO JÚNIOR; GUERRA, 2008; LAAN et al., 2013) and health perception (SANTOS; GRIEP, 2013; ROSA et al., 2003; VIRTUOSO JÚNIOR; GUERRA, 2008) are correlated with functional fitness in the elderly. Most of these studies used assessment scales of functional limitations (e.g., difficulty in bathing or feeding) (FIEDLER; PERES, 2008; ARIAS-MERINO et al. 2012; SANTOS; GRIEP, 2013; ROSA et al., 2003; VIRTUOSO JÚNIOR; GUERRA, 2008; DEL DUCA; SILVA; HALLAL, 2009; LAAN et al., 2013; YLITALO et al., 2013; DORYŃSKA et al., 2012) instead of assessing functional fitness through motor tests (RIKLI; JONES, 1999a). The limitations observed in functional fitness tests can be considered as a process preceding functional disability status (functional fitness); thus, the assessment of functional fitness through motor tests has been valued (SULANDER et al., 2012; LAAKSONEN et al., 2009; LOUIE; WARD, 2011; KONOPACK et al., 2008).

To our knowledge, no study has proposed to independently identify sociodemographic and health factors associated with each of the functional fitness components. One study, however, investigated the association of sex, age, and self-efficacy for exercise with functional fitness components (Chair Sit-and-Reach, Back Scratch, Chair Stand, Arm Curl, 8-Foot Up-and-Go, and VO2max) in combination representing models of flexibility and physical strength (KONOPACK et al., 2008), highlighting the association of sex for flexibility model, and sex, age, and self-efficacy for the combination of strength variables.

Thus, the objective of this study was to investigate the association of sociodemographic (skin color, socioeconomic status, education, occupational status and marital status) and health (high blood pressure, self-reported health

problems, use of medicines and health perception) variables with different components and total scores of functional fitness in a sample of older women from a physical activity program in Southern Brazil.

2 Methods

2.1 Study population and sample

Overall, 1,806 older women participants of a physical activity program in the city of Curitiba, Paraná, Brazil, participated in this study. Further details of the sample selection were verified in previous studies (VAGETTI et al., 2013a, 2013b).

2.2 Instruments and procedures

Data collection was conducted from February to July 2011. Questionnaires were answered as interviews, due to possible difficulties in reading, visual problems and illiteracy among participants. The interview and anthropometric measurements (weight and height) were performed by professionals linked to the *Research Center for Exercise and Sport*, of the Federal University of Parana. These evaluators attended training consisting of theoretical explanations and practical simulations of data collection, and were involved in a pilot study under the same conditions as the main study.

2.3 Functional Fitness Assessment

The motor tests proposed in "Senior Fitness Test" were used to evaluate the functional fitness of participants (RIKLI; JONES 1999a). Test description was shown in Table 1. All tests were performed as a circuit in order to minimize the effects of localized fatigue, and the performance of participants in these tests was recorded in individual sheets. Before starting the tests, participants performed 10-minute warm-up exercises. Rest interval between tests was of approximately 2 minutes. For familiarization with the test battery, participants had a moment for explanation and experimentation (RIKLI; JONES 1999a).

Table 1 – Description of tests comprising "Senior Fitness Test" (SFT) according to Rikli and Jones (1999a) and of the general functional fitness indicator.

Test item	Assessment category	Description
Body mass index (BMI)	BMI	Body weight to height ratio (kg/m^2), classified as normal weight (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2) and obesity (≥30 kg/m^2) according to WHO (2000)
6-min walk	Aerobic endurance	Number of meters walked in 6 minutes around 50 meters course
Arm curl	Upper body strength	Number of biceps curls in 30 seconds holding hand weight (5 lb)
30-s chair stand	Lower body strength	Number of full stands in 30 seconds with arms folded across chest
Chair sit-and-reach	Lower body flexibility	From sitting position in front of the chair, with leg extended and hands reaching toward toes, number of in. (+ or -) from extended fingers to tip of toe
Back scratch	Upper body flexibility	With one hand reaching over shoulder and one up in the middle of the back, number of in. (between) extended middle fingers (+ or -)
8-ft up-and-go	Agility/Dinamic balance	Number of seconds required to rise from seated position, walk 8 ft, turn, and return to seated position on chair
General Functional Fitness		Z-score was estimated by age for each component of functional fitness, considering the distribution of the sample

Source: Table elaborated by the authors, based on Rikli and Jones (1999a).

A general indicator of functional fitness was calculated as follows: age-specific z-score was estimated for each functional fitness component, considering the distribution of the sample itself. An average of z-score in the seven functional fitness components was calculated for each participant and it was included in data analysis as an indicator of overall functional fitness.

2.4 Potential correlates of functional fitness

The present study analyzed, through a questionnaire, five sociodemographic variables (skin color, economic class, education level, employment status and marital status) and four variables related to clinical conditions and health (self-reported health problems, blood pressure, number of medications and health perception). Information regarding age group (60-64; 65-69; 70-74; 75-79; ≥80 years); skin color (white, brown and others); marital status (single, married, separated and widow), occupational status (retired, pensioner, does not work/housewife) and educational level (incomplete elementary level, complete elementary level, high school and higher education). Economic class was assessed by a questionnaire of the Brazilian Association of Research Companies (ABEP, 2015). This questionnaire aims to estimate the family's purchasing power and the level of education of the household head, creating a score that estimates economic classes from A (best condition) to E (worst condition). Economic classes were grouped into high (A + B), intermediate (C) and low (D + E) classes.

Other medical and health conditions were reported by participants during the interview, using the following questions: *Do you have any health problems*? (No and yes); *Do you take any medications*? (None, 1 medicine, 2 medicines, 3 or more medicines); *What is your perception of health*? (Poor/fair and good/excellent).

Blood pressure was assessed on the day of collection through the use of an electronic device, Hem-6200 type *Omrom*. Each woman was assessed once with a standardized protocol (SBC, 2010) after five minutes of rest in the sitting position. Participants with systolic blood pressure ≥140 mmHg or diastolic ≥90 mmHg were considered to have high blood pressure.

2.5 Data analysis

Mean and standard deviation were used for description of functional fitness components. Categorical variables were expressed as absolute and relative frequency. Data normality was tested with the Kolmogorov-Smirnov test, indicating that none of the functional fitness components had normal distribution. Therefore, non-parametric statistical resources were chosen. Performance values in each functional fitness test were classified into age-specific quartiles (0=quartile 1; 1=quartile 2, quartile 2=3, 3=quartile 4), aiming to form the ordinal scores for the regression model. In the case of variables with reverse score, in which higher scores imply worse physical fitness component

(BMI and time in the Sit-and-go test), the classification of quartiles was performed in reverse (0 quartile=4; 1=quartile 3; quartile 2=2; 3=1 quartile). The mean z-scores of the seven functional fitness components (general functional fitness index) were also classified into quartiles (0=quartile 1; 1=quartile 2; 2= quartile 3; 3=quartile 4).

The differences among age groups for the values of each functional fitness test were tested using the Kruskal-Wallis test. The chi-square test for linear trend was used in the bivariate analysis of association between functional fitness components, when categorized, and independent variables. In multivariate analysis, the ordinal logistic regression, proportional odds model (ABREU et al., 2008), was performed to examine the associations of each component of functional fitness and the independent variables.

The hierarchical approach was adopted for inclusion of variables in the multivariate regression model, considering four levels: a) in the first, race was included as demographic variable; b) in the second, socioeconomic factors were included (education, marital status and occupational status and economic class); c) in the third, medical and health conditions were inserted (blood pressure classification, use of medications and health problems); and d) in the last one, health perception was included. Initially, adjustment of variables in the first level (skin color) was performed. Analyses of subsequent levels were controlled for variables of the same level and those from the previous level. As a criterion for the permanence factor in the regression analyses, p-value of less than 0.20 was adopted. Finally, those with p-value less than 0.05 were considered significantly associated with the outcomes being analyzed.

No high multicollinearity values were observed among the independent variables of this study, thus allowing the inclusion of all variables in the multivariate model. Statistical analyses were performed using Stata 10.1 software (Stata Corp. College Station, United States), and the sample selection strategy for the third age group (sampling unit) was considered using the "svy" command. The significance level adopted was 5% for two-tailed tests.

2.6 Ethical approval

The Research Ethics Committee of the Health Sciences Division of the Federal University of the State of Parana approved this study (registration No. 1040.165.10.11). All the elderly women participating in this study signed a free and informed consent form.

3 Results

Of the 1,895 elderly women who participated in data collection, 89 (4.7%) were excluded because they had not completed all assessment tests considered in this study (questionnaires, and anthropometric measurements). No objection was recorded. Therefore, the final study sample consisted of 1,806 individuals, representing 95.3% of older women. An estimate of the subsequent sample power that was performed indicated that the sample size has acceptable power to complete the proposed statistical analyses.

The sample consisted of older women aged 60.0-92.7 years (mean 68.93 years, SD 6.6 years). The socio-demographic description and the health status of participants are presented on Table 2. The sample showed higher participation of elderly aged 60-64 years (34.6%), of white color (80.8%), economic class C (57.6%) with complete elementary education (44.6%), retired (58.8%), married or having a partner (40.3%). Regarding clinical and health conditions, they had high blood pressure (45.5%), reported a health problem (78%), were on use of controlled drug (43.6%), and had good/excellent health perception (76.5%).

Table 2 – Characteristics of the study sample. Curitiba, Brazil (n=1,806).

Variables	n	%
Age group (years)		
60-64	624	34.6
65-69	432	23.9
70-74	409	22.6
75-79	196	10.9
≥80	145	8.0
Skin color		
White	1459	80.8
Brown	216	12.0
Other (Black and yellow)	131	7.3
Socio Economic Level		
A+B (best condition)	592	32.8
C	1040	57.6
D+E (worst condition)	174	9.6

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Continuation

Variables	n	%
Educational Level		
Primary/secondary (incomplete)	583	32.3
Primary/secondary (complete)	806	44.6
High School	269	14.9
College	148	8.2
Ocupational Status		
Retired	1062	58.8
Pensioner	365	20.2
Housewife	379	21.0
Marital Status		
Single	143	7.9
Married	727	40.3
Separated/Divorced	197	10.9
Widow	739	40.9
Blood Pressure Classification		
Normal	984	54.5
Altered (Systolic ≥140 mmHg or Diastolic ≥ 90 mmHg)	822	45.5
Self Reported Health Problems		
No	398	22.0
Yes	1408	78.0
Regular use of medicine		
None	406	22.5
1 medicine	788	43.6
2 medicines	454	25.1
3 or more medicines	158	8.7
Health Perception		
Bad/Regular	424	23.5
Good/Excellent	1382	76.5

Source: Table elaborated by the authors.

Table 3 shows the mean and standard deviation for functional fitness tests. There was a clear and statistically significant reduction in performance in the fitness tests among participants in older age groups (all p<0.001).

Table 3 – Differences of functional fitness component scores by age. Curitiba, Brazil (n=1,806).

Functional Fitness Component Scores	60-64 years (n=624)	65-69 years (n=432)	70-74 years (n=409)	75-79 years (n=196)	≥80 years (n=145)	p-value
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
Weight (Kg)	70.68 (12.53)	68.39 (11.58)	68.11 (10.96)	65.43 (11.71)	61.89 (10.45)	<0,001
Height (m)	1.56 (0.061)	1.55 (0.064)	1.54 (0.062)	1.53 (0.055)	1.52 (0.054)	<0,001
BMI (kg/m2)	29.10 (4.80)	28.38 (4.59)	28.39 (4.20)	27.67 (4.57)	26.63 (4.04)	<0,001
6-min walk (m)	572.94 (48.93)	560.21 (51.63)	531.72 (47.20)	514.02 (58.90)	480.92 (51.87)	<0,001
Arm Curl (repetitions)	17.51 (3.57)	17.38 (3.75)	16.28 (3.53)	15.89 (3.06)	15.19 (3.16)	<0,001
Chair stand (repetitions)	15.62 (2.30)	15.78 (2.94)	15.15 (2.80)	14.51 (2.64)	14.31 (3.04)	<0,001
Chair sit-and--reach (cm)	1.01 (6.40)	1.16 (6.68)	-0.50 (6.72)	-1.12 (6.79)	-0.50 (6.66)	<0,001
Back scratch (cm)	-4.92 (8.84)	-7.00 (9.70)	-8.68 (9.42)	-8.98 (10.26)	-10.14 (10.79)	<0,001
8-ft up-and-go (segundos)	5.95 (0.78)	6.00 (0.81)	6.35 (0.85)	6.63 (0.92)	6.88 (1.01)	<0,001
Mean of Z-scores	0.000 (0.39)	-0.0029 (0.36)	0.0045 (0.37)	-0.0043 (0.38)	0.0000 (0.38)	0,998

p-values for Kruskal-Wallis test; M – Mean; SD – Standard Deviation; BMI: Body Mass Index.
Source: Table elaborated by the authors.

Table 4 presents the proportion of elderly in the last quartile of each functional fitness test (indicating higher scores of functional fitness), according to sociodemographic and health variables. In the bivariate analysis, skin color was significantly associated with BMI. Economic class was associated with the scores of *Sit up and Walk, Sit and Reach, Back scratch, Stand up, Walk* and *Sit* tests. Educational level was associated with higher scores in five functional fitness tests: *BMI, Chair Stand, Sit and reach, Back scratch, 8-ft up-and-go*. Occupational status and marital status were not significantly associated with functional fitness tests. When health conditions were analyzed, it was found that blood pressure was significantly associated with *BMI, Arm curl, Back scratch* and *Z score* tests. Participants who reported having health problems had worse functional fitness scores in the BMI, 6-minute walk test, Sit and reach, Back scratch, 8-ft up-and-go tests. The number of drugs in the bivariate analysis was not significantly associated with functional fitness components. Finally, health perception was positively associated with all functional fitness components.

Table 4 – Proportion of elderly in the last quarter of the specific z scores by age (which indicates better performance) in each functional fitness component according to the sociodemographic and health variables. Curitiba, Brazil (n=1,806).

Variables	Proportion (%) of elderly in the last quarter of Functional Fitness Components							
	BMI	6-min walk	Arm Curl	Chair Stand	Chair sit-and-reach	Back Scratch	8-ft up-and-go	Mean of Z-scores
Skin color	0.017	0.876	0.407	0.217	0.613	0.577	0.717	0.348
White	24.7	25.8	32.1	28.4	27.7	28.9	24.9	25.4
Brown	21.3	22.7	23.1	34.3	25.5	31.5	22.7	22.2
Other (Black and yellow)	32.8	26.0	31.3	35.9	31.3	28.2	24.4	24.4
Socio Economic Level	0.422	0.167	0.784	**<0.001**	**0.037**	**0.019**	**<0.001**	0.226
A+B (best condition)	28.2	25.5	30.9	34.5	30.7	32.9	29.6	25.0
C	22.5	26.0	31.4	28.2	26.2	27.9	23.0	25.5
D+E (worst condition)	28.2	21.8	28.7	22.4	26.4	24.1	17.8	21.8

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Continuation

Variables	Proportion (%) of elderly in the last quarter of Functional Fitness Components							
	BMI	6-min walk	Arm Curl	Chair Stand	Chair sit-and-reach	Back Scratch	8-ft up-and-go	Mean of Z-scores
Educational Level	**<0.001**	0.168	0.988	**0.001**	**<0.001**	**<0.001**	**<0.001**	0.540
Primary/ secondary (incomplete)	20.9	25.0	29.2	27.1	23.8	21.8	21.1	25.7
Primary/ secondary (complete)	24.4	25.3	32.6	28.7	27.5	29.7	23.2	24.6
High school	32.3	26.0	30.5	33.5	32.7	37.5	32.3	24.2
College	29.7	26.4	30.4	38.5	34.5	40.5	32.4	25.7
Occupational Status	0.102	0.767	0.103	0.177	0.143	0.957	0.468	0.110
Retired	25.8	25.4	29.7	28.7	29.4	28.7	24.8	23.4
Pensioner	24.4	26.3	32.3	28.5	24.9	29.9	22.2	28.8
Housewife	23.0	24.5	33.5	33.5	25.6	29.8	26.6	25.9
Marital Status	0.939	0.499	0.923	0.097	0.074	0.329	0.073	0.826
Single	35.7	29.4	26.6	34.3	33.6	33.6	35.0	20.3
Married	22.1	24.3	32.9	29.7	28.9	28.5	24.6	25.6
Separated/ Divorced	26.4	26.4	27.4	33.5	33.0	31.0	23.4	25.4
Widow	25.2	25.4	31.0	27.7	24.0	28.6	23.0	25.2
Blood Pressure Classification	**0.007**	0.762	**0.030**	0.310	0.493	**0.019**	0.056	**0.042**
Normal	27.2	25.2	29.5	31.3	27.9	31.5	26.8	23.9

Continues

Continuation

Variables	Proportion (%) of elderly in the last quarter of Functional Fitness Components							
	BMI	6-min walk	Arm Curl	Chair Stand	Chair sit-and-reach	Back Scratch	8-ft up-and-go	Mean of Z-scores
Altered (Systolic ≥140 mmHg or Diastolic ≥ 90 mmHg)	22.1	25.7	32.8	27.7	27.4	26.4	22.0	26.3
Self Reported Health Problems	**<0.001**	**0.001**	0.697	0.223	**<0.001**	**<0.001**	**<0.001**	0.223
No	35.2	30.4	31.9	31.7	30.7	40.7	31.7	24.4
Yes	22.0	24.0	30.8	29.1	26.8	25.9	22.7	27.1
Regular use of medicine	0.797	0.097	0.629	0.556	0.657	0.874	0.506	0.506
None	26.6	28.1	28.1	26.6	27.3	29.1	23.6	23.4
1 medicine	22.8	25.1	34.6	31.5	27.2	29.6	25.0	26.8
2 medicines	28.0	26.0	29.5	29.5	29.5	29.1	23.8	24.2
3 or more medicines	22.2	18.4	24.7	29.1	25.9	27.8	27.8	22.2
Health Perception	**0.010**	**<0.001**	**<0.001**	**0.001**	**<0.001**	**0.004**	**0.001**	**<0.001**
Bad/Regular	22.4	18.9	23.3	23.6	22.6	22.6	20.3	19.3
Good/ Excellent	25.7	27.4	33.4	31.5	29.2	31.2	26.0	26.7

P-value significance (p<0,05) in the Chi-square test.
BMI: Body Mass Index. Mean of Z-scores – Mean of z-scores of seven components of functional fitness
Source: Table elaborated by the authors.

Adjusted analyses of sociodemographic variables and clinical and health conditions associated with functional fitness components are presented on Table 5. In ordinal logistic regression analysis, skin color was significantly associated with *BMI* and *8-ft up-and-go* tests. Economic class remained directly

associated only with *Chair stand* and *8-ft up-and-go* tests. Participants of low economic classes (D + E) were less likely of being among the highest scores of these tests. Educational level of participants was associated with *BMI, Sit and reach, Back scratch, 8-ft up-and-go* tests after adjusting for confounding variables. Occupational status and marital status were not associated with functional fitness components after adjustments.

On the analysis of clinical and medical conditions, it was found that the blood pressure classification remained associated with *BMI* components (OR=0.84; 95% CI: 0.72-0.98). The presence of health problems remained associated with lower chance of being in the lowest BMI scores and in the best scores of *6-minute walk, Sit and reach, Back scratch, 8-ft up-and-go* tests, compared to women who reported no health problems. This chance ranged from 0.55 (CI 95%: 0.45-0.66, *BMI*) to 0.71 (CI 95%: 0.62-0.80, *Sit and reach* test). The regular use of medicines remained with no significant association with functional fitness components. Finally, health perception was positively and significantly associated with *BMI*, 6-minute walk, Arm curl, Chair stand, Sit and reach, 8-ft up-and-go and the average Z score components. This chance ranged from 1.19 (CI 95%: 1.02-1.38, *BMI*) to 1.66 (CI 95%: 1.20-2.29, Z-score average) as shown in Table 5.

Table 5 – Adjusted ordinal logistic regression and 95% confidence interval for the related potential functional fitness and the overall functional fitness score (both classified in quartiles) in elderly women. Curitiba, Brazil (n=1,806).

Variables	Functional Fitness Components							
	BMI	6-min walk	Arm Curl	Chair Stand	Chair sit-and--reach	Back Scratch	8-ft up-and-go	Mean of Z-scores
	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)
Skin color	**0.050**	0.155	0.05	0.484	0.705	0.916	**0.045**	0.724
White	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Brown	0.97 (0.81-1.15)	0.84 (0.66-1.07)	0.77 (0.57-1.04)	1.12 (0.78-1.60)	0.99 (0.81-1.23)	0.99 (0.78-1.28)	0.75 (0.58-0.99)	0.96 (0.71-1.30)
Other (Black and yellow)	1.61 (1.06-2.46)	1.15 (0.88-1.51)	1.02 (0.73-1.41)	1.23 (0.61-2.50)	0.91 (0.71-1.15)	0.90 (0.51-1.58)	1.11 (0.90-1.39)	0.85 (0.56-1.28)
Socio Economic Level	**0.247**	**0.535**	**0.931**	**0.001**	**0.700**	**0.926**	**0.025**	**0.463**
A+B (best condition)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
C	0.91 (0.76-1.10)	0.99 (0.77-1.29)	1.06 (0.88-1.27)	0.78 (0.68-0.90)	0.88 (0.71-1.09)	1.00 (0.84-1.20)	0.86 (0.76-0.97)	0.99 (0.82-1.19)
D+E (worst condition)	1.30 (0.83-2.03)	0.82 (0.51-1.32)	0.94 (0.59-1.48)	0.66 (0.53-0.82)	1.00 (0.76-1.32)	0.98 (0.80-1.20)	0.66 (0.49-0.90)	0.87 (0.56-1.35)

Continues

Continuation

Variables	Functional Fitness Components							
	BMI	6-min walk	Arm Curl	Chair Stand	Chair sit-and--reach	Back Scratch	8-ft up-and-go	Mean of Z-scores
	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)
Educational Level	**<0.001**	**0.478**	**0.965**	**0.106**	**0.004**	**0.007**	**0.001**	**0.852**
Primary/secondary (incomplete)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Primary/secondary (complete)	1.49 (1.24-1.80)	0.99 (0.79-1.25)	1.02 (0.74-1.40)	1.10 (0.91-1.32)	1.36 (1.16-1.59)	1.34 (1.06-1.69)	1.26 (1.05-1.51)	1.02 (0.80-1.32)
High school	1.94 (1.54-2.45)	0.97 (0.77-1.23)	1.04 (0.71-1.52)	1.07 (0.76-1.51)	1.59 (1.28-1.97)	1.78 (1.24-2.55)	1.76 (1.30-2.37)	0.90 (0.67-1.21)
College	1.65 (1.14-2.38)	1.23 (0.87-1.77)	1.01 (0.65-1.59)	1.40 (0.95-2.05)	1.35 (0.80-2.28)	1.86 (1.13-3.06)	1.61 (1.18-2.19)	1.30 (0.78-2.12)
Occupational Status	**0.316**	**0.849**	**0.198**	**0.221**	**0.274**	**0.731**	**0.507**	**0.129**
Retired	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pensioner	0.88 (0.73-1.06)	0.99 (0.84-1.19)	1.14 (0.95-1.36)	1.11 (0.93-1.33)	1.09 (0.89-1.35)	1.07 (0.88-1.30)	0.97 (0.82-1.15)	1.28 (1.05-1.56)
Housewife	0.92 (0.68-1.24)	0.99 (0.71-1.39)	1.16 (0.79-1.68)	1.22 (0.95-1.56)	0.78 (0.58-1.05)	0.99 (0.79-1.24)	1.17 (0.89-1.55)	1.08 (0.81-1.43)

Marital Status	**0.415**	**0.496**	**0.923**	**0.696**	**0.102**	**0.879**	**0.460**	**0.897**
Single	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Married	0.66 (0.44-0.98)	0.88 (0.54-1.43)	1.06 (0.75-1.50)	0.72 (0.51-1.00)	0.92 (0.66-1.29)	1.07 (0.79-1.45)	0.71 (0.43-1.17)	1.32 (0.96-1.82)
Separated/ Divorced	0.75 (0.50-1.13)	0.82 (0.60-1.14)	0.99 (0.72-1.35)	0.80 (0.48-1.30)	0.94 (0.70-1.28)	1.09 (0.76-1.56)	0.74 (0.49-1.10)	1.18 (0.92-1.52)
Widow	0.82 (0.61-1.10)	0.88 (0.65-1.20)	1.05 (0.65-1.68)	0.74 (0.45-1.24)	0.76 (0.62-0.93)	1.00 (0.66-1.51)	0.80 (0.56-1.15)	1.12 (0.69-1.82)
Blood Pressure Classification	**0.036**	**0.619**	**0.051**	**0.130**	**0.180**	**0.310**	**0.192**	**0.071**
Normal	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Altered (Systolic ≥140 mmHg or Diastolic ≥ 90 mmHg)	0.84 (0.72-0.98)	1.05 (0.87-1.28)	1.21 (1.00-1.46)	0.93 (0.84-1.03)	1.10 (0.95-1.28)	0.86 (0.65-1.15)	0.90 (0.78-1.04)	1.20 (0.98-1.48)
Self Reported Health Problems	**>0.001**	**0.001**	**0.698**	**0.612**	**<0.001**	**<0.001**	**0.001**	**0.179**
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	0.55 (0.45-0.66)	0.71 (0.60-0.86)	0.94 (0.72-1.23)	0.91 (0.67-1.24)	0.71 (0.62-0.80)	0.61 (0.49-0.76)	0.61 (0.48-0.78)	0.87 (0.71-1.05)

Continues

Continuation

Variables	Functional Fitness Components							
	BMI	6-min walk	Arm Curl	Chair Stand	Chair sit-and--reach	Back Scratch	8-ft up-and-go	Mean of Z-scores
	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)	OR (95% IC)
Regular use of medicine	**0.909**	**0.075**	**0.736**	**0.393**	**0.392**	**0.521**	**0.632**	**0.458**
None	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1 medicine	0.85 (0.66-1.08)	0.94 (0.80-1.13)	1.36 (1.03-1.79)	1.22 (1.01-1.47)	1.04 (0.88-1.22)	1.03 (0.77-1.37)	0.98 (0.77-1.24)	1.20 (1.00-1.43)
2 medicines	1.04 (0.76-1.43)	0.97 (0.79-1.19)	1.16 (1.02-1.31)	1.05 (0.83-1.33)	1.15 (0.96-1.38)	0.96 (0.74-1.24)	0.89 (0.74-1.05)	0.99 (0.88-1.12)
3 or more medicines	0.89 (0.68-1.18)	0.68 (0.52-0.91)	1.07 (0.66-1.74)	1.24 (0.96-1.61)	1.01 (0.81-1.28)	1.19 (0.82-1.74)	1.05 (0.75-1.48)	0.94 (0.62-1.42)
Health Perception	**0.030**	**<0.001**	**0.012**	**0.021**	**0.006**	**0.075**	**0.029**	**0.004**
Bad/Regular	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Good/Excellent	1.19 (1.02-1.38)	1.55 (1.25-1.93)	1.45 (1.09-1.91)	1.35 (1.05-1.74)	1.53 (1.14-2.03)	1.20 (0.98-1.46)	1.29 (1.03-1.62)	1.66 (1.20-2.29)

CI95%: 95% confidence interval; OR: Odds Ratio; BMI: Body Mass Index
Source: Table elaborated by the authors.

4 Discussion

The results of the present study indicated that sociodemographic (skin color, economic class and education) and health (high blood pressure, health perception and self-reported health problems) factors were associated with different functional fitness components in older women. In particular, the positive association of various functional fitness components with education and health perception (four and six components, respectively) was highlighted, as well as significant and positive association between health perception and the overall functional fitness score.

Skin color was associated with BMI (worst scores in the category "others") and the 8-ft up-and-go component (worst scores in the category "brown"). For the association with BMI, similar results were previously obtained demonstrating higher BMI for black Brazilian women (CHOR et al., 2004). However, the analysis of the results presented in this study requires caution because the category "others" included people with black and yellow skin.

The association between skin color and the 8-ft up-and-go component is in agreement with other studies, showing increased risk of limitation of functional capacity in black women (YLITALO et al., 2013) and those who are brown/black/other (DEL DUCA; SILVA; HALLAL, 2009). Studies aiming to identify mediators of these associations are needed.

Economic class and educational level were positively associated with two (*Chair stand,* and *8-ft up-and-go*) and four (*BMI, Sit and reach, Back scratch,* and *8-ft up-and-go*) functional fitness components, respectively. Such evidence leads us to believe that both favorable economic condition and access to formal education improve the chance to incorporate healthy behaviors such as balanced nutrition and physical activity practice (MAIA RIBEIRO et al., 2013), including participation in structured physical activities, allowing the maintenance of basic functionalities of older women.

Our results corroborate with previously reported data (LAAKSONEN et al. 2009; ROSA et al., 2003) with regard to social indicators. For example, educational level is a factor independent of socioeconomic level, indicating that adherence to a lifestyle that promotes adequate BMI may depend more on access to information than strictly on financial resources. Even though poverty and low educational level are associated, it is important to understand that both are independent indicators in relation to functional capacity, and that the targeting of strategies that favor the promotion of functional fitness in Brazilian older women should consider these features.

High blood pressure was associated with BMI in older women but was not significantly associated with other functional fitness components. High blood pressure, in the first stages of development, is an asymptomatic disease that may not limit physical activity or functional fitness (VAGETTI et al., 2013b).

In accordance with previous results, health perception was directly related to almost all functional fitness variables, even after the control of variables such as self-reported health problems and regular use of drugs (SCHNEIDER et al., 2004; SANTOS; GRIEP, 2013; ROSA et al., 2003). Sporadic (SCHNEIDER et al., 2004) or chronic (EURENIUS; STENSTRÖM, 2005) physical pain, experiences of fall (MAIA RIBEIRO et al., 2013), and low levels of physical activity (VAGETTI et al., 2013a) are factors that tend to negatively impact both health perception and functional fitness in the elderly, which may explain these findings.

Our sample consisted of women who participated in a physical activity program; yet, not all of them had the health perception of the benefits from the association between physical activity and functional fitness. In fact, a strong positive relationship between physical activity and functional fitness was demonstrated when older women participate in moderate intensity physical activity (OFEI-DODOO et al., 2016). Intervention studies with varied methodologies state that 3 to 5 sessions of 60 minutes for at least 5 weeks are optimal frequencies and duration of exercise programs (BERTOLI, BIDUSKI; FREITAS, 2017; OFEI-DODOO et al., 2016). Improvements in functional capacity and anthropometric measures was also present for diabetic older women who participated in a 10-week aerobic exercise program; however, with no changes in the plasma levels of inflammatory markers for diabetes (ANJOS et al., 2017).

The presence of health problems (e.g. heart disease, diabetes, cancer, orthopedic problems, among others) was inversely associated with five scores of seven functional fitness components. Health problems directly affect the ability to perform movements and functionality of older women, including recovery from injuries (LAAN et al., 2013; MONTALBÁN-QUESADA; GARCÍA-GARCÍA; MORENO-LORENZO, 2012). The high level of hip pre-injury functional fitness directly influences the ability for recovery and consequent level of dependence three months after surgery (MONTALBÁN-QUESADA; GARCÍA-GARCÍA; MORENO-LORENZO, 2012). In addition, diseases such as rheumatism and osteoarthritis may be accompanied by pain and discomfort, changing walking patterns, limiting active movement, and participation in leisure activities, thus reducing independence and functional capacity (SANTOS; GRIEP, 2013; GOUVEIA et al., 2012).

Among the clinical and health variables, the one that showed no association with functional fitness was use of drugs. Although the frequency

and quantity of drug use is an indicative of the number of diseases, in some cases, their use occurs to reduce discomfort such as pain, feelings of fatigue or depression. This can encourage participation in physical activities necessary for maintaining functional fitness (GOUVEIA et al., 2013; SANTOS; GRIEP, 2013).

This study has some limitations. First, the sample consisted of older women participating in a municipal program including physical activities; so the results should not be extrapolated to the entire elderly population of the city of Curitiba. Second, blood pressure was measured with a digital device (oscillometric), which may not be as accurate as the auscultation-type device. Finally, the cross-sectional design does not allow establishing a causal relationship among variables.

Moreover, this study innovates the knowledge in the area as it indicates a number of sociodemographic and health variables that are potentially associated with functional fitness. Another strength of the study was the evaluation of seven functional fitness components, as well as its overall score, in order to create more accurate and thorough understanding of functional fitness and associated factors. Finally, the representative sample size that ensured enough statistical power to make inferences identified during the study is highlighted.

FATORES SOCIODEMOGRÁFICOS E DE SAÚDE ASSOCIADOS À APTIDÃO FUNCIONAL EM MULHERES IDOSAS DE UM PROGRAMA DE ATIVIDADE FÍSICA DO SUL DO BRASIL

resumo

Objetivo: O objetivo do presente estudo foi investigar a associação de fatores sociodemográficos (cor da pele, classe econômica, escolaridade, ocupação e estado civil) e saúde (pressão arterial, problemas de saúde auto reportados, utilização de medicamentos e percepção de saúde) com a aptidão funcional em mulheres idosas de um programa de atividade física. Métodos: Este estudo com delineamento transversal investigou variáveis sociodemográficas e de saúde por meio de questionário e aptidão funcional por meio do "Senior Fitness Test". O teste de Kruskall-Wallis foi utilizado para diferenças entre faixas etárias, o Qui-Quadrado e Regressão Logística Ordinal para analisar associações entre aptidão funcional e as variáveis independentes. Resultados: A amostra final consistiu em 1.806 mulheres, com idade média de 68,9 anos (DP 6,6). Fatores sociodemográficos (cor da pele, classe econômica e escolaridade)

e de saúde (pressão arterial, percepção de saúde e problemas de saúde auto reportados) estiveram associados aos diferentes componentes da aptidão funcional em idosas. Conclusão: Dentre todas as variáveis sociodemográficas e de saúde, a escolaridade e percepção de saúde apresentaram as associações mais relevantes com o escore geral e os componentes de aptidão funcional.

palavras-chave

Envelhecimento. Aptidão funcional. Saúde do idoso.

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Data de submissão: 04/04/2016
Data de aprovação: 28/03/2017