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ORIGINAL ARTICLE

Sarcopenia: prevalence and associated factors among community-dwelling and institutionalized older women in the south region of Brazil

Sarcopenia: prevalência e fatores associados entre mulheres idosas da comunidade e institucionalizadas da região sul do Brasil

Sarcopenia: prevalencia y factores asociados entre mujeres de edad avanzada de la comunidad e institucionalizados de la región sur de Brasil

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ABSTRACT

Objective: To assess the prevalence of sarcopenia and associated factors among older women from the local community and older women living in Long-Term Care (LTC) institutions.
Methods: A cross-sectional study conducted with 423 older women aged 60 or more, from the local community and older women aged 60 or more, living in LTC institutions. Sarcopenia was defined, according to the consensus of the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), including three criteria: low muscle strength (LMS) (<16kg); low muscle mass (LMM) (≤6.75kg/m²) assessed by a skeletal muscle mass index, and low physical performance (LPP) (≤0,8m/s) assessed by gait speed test. Older women who only showed LMS were considered to have pre-sarcopenia, those with LMS associated with LMM were diagnosed with sarcopenia and those who met all three criteria, were diagnosed with severe sarcopenia.
Results: Among the community-dwelling older women, the prevalence of sarcopenia was 2.0% (from 60 to 69), 8.6% (from 70 to 79) and 12.9% (80 or more) and among the ones living in LTC Institutions, 3.3% (from 60 to 69), 14.8% (from 70 to 79) and 34.2% (80 or more). After multivariate logistic regression, age and low body mass index (BMI) were associated with sarcopenia in both groups.
Conclusion: The prevalence of sarcopenia is higher among LTC older women. However, this is not an independent factor. In addition, regardless of residence, low BMI and advanced age are predictive for sarcopenia.

Keywords: Sarcopenia; Aged; Prevalence.

RESUMO

Objetivo: O objetivo do estudo é avaliar a prevalência de sarcopenia e fatores associados entre mulheres idosas residentes na comunidade e em Instituições de Longa Permanência para Idosos (ILPI).
Métodos: Estudo transversal realizado com 423 idosas com ≥ 60 anos, residentes em ILPI e na comunidade. A sarcopenia foi definida de acordo com o Grupo de Trabalho Europeu sobre Sarcopenia em Idosos 2 (EWGSOP2) a partir de três fatores: baixa força muscular (<16kg), baixa massa muscular avaliada pelo índice de massa muscular esquelética (MME) ≤6,75kg/m² e baixo desempenho físico, avaliado pela velocidade da marcha ≤0,8m/s. Mulheres com, apenas, baixa força muscular foram consideradas pré-sarcopenicas, aquelas com baixa resistência muscular associada à baixa MME foram sarcopenicas e aquelas que atendem aos três critérios, foram classificadas com sarcopenia grave.
Resultados: Entre as idosas da comunidade, a prevalência de sarcopenia foi de 2,0% (60-69 anos), 8,6% (70-79 anos) e 12,9% (≥80 anos) e entre os residentes de ILPI, 3,3% (60-69 anos), 14,8% (70-79 anos) e 34,2% (≥80 anos). Após regressão logística multiva-

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riada, idade avançada e baixo Índice de Massa Corporal (IMC) foram associados à sarcopenia em ambos os grupos. **Conclusão:** A prevalência de sarcopenia é maior em idosas de ILPI, mas este não é um fator independente. Além disso, independentemente do domicílio, o IMC baixo e a idade avançada são preditivos da sarcopenia.
Palavras-chave: Sarcopenia; Idoso; Prevalência.

RESUMEN
Objetivo: El objetivo del estudio es evaluar la prevalencia de la sarcopenia y los factores asociados entre las mujeres ancianas que viven en la comunidad y en las Instituciones de atención a largo plazo para los ancianos.
Métodos: Estudio transversal realizado con 423 ancianas ≥ 60 años, viviendo en Instituciones de atención a largo plazo para los ancianos y en la comunidad. La sarcopenia se definió según el Grupo de Trabajo Europeo sobre Sarcopenia en los Ancianos 2 (EWGSOP2): baja fuerza muscular (<16kg), baja masa muscular evaluada por el índice de masa muscular esquelética (MME) ≤6,75kg/m² y bajo rendimiento físico, velocidad de marcha ≤0.8m/s. Las mujeres con baja fuerza muscular fueron consideradas como pre sarcopénicas, aquellas con baja fuerza muscular asociada con MME baja eran sarcopénicas y aquellas que cumplen con tres criterios, fueron clasificadas con sarcopenia grave.
Resultados: Entre los ancianos de la comunidad, la prevalencia de sarcopenia fue del 2,0% (60-69 años), del 8,6% (70-79 años) y del 12,9% (≥80 años) y entre los residentes de Instituciones, 3,3% (60-69 años), 14,8% (70-79 años) y 34,2% (≥80 años). Después de la regresión logística multivariada, la edad alta y el bajo Índice de Masa Corporal (IMC) se asociaron con sarcopenia en ambos grupos.
Conclusión: La prevalencia de la sarcopenia es mayor en los hogares de ancianos, pero este no es un factor independiente. Además, independientemente del hogar, el IMC bajo y la edad avanzada son predictivos de la sarcopenia.
Palabras clave: Sarcopenia; Anciano; Prevalencia.

Introduction

According to the World Health Organization (WHO), world life expectancy is increasing. In Brazil, in 2019, life expectancy was 75.9 years for both sexes, being 79.4 for women[1]. For females, the postmenopausal period is characterized by decreased synthesis and secretion of estradiol, contributing strongly to the reduction of bone mass; skeletal fragility; decreasing bone resistance, as well as gradual and generalized loss of muscle mass and senescence-related strength[2, 3].

Associated with the aging process and older people, recognized as a muscle skeletal disease, sarcopenia has as a key characteristic: Low Strength. Accompanied by low muscle quantity and quality, according to European Working Group on Sarcopenia in Older People 2 (EWGSOP2)[4], which represents a significant change in the health status of older people and is associated with falls, fractures, functional decline, reduced life quality and increasing mortality in this population[5].

The prevalence of sarcopenia differs worldwide and may vary according to age, gender, parameters used for evaluation, cutoff points used for diagnosis and also among community-dwelling and institutionalized[6] older people, which is the reason why it is more difficult to compare different studies to determine the real prevalence of sarcopenia in different populations.

In Brazil, important studies have shown a higher prevalence of sarcopenia in community-dwelling women than in men, 10.4% x 6.9% in São Paulo[7] and 16.1% x 14.4% in Rio Grande do Sul[8], respectively. In other countries, the prevalence is also higher among women, being observed in Mexico: 9, 5%[9] and Japan: 7.6%[10].

In the institutionalized older population, the prevalence of sarcopenia is more expressive and also higher among women, being approximately 17.0% in Turkey[11], 20.0% in Spain[12], and reaching 28.0% in Japan[13]. In Brazil, there are few studies with the institutionalized population, these ones show a variation of 45.3%[14] to 49.0%[15] for prevalence of sarcopenia in institutionalized older people. Higher in women than in men.

Several factors have been associated with sarcopenia, including low Body Mass Index (BMI), sedentary lifestyle, malnutrition, continuous polymedication[16,17], lower functional ability, smoking[18,19], greater fragility and depression[19]. Therefore, the aim of this study was to assess the prevalence of sarcopenia and associated factors among community-dwelling and LTCs dwelling older women.

Methods

This cross-sectional epidemiological study was conducted from October 2016 to March 2018, carried out with 423 older women (aged 60 years or more), 212 community-dwellers and 211 institutionalized (from LTC homes). The data collection occurred in groups of older women from the community (church groups) and in 36

public and private LTC Institutions in the city of Caxias do Sul, state of Rio Grande do Sul, Brazil.

The sample size calculation was based in a prevalence of 16.1% of sarcopenia for the non-institutionalized group[8] and a proportion of 17.7% for the institutionalized group[20], determined showing a power of 80% and significance level of 5%. A total sample size of 422 subjects was reached, 211 in each group.

Our eligibility criteria for samples were: female; 60 years or more; present at the time of data collection; able to communicate with the interviewers; without dementia, severe cognitive impairment, Alzheimer's disease or other neurological disorders; without metal implants in the body or pacemaker; able to perform the handgrip strength test, gait speed test (GST), proposed anthropometric and able to walk. The women with edema and amputation of any member were excluded.

The project was approved by the Research Ethics Committee, CAAE number 53879816.4.0000.5668. All individuals were aware of the study procedures and signed the Free and Informed Consent Term.

The women weighed on a digital scale of the Brand Plenna®, with capacity up to 150kg, with accuracy of 100g. The scale was placed on a firm surface and the women stood on it, with limbs along the body, stepping on the center of the scale, looking forward, without shoes and with as few clothes as possible. The height was checked with the help of a measuring tape and a square placed on top of the woman's head. Participants remained erect, facing forward, stretched knees, feet and ankles together, buttocks and shoulder blades touching the wall, without arching their feet and with arms loose along the body[21]. Body mass and height were used to calculate the BMI, for later classification of the nutritional status proposed by Lipschitz (1994)[22].

Calf circumference (CC) was measured, considering 33.0 centimeters or less as muscle mass depletion, validated cutoff point for the Brazilian older population[23].

Body composition test was performed with the portable bioimpedance device, tetrapolar standard, Maltron BF 906®. The criteria for performing the examination were provided to the collection places and the collection times were adjusted so that the following pre-examination recommendations were ensured: remove all metal objects from the body; urinate at least 30 minutes before; fast 4 hours for liquids and solid food; not perform physical activity on the day of the exam; remain in supine position for 10 minutes. The electrodes were placed on the right foot, black distal electrode at the base of the middle finger and the proximal red one, just above the ankle joint line between medial and lateral malleolus; and right hand, black distal electrode at the base of the middle finger and the red proximal electrode according to the styloid process. The distance between the electrodes above 5 cm and the individual in supine position with right foot and hand slightly away from the trunk[24]. The resistance values found were used for the calculation of skeletal muscle mass (SMM).

Muscle strength (MS) was measured in kilograms (kg), through the usage of the Saehan® brand hydraulic hand dynamometer (Saehan Corporation - SH5001). During the test, the participant was in seated position without armrests; with shoulders engaged and in neutral rotation; elbow flexed at 90°, as recommended by the American Society of Hand Therapists[25]. The participant was required to contract the device for a maximum of 3 seconds, for 3 consecutive times, using the highest recorded value. The cut-off point for low muscle strength was < 16kg[4].

To assess the physical performance, a 4-meter GST was performed. On a flat, straight surface, a 4 meters distance was marked on the ground. The volunteer was asked to walk at her normal pace, even using walking aids, and it was timed by the researcher. A speed of ≤0.8m/s was considered a low physical performance[4,26].

Sociodemographic characteristics included age (grouped into 3 categories: 60 to 69 years, 70 to 79 years and ≥ 80 years), marital status (classified as with or without spouse), schooling (categorized in years, up to 8 years or more of schooling education), income (classified into 3

categories: up to 2 minimum wages, from 2 to 5 minimum wages or above 5 minimum wages) and ethnicity (categorized as white or non-white).

Physical activity was assessed through the Brazilian version of the International Physical Activity Questionnaire (IPAQ)[27], which classifies the individual as very active (who practices vigorous activity for more than 5 days a week and more than 30 minutes per session; or who practices vigorous activity for more than 3 days a week and more than 20 minutes per session + moderate activity and/or walking for more than 5 days a week and more than 30 minutes per session), active (one who practices vigorous activity for more than 3 days a week and more than 20 minutes per session); or who practices moderate activity or walking for more than 5 days a week and more than 30 minutes per session; or who practices any activity added to more than 5 days a week and more than 150 minutes per week), irregularly active A (practices physical activity for at least 150 minutes per week or 5 days a week) and B (practices physical activity for less duration and less frequency when compared to A) or sedentary (does not perform any physical activity for at least 10 minutes continuously during the week)[28].

Sarcopenia was diagnosed according to the criteria proposed by the EWGSOP2 as low muscle strength, low muscle mass and poor physical performance. The older women were classified into four categories: no sarcopenia (adequate muscle strength); probable sarcopenia (low muscle strength); sarcopenia (low muscle strength and mass); and severe sarcopenia (low muscle strength and mass, and poor physical performance). For analytical purposes, the samples were subsequently divided in relation to the presence ("sarcopenia" or "severe sarcopenia") or not ("without sarcopenia" or "probable sarcopenia")[4].

The SMM was estimated from the formula: SMM (kg) = [(h2/R x 0.401) + (sex x 3.825) + (age x -0.071)] + 5.102 from Janssen et al., (2000)[29], being height (h) in centimeters, "R" the resistance value in ohm; for sex, woman = zero and age in years. Consequently, the skeletal muscle index (SMI) was obtained, dividing the SMM by squared height. A cut-off point for low muscle mass was considered to be an SMI equal to or less than 6.75kg/m^2[30].

Statistical analysis

The quantitative variables are described through mean and standard deviation or median and interquartile range. The qualitative variables are described through absolute and relative frequencies. The sarcopenia variables were recategorized for bivariate analyzes, in which the categories "sarcopenia" and "severe sarcopenia" were considered to be the presence of sarcopenia. The Chi-square test was used for verifying possible associations between the outcome and the independent variables and Poisson regression to control confounding factors associated with sarcopenia. The variables that presented a p-value equal to 0.20 or less in the univariate analysis were inserted in the multivariate model. The data analysis was performed using SPSS software version 25.0. The 95% confidence level and 5% significance coefficient were adopted ($p \leq 0.05$).

Results

Table 1 presents the description of the sociodemographic and anthropometric characteristics of the studied sample. The groups revealed significant statistical difference for age, being 56.9% (n=120) of institutionalized older women aged 80 years or older ($p<0.001$), 79.1% (n=167) with less than 8 years of schooling ($p=0.005$), 98.6% (n=208) without spouse ($p<0.001$) and 90.5% (n=191) with monthly income up to 2 minimum wages ($p<0.001$). For the ethnic variable, most individuals from both groups were considered white.

Table 1 – Description of sociodemographic and anthropometric variables according to the older women residence in Rio Grande do Sul, Brazil, 2016-2018 (n = 423).

Exposure Variable	Total (N=423)	Community (N=212)	LTCH± (N=211)	*p-value*
Age (years) (minimum - maximum)	75.57 ± 9.24 (60.00 – 102.00)	71.22 ± 7.23 (60.00 – 90.00)	79,93 ± 8,98 (60.00 – 102.00)	**≤0.0001**
BMI* (kg/m²) (minimum - maximum)	27.84 ± 5.21 (15.58 – 51.63)	28.11 ± 4.37 (18.69 – 42.42)	27.58 ± 5.93 (15.58 – 51.63)	0.377
CC*	35.61 ± 4.08	36.92 ± 3.28	34.29 ± 4.37	**≤0.0001**
Age				**<0.001**
60-69 years	130 (30.7%)	100 (47.2%)	30 (14.2%)	
70-79 years	142 (33.6%)	81 (38.2%)	61 (28.9%)	
≥ 80 years	151 (35.7%)	31 (14.7%)	120 (56.9%)	
Schooling				**0.005**
Upto 8 years schooling	308 (72.8%)	141 (66.5%)	167 (79.1%)	
>to 8 years of schooling	115 (27.2%)	71 (33.5%)	44 (20.9%)	
Marital Status				**<0.001**
With spouse	96 (22.7%)	93 (43.9%)	3 (1.4%)	
No spouse	327 (77.3%)	119 (56.1%)	208 (98.6%)	
Family income				**<0.001**
<2 minimum wages	297 (70.2%)	106 (50.0%)	191 (90.5%)	
From 2 to 5 minimum wages	109 (25.8%)	92 (43.4%)	17 (8.1%)	
≥ 5 minimum wages	17 (4.0%)	14 (6.6%)	3 (1.4%)	
Ethnicity				0.338
Non-white	10 (2.4%)	7 (3.3%)	3 (1.4%)	
White	413 (97.6%)	205 (96.7%)	208 (98.6%)	

±LTCH – Long-Term Care Homes. *BMI - Body Mass Index. *CC - Calf Circumference.

Regarding the anthropometric variables described in Table 2, it was also observed a statistically significant difference between the groups, being 14.2% (n=30) of the institutionalized older women with low weight according to BMI (p=0.006), 43.1% (n=91) with low muscle reserve according to CC (p<0.001), 94.8% (n=200) with low MS (p<0.001) and 26.5% (n=56) sedentary (p<0.001).

Table 2 – Description of nutritional status, grip strength and physical activity according to older women residence in Rio Grande do Sul, Brazil, 2016-2018 (n = 423).

Exposure Variable	Total sample (N=423)	Community (N=212)	LTCH ± (N=211)	*p-value*
N (%)				
BMI* Classification				**0.006**
Low weight	43 (10.2)	13 (6.1)	30 (14.2)	
Eutrophy	152 (35.9)	72 (34.0)	80 (37.9)	
Overweight	228 (53.9)	127 (59.9)	101 (47.9)	
Calf circumference				**<0.001**
Low muscle reserve	119 (28.1)	28 (13.2)	91 (43.1)	
Adequate muscle reserve	304 (71.9)	184 (86.8)	120 (56.9)	
Muscle Strength				**< 0.001**
Low	312 (73.8)	112 (52.8)	200 (94.8)	
Adequate	111 (26.2)	100 (47.2)	11 (5.2)	
IPAQ°				**<0.001**
Sedentary	85 (20.1)	29 (13.7)	56 (26.5)	
Irregularly active A	53 (12.5)	35 (16.5)	18 (8.5)	
Irregularly active B	265 (62.6)	132 (62.3)	133 (63.0)	
Active	20 (4.7)	16 (7.5)	4 (1.9)	

*BMI - Body Mass Index. IPAQ - International Physical Activity Questionnaire. ± LTCH – Long-Term Care Homes.

Table 3 describes the general prevalence of sarcopenia, observed in 6.1% of older women from the community and 24.2% of institutionalized ones (p≤0.0001). In addition, a higher prevalence of sarcopenia was observed among older women aged ≥ 80 years (29.8%) (p≤0.0001), who lived without a spouse (17.4%) (p = 0.023), with income < 2 minimum wages (18.5%) (p = 0.010) and underweight according to the BMI (55.8%) (p≤0.0001).

Table 3 – Prevalence of sarcopenia and associated factors in older people from Rio Grande do Sul, Brazil, 2016-2018 (n=423).

Exposure Variable	n	Prevalence of sarcopenia (%)	*p-value*
Residence			**≤0.0001**
Community	212	6.1	
LTCH±	211	24.2	
Age			**≤0.0001**
60-69 years	130	2.3	
70-79 years	142	11.3	
≥ 80 years	151	29.8	

Exposure Variable	n	Prevalence of sarcopenia (%)	*p-value*
Schooling			0.784
Up to 8 years schooling	308	15.6	
>to 8 years of schooling	115	13.9	
Marital Status			**0.023**
Withspouse	96	7.3	
No spouse	327	17.4	
Family income			**0.010**
< 2 minimum wages	297	18.5	
From 2 to 5 minimum wages	109	6.4	
≥ 5 minimum wages	17	11.8	
BMI* Classification			**≤0.0001**
Lowweight	43	55.8	
Eutrophy	152	19.7	
Overweight	228	4.4	
IPAQ ˚			0.520
Sedentary	85	20.0	
Irregularly active A	53	13.2	
Irregularly active B	265	14.3	
Active	20	10.0	

*BMI - Body Mass Index. ˚IPAQ - International Physical Activity Questionnaire. ǂLTCH – Long-Term Care Homes.

The prevalence of sarcopenia and associated factors according to residence are described in Table 4. Statistically significant differences were observed between the community (p=0.026) and institutionalized (p≤0.0001) population in terms of age and BMI (p≤0.0001). The highest prevalence of sarcopenia was found in older women, both in the community and in LTC Homes. Among the older women with age ≥ 80 years, 31 (12.9%) of the community and 120 (34.2%) of the institutionalized were sarcopenic and among the older women with low weight, 13 (38.5%) of the community and 30 (63.3%) of the institutionalized were sarcopenic. No significant association was observed between sarcopenia and the place of residence with the other assessed variables.

Table 4 –Prevalence of sarcopenia and associated factors according to residence in elderly from Rio Grande do Sul, Brazil, 2016-2018 (n=423).

	Community (N=212)			LTCH‡ (N=211)		
Exposure Variables	**n**	**Prevalence of sarcopenia (%)**	**p-valor**	**n**	**Prevalence of sarcopenia (%)**	**p-valor**
Age			**0.026**			**≤0.0001**
60-69 years	100	2.0		30	3.3	
70-79 years	81	8.6		61	14.8	
≥ 80 years	31	12.9		120	34.2	
Schooling			1.000			0.732
Up to 8 years schooling	141	6.4		167	23.4	
>to 8 years of schooling	71	5.6		44	27.3	
Marital Status			0.907			0.146
Withspouse	93	5.4		3	66.7	
No spouse	119	6.7		208	23.6	
Family income			0.120			0.263
< 2 minimum wages	106	9.4		191	23.6	
From 2 to 5 minimum wages	92	3.3		17	23.5	
≥ 5 minimum wages	14	0.0		3	66.7	
BMI* Classification			**≤0.0001**			**≤0.0001**
Lowweight	13	38.5		30	63.3	
Eutrophy	72	8.3		80	30.0	
Overweight	127	1.6		101	7.9	
IPAQ ˚			0.226			0.539
Sedentary	29	10.3		56	25.0	
Irregular lyactive A	35	11.4		18	16.7	
Irregular lyactive B	132	4.5		133	24.1	
Active	16	0.0		4	50.0	

*BMI - Body Mass Index. ˚IPAQ - International Physical Activity Questionnaire. ‡LTCH – Long-Term Care Homes.

The variables that presented a p-value equal to 0.20 or less in the univariate analysis were inserted in the multivariate model. The environment in which the participants live was not independently associated with sarcopenia. Table 5 shows Poisson regression analysis with variables significantly associated with sarcopenia. The community older women with low weight were more likely to develop sarcopenia when compared to those with overweight (PR=24.42, 95%CI: 5.25-113.61; p≤0.0001). Also, among LTC residents, advanced age (PR=7.40, 95%CI: 1.03-53.28; p=0.014) and low weight (PR=6.81, 95%CI: 3.42-13.58; p≤0.0001) were significant predictors of sarcopenia, when compared to the younger ones with overweight. When adjusted in the multivariate model for age and BMI, residence; family income and marital were no longer considered independent factors associated with sarcopenia.

Table 5 – Final model of Poisson regression analysis with variables significantly associated with sarcopenia in older women from Rio Grande do Sul, Brazil, 2016-2018 (n=423).

	Community (N=212)	LTCH ‡ (N=211)	Total (N=423)
Exposure Variables	**PR adjusted (CI 95%)**	**PR adjusted (CI 95%)**	**PR adjusted (IC 95%)**
Residence			
Community	-	-	1
LTCH‡	-	-	0.70 (0.36-1.36)
p-value	-	-	0.296
Age			
60-69 years	1	1	1
70-79 years	4.35 (1.05-18.08)	3.78 (0.48-29.7)	4.19 (1.28-13.74)
≥ 80 years	5.67 (1.19-26.93)	7.40 (1.03-53.28)	8.93 (2.88-27.61)
p-value	0.079	**0.014**	**≤0.0001**
Marital Status			
Withspouse	-	1	1
No spouse	-	0.76 (0.36-1.59)	0.84 (0.43-1.64)
p-value	-	0.477	0.608
Family income			
< 2 minimum wages	1	-	1
From 2 to 5 minimum wages	0.36 (0.10-1.23)	-	0.50 (0.25-0.99)
≥ 5 minimum wages	5.04 (0.00-0.00)	-	1.24 (0.51-3.01)
p-value	0.103	-	0.113
BMI* Classification			
Overweight	1	1	1
Eutrophy	5.29 (1.10-25.53)	3.02 (1.47-6.23)	3.42 (1.75-6.71)
Low weight	24.42 (5.25-113.61)	6.81 (3.42-13.58)	9.42 (4.93-18.01)
p-value	**≤0.0001**	**≤0.0001**	**≤0.0001**

*BMI - Body Mass Index. ‡LTCH – Long-Term Care Homes. PR – Prevalence Ratio; CI – Confidence Interval.

Discussion

This cross-sectional study was carried out to assess the prevalence of sarcopenia and its association with residence and other variables in a city in southern Brazil using recommendations proposed by EWGSOP2. Although the findings demonstrated a higher prevalence of sarcopenia among institutionalized older women, in this study sarcopenia was not associated with the place of residence, but with advanced age and low weight.

Studies with the same method present prevalence of sarcopenia among community older women quite divergently, ranging from 4.5% in Germany[31], 10.4% in Brazil[7] to 12.4% in Belgium[32].

The prevalence observed in this study (6.1%) was less than the one found in the study of Alexandre et al., which found 10.4% of sarcopenic women, with higher prevalence among the ones with lower education, low schooling, current smoking habit, and not having a marital life[7]. In another Brazilian study, by Alexandre and collaborators[8], with an average age of 69.6 years, 16.1% of women were sarcopenic, being advanced age, lower income and malnutrition factors associated with sarcopenia. In other countries, studies have shown similar values, 6.7% in older women from Taiwan[33]and 7.6% in older women from Japan[10]. These discrepancies are even greater when comparing different diagnostic methods and cutoff points, ranging from 2.8% to 23.6% in women[34]. Moreover, characteristics of the studied population and the average age of the groups may be responsible for the different results presented.

The current work showed a higher prevalence of sarcopenia among institutionalized older women compared to the ones from the community (24.2% x 6.1%), although this condition was not determined by the place of residence but by age, being the highest prevalence in older women with age ≥80 years. Aging is the first cause of sarcopenia, related to the decline in muscle strength and muscle mass[4].

Studies show similar prevalence among women from LTC institutions in Spain. A study of institutionalized older people, with an average age of 84.9 years, observed 20.0% of sarcopenia in women, concluding that low BMI and age, 80 or more, were predictive of sarcopenia[12]. Kamo et al. assessed 250 LTC residents in Japan with an average age 86.4 years and observed 28.0% of sarcopenia in women[13].

It is important to note that the higher prevalence of sarcopenia among institutionalized older women, in this study, was determined by their age, regardless of the place of residence. This situation is clearly mentioned in literature, where, with increasing age, sarcopenia rates increase[8, 10, 33, 35, and 36]. The aging process is associated with significant changes in body composition, with reduced muscle mass and increased visceral fat mass[37].

In Brazil, no population-based studies have been found in literature comparing this prevalence among community populations to institutionalized ones. A small work from the same state, with 28 older women, 11 from the community and 17 from LTCs, concluded that institutionalized older women showed more predisposition factors to the presence of sarcopenia, including sedentarism and inadequate nutritional status[38]. De Almeida Campos et al.[14], with a short sample of 83 institutionalized older people in São Paulo (Brazil), found 45.3% of sarcopenia among women. Similarly, Mesquita et al.[15], that assessed 291 institutionalized older people from Bahia (Brazil) and found 49.0% of sarcopenia among women.

Data from the present study demonstrated a significantly higher risk of sarcopenia for older adults with a low BMI (PR=9.42, CI95: 4.93-18.01; p≤0.0001). These findings agree with numerous authors who relate low BMI with higher prevalence of sarcopenia in older people from the community[18, 39, and 40] and from LTC Institutions[12, 13, 41]. Malnutrition is significantly higher in the most fragile groups, especially in low-income individuals with low levels of education, factors that can affect food availability and consequently nutritional status. Inadequate nutritional status contributes to protein catabolic condition, reducing muscle mass and therefore body functioning[42].

The results of this study have important characteristics: They complement the current publications regarding the prevalence of sarcopenia among older women in southern Brazil, especially institutionalized older women, subject in which we have a gap in literature. It also has a considerable sample; demonstrates associations between different households; in addition to be useful for health professionals as a tool for early diagnosis and also for prevention in this population.

There were some limitations in this study that should be considered, since it is a cross-sectional observational study, it becomes limited to establish cause-effect relation between sarcopenia and its associated factors. The use of bioimpedance is a portable, easy and affordable alternative compared to dual-energy X-ray absorptiometry and it can be used in daily clinical practice[43]. Its use for the assessment of SMM shows some disadvantages,

especially concerning hydration, considering that edema and dehydration are problems often observed in older people and might result in under or overestimation of fat-free mass.

Therefore, based on our findings and previous studies, clinical practices should be suggested to prevent low weight and sarcopenia, especially in older people. Further studies with follow-up and additional samples are needed in order to assess other lifestyle behavioral aspects that may contribute to sarcopenia.

Conclusion

In this sample of older women from Southern Brazil, a higher prevalence of sarcopenia was found in institutionalized older women, with higher age and lower weight, and the place of residence was not determinant for this condition, demonstrating that the disease is influenced by several factors. Considering that people`s aging is a fact and that sarcopenia is a cause of higher mortality in older people, public policies for early diagnosis, as well as prevention, should be adopted in multiple fields among this population.

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