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ASPECTS ASSOCIATED WITH THE RISK OF SARCOPENIA IN OLDER ADULTS

ASPECTOS ASSOCIADOS AO RISCO DE SARCOPENIA EM PESSOAS IDOSAS

ASPECTOS ASOCIADOS AL RIESGO DE SARCOPENIA EN PERSONAS MAYORES

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ABSTRACT

Introduction: Defined as the gradual loss of skeletal muscle mass and loss of muscle function, sarcopenia is considered a predominantly geriatric and multifactorial condition, being considered one of the main health problems of elderly people. Approximately 56% of elderly people with sarcopenia have metabolic syndromes and have a 2.4 times higher risk of death from cardiovascular diseases.

Objective: To evaluate aspects related to sarcopenia in elderly people.

Methods: This is a cross-sectional study with a quantitative approach, being a part of the longitudinal and multicenter project of the International Research Network on vulnerability, health, safety and quality of life of the elderly: Brazil, Portugal, Spain and France.

Results: 423 elderly people participated in the research, 296 females (70%) and 127 males (30%), with a predominance of people aged 80 or over (52.2%), non-white (58.2%) and illiterate (63.8%), 54.2% of participants were at risk of sarcopenia and 56% of them reported having suffered falls. Depression and nutritional risk are also important determinants, reaching 60% and 71.6% of the population at risk of sarcopenia.

Conclusion: It was concluded that variables such as increasing age, falls, cognitive decline, risk of functional and nutritional decline and depression are associated with the risk of sarcopenia in the elderly. The importance of monitoring and evaluating the elderly is highlighted, as with the necessary interventions the occurrence or degree of sarcopenia can be reduced.

Keywords: Accidental Falls; Frail Elderly; Health of the Elderly; Nutrition for the Elderly; Sarcopenia.

RESUMO

Introdução: Definida como a perda gradual de massa muscular esquelética e perda da função muscular, a sarcopenia é considerada uma condição de predomínio geriátrico e multifatorial, sendo considerado um dos principais problemas da saúde da pessoa idosa. Aproximadamente 56% dos idosos com sarcopenia possuem síndromes metabólicas e risco 2,4 vezes maior de morte por doenças cardiovasculares.

Objetivo: Avaliar os aspectos relacionados à sarcopenia em pessoas idosas.

Métodos: Trata-se de um estudo do tipo transversal com abordagem quantitativa, sendo um recorte do projeto longitudinal e multicêntrico da Rede internacional de pesquisa sobre vulnerabilidade, saúde, segurança e qualidade de vida do idoso: Brasil, Portugal, Espanha e França.

Resultados: Participaram da pesquisa 423 idosos, sendo 296 do sexo feminino (70%) e 127 do

sexo masculino (30%), havendo predomínio de pessoas com 80 anos ou mais (52,2%), não brancas (58,2%) e não alfabetizadas (63,8%), tendo 54,2% dos participantes apresentado risco de sarcopenia e 56% destes relataram ter sofridos quedas. A depressão e o risco nutricional também se mostram importantes determinantes, alcançando 60% e 71,6% da população em risco de sarcopenia.

Conclusão: Concluiu-se que variáveis como o aumento da idade, quedas, declínio cognitivo, risco de declínio funcional, nutricional e a depressão estão associados ao risco de sarcopenia em idosos. Ressalta-se a importância de acompanhamento e avaliação dos idosos, visto que com as intervenções necessárias pode-se reduzir a ocorrência ou grau de sarcopenia.

Palavras-chave: Acidentes por Quedas; Idoso Fragilizado; Nutrição do Idoso; Sarcopenia; Saúde do Idoso.

RESUMEN

Introducción: Definida como la pérdida gradual de masa músculo esquelética y pérdida de función muscular, la sarcopenia es considerada una condición predominantemente geriátrica y multifactorial, considerándose uno de los principales problemas de salud de las personas mayores. Aproximadamente el 56% de las personas mayores con sarcopenia padecen síndromes metabólicos y tienen un riesgo 2,4 veces mayor de muerte por enfermedades cardiovasculares.

Objetivo: Evaluar aspectos relacionados con la sarcopenia en personas mayores.

Métodos: Se trata de un estudio transversal con enfoque cuantitativo, que forma parte del proyecto longitudinal y multicéntrico de la Red Internacional de Investigación sobre vulnerabilidad, salud, seguridad y calidad de vida de las personas mayores: Brasil, Portugal, España y Francia.

Resultados: Participaron de la investigación 423 personas mayores, 296 mujeres (70%) y 127 hombres (30%), con predominio de personas de 80 años o más (52,2%), no blancas (58,2%) y analfabetas (63,8%), el 54,2% de los participantes tenía riesgo de sarcopenia y el 56% de ellos refirió haber sufrido caídas. La depresión y el riesgo nutricional también son determinantes importantes, alcanzando entre el 60% y el 71,6% de la población en riesgo de sarcopenia.

Conclusión: Se concluyó que variables como el aumento de la edad, las caídas, el deterioro cognitivo, el riesgo de deterioro funcional y nutricional y la depresión se asocian con el riesgo de sarcopenia en el adulto mayor. Se destaca la importancia del seguimiento y evaluación de los ancianos, ya que con las intervenciones necesarias se puede reducir la aparición o el grado de sarcopenia.

Descriptores: Accidentes por Caídas; Anciano Frágil; Nutrición del Anciano; Salud del Anciano; Sarcopenia.

INTRODUCTION

The World Health Organization highlights the increasing number of older adults in the global population. This phenomenon, currently observed worldwide, is expected to result in one in six people being 60 years or older by 2030, with the number of individuals aged 80 years or older tripling between 2020 and 2050[1]. In this context, it is essential to understand the aging process and its potential to affect autonomy and functionality, leading to progressive changes[2].

In Brazil, individuals aged 60 years or older are considered elderly. The country has witnessed a demographic shift toward longer life expectancies, resulting in population aging. Therefore, understanding the natural changes that occur during aging and the conditions that may affect older adults is critical[3].

Among the changes associated with aging, muscle loss and decreased strength are noteworthy[4]. Sarcopenia, defined as the gradual loss of skeletal muscle mass and function, is a geriatric condition of multifactorial origin and one of the primary health concerns among older adults[5]. The European Working Group on Sarcopenia in Older People (EWGSOP) emphasizes the assessment of three parameters to diagnose sarcopenia: muscle quantity and/or quality, muscle strength, and physical performance. Low levels in these parameters are considered indicators of severity[6].

Furthermore, sarcopenia, if left untreated, can result in personal, social, and economic consequences, such as difficulties in daily activities, reduced functional capacity, falls, fractures, institutionalization, hospitalization, and mortality[7].

In a study conducted in the United States using data from the National Health and Nutrition Examination Survey (NHANES), approximately 11% of the 10,778 participants were found to have sarcopenia, with 56.7% of these individuals also presenting metabolic syndrome. This study revealed that individuals with sarcopenia and metabolic syndrome had nearly twice the risk of all-cause mortality and approximately 2.4 times the risk of cardiovascular mortality[8].

Therefore, sarcopenia emerges as a highly relevant topic in global health, as its presence poses significant risks to individuals' health, reducing their ability to perform daily and social activities[9].

This study aims to evaluate aspects related to sarcopenia in older adults.

MATERIALS AND METHODS

This cross-sectional study is part of a longitudinal, multicenter project conducted by the International Network for Research on Vulnerability, Health, Safety, and Quality of Life of Older Adults. The project encompasses Brazil, Portugal, Spain, and France and received ethical approval from the Research Ethics Committee of the Onofre Lopes University Hospital at the Federal University of Rio Grande do Norte (approval number 4267762; CAAE: 36278120.0.1001.5292).

The study sample consisted of older adults attending primary health care services (APS) in the municipality of Santa Cruz and residents of long-term care institutions for the elderly (ILPIs) in Natal, both located in Rio Grande do Norte, Brazil.

Data collection was conducted between June and December 2023 by a trained multidisciplinary team, including collaborators, researchers, and undergraduate and graduate students.

The inclusion criteria were individuals aged 60 years or older who were either registered with or users of a primary healthcare unit or residents of long-term care institutions. Older adults with clinical conditions that prevented participation, as determined by the researchers or primary care/ILPI professionals, were excluded. Participants meeting the inclusion criteria and agreeing to participate were informed about the study and invited to sign an informed consent form.

For sampling, a probabilistic method was employed to calculate the sample size for finite populations of older adults in APS in the two study locations. The target population was estimated at 125,630 older adults, with a 95% confidence level (Z = 1.96), a sampling error of 5% (e = 0.05), an estimated proportion of 50% of older adults in APS (P), and an expected margin of error (Q) of 50%. This yielded an estimated sample size of 384 participants, with 200 from Natal and 184 from Santa Cruz. An additional 10% was added for potential losses, resulting in a final sample of 423 older adults, with 223 from Natal/RN and 200 from Santa Cruz/RN.

The following instruments were used in this study: Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS-15), Functionality Scales (Barthel & Lawton), Vulnerability Scale (VES-13), PRISMA-7, SARC-F Score(10), Older Adults' Health Booklet, Mini Nutritional Assessment (MNA), Edmonton Frailty Scale (EFS), and Downton Fall Risk Scale.

The Older Adults' Health Booklet[11] was used to obtain sociodemographic and health characteristics. Data collection included the following variables: Gender (male; female), Age group (60-79 years; ≥ 80 years), Race/ethnicity (white; non-white), Education (literate; illiterate), Polypharmacy (≥ 5 medications: yes; no), Self-reported diseases (yes; no).

Cognitive function was assessed using the Mini-Mental State Examination (MMSE), validated for use in Brazil[12]. This test consists of seven categories: temporal orientation, spatial orientation, word registration, attention and calculation, recall, language, and visual constructive ability. Scores range from 0 (minimum) to 30 (maximum). In this study, cognitive decline was classified as present (≥ 17 points) or absent (< 17 points).

Frailty was evaluated using the Edmonton Frailty Scale (EFS), adapted and validated for the Brazilian older adult population[13]. The scale covers nine domains: general health status, mood, cognition, functional independence, social support, medication use, nutrition, continence, and functional performance. Frailty was classified as non-frail (≤ 6 points) or frail (≥ 7 points).

The Vulnerability Elderly Survey (VES-13), adapted and validated for the Brazilian population[14-15], was used to assess vulnerability. This protocol comprises 13 items divided into four domains: age, self-perceived health, physical limitation, and disability. Scores range from 0 to 10, with a score ≥ 3 indicating vulnerability.

The PRISMA-7 tool, adapted[16] and validated[17] for Brazilian older adults, was used to identify functional decline risk. It consists of seven dichotomous items (yes/no), with three or more positive responses indicating a risk of functional decline.

Depressive symptoms were assessed using the Geriatric Depression Scale (GDS-15), validated for the Brazilian population[18]. This scale includes 15 items assessing life satisfaction, interruption of activities, irritability, mood, isolation, energy, joy, and memory problems. Scores range from 0 to 15, with a score ≥ 5 indicating depressive symptoms.

The Mini Nutritional Assessment (MNA) was used to evaluate nutritional status. This tool consists of 18 questions covering anthropometric, dietary, and global clinical assessments, as well as self-perceived health and nutritional status. Scores ≤ 23.5 indicate malnutrition or risk of malnutrition, while scores ≥ 24 indicate adequate nutritional status.

Sarcopenia risk was assessed using the SARC-F Score, which evaluates five criteria: strength, walking assistance, chair rise, stair climbing, and falls. Each criterion scores up to two points, with a total score ≥ 4 indicating sarcopenia risk.

Data were tabulated and analyzed using Statistical Package for the Social Sciences (SPSS) version 23.0. Descriptive analysis was performed using absolute and relative frequencies for categorical variables. The association between sarcopenia risk and sociodemographic and clinical variables was evaluated using Pearson's chi-square test, with a significance level of 5%.

RESULTS

A total of 423 older adults participated in the study, of which 296 were female (70%) and 127 male (30%). The majority were aged 80 years or older (52.2%), non-white (58.2%), and illiterate (63.8%). Table 1↗ presents the sociodemographic characteristics of the participants and the prevalence of sarcopenia risk across variables.

From the total sample, 229 participants were identified as at risk of sarcopenia, representing 54.2% of the total population analyzed. Regarding gender, 156 out of the 296 female participants were at risk for sarcopenia, representing 53% of the female participants and 36.9% of the total sample. Among the male participants, 73 out of 127 were at risk, representing 57% of males and 17.3% of the total participants (Table 1↗).

In terms of age, older adults aged 80 years or more had a higher prevalence of sarcopenia risk (67.8%) compared to those aged 60 to 79 years (39%). Regarding race, 177 participants (41.8%) were white, with 101 of them (57%) at risk for sarcopenia. Among non-white participants, who accounted for 58.2% of the total, 128 were at risk for sarcopenia (Table 1↗).

Regarding literacy, 153 participants (36.2%) were literate, of which 92 (60%) were at risk for sarcopenia. Among the illiterate participants (270 individuals, 63.8% of the total), 137 (50.7%) were at risk. Thus, sarcopenia risk was more prevalent among literate individuals (Table 1↗).

Among the 229 participants at risk for sarcopenia, 129 reported experiencing falls, representing 56.3% of this subgroup. Furthermore, 70.3% of those at risk for sarcopenia were identified as being at risk of falls. Polypharmacy was also observed as a determinant, affecting 124 (54.1%) of the participants with sarcopenia risk (Table 2↗).

Concerning self-reported comorbidities, 93.4% of participants at risk for sarcopenia reported having at least one chronic condition. Cognitive decline was also a significant determinant, affecting 132 participants (57.6%) in this group. Depression and nutritional risk were identified as key factors, affecting 60% and 71.6%, respectively, of those at risk for sarcopenia (Table 2↗).

Functional decline was present in 299 participants (70.7% of the total sample) and was more pronounced among those at risk for sarcopenia, affecting 86% of this subgroup. Frailty was identified as an even stronger determinant, affecting 202 participants (88.2%) at risk for sarcopenia. Additionally, vulnerability was observed in 255 participants overall and was statistically significant among those at risk for sarcopenia, affecting 70% of this subgroup (Table 2↗).

DISCUSSION

According to the analyses conducted in this study, the risk of sarcopenia was present in 54.2% of the population analyzed, with higher prevalence among older adults. Similarly, a population-based cross-sectional study conducted in Manaus[19] identified an association between sarcopenia and age, highlighting the importance of analyzing this trend given the increasing aging population in recent decades and its significance as a public health issue.

The risk of sarcopenia was more prevalent among men, as noted in another study[20], where the prevalence of sarcopenia was higher in males (28.8%) compared to females (17%). However, attention should also be directed toward women, as muscle strength loss accelerates after the age of 50 due to hormonal changes during non-reproductive phases[21].

When clinical variables were evaluated, the risk of sarcopenia was more common among older adults who had experienced falls or were at risk of falling. This aligns with findings from another study[22] that investigated the association between sarcopenia and falls among 147 older patients in South Korean hospitals. That study found a significant correlation, with sarcopenia being more prevalent in the group of older adults who had fallen (53.5%).

A study aimed at enhancing consistency in sarcopenia diagnosis[6] concluded that the primary indicators of this condition are loss of muscle mass and strength. Furthermore, another study[23] emphasized that muscle mass and strength loss are key contributors to fall risk among older adults. In agreement with these findings, this study observed that 70.3% of participants at risk of sarcopenia were also at risk of falls.

The loss of muscle mass and strength, in addition to increasing fall risk, was associated with frailty and low educational levels. Similarly, a cross-sectional study conducted in Brazil[24] concluded that older adults with sarcopenia were characterized by low educational attainment and frailty related to aerobic and/or muscular capacity.

Lean muscle mass loss is also associated with the risk of malnutrition, while malnutrition contributes to skeletal muscle loss[25]. Reflecting these findings, this study identified a 71.6% incidence of nutritional risk among the 229 older adults at risk for sarcopenia.

Polypharmacy was another notable characteristic observed among participants at risk of sarcopenia, consistent with findings from another study[26]. That study identified polypharmacy as one of the most prevalent characteristics in older adults with any degree of sarcopenia, demonstrating alignment with international research.

Cognitive decline was closely associated with sarcopenia risk. A seven-year cohort study[27] found that older adults at risk of sarcopenia had an increased likelihood of cognitive decline. Similarly, this study observed that 132 participants (57.6%) at risk for sarcopenia exhibited cognitive decline, reinforcing the correlation between the two conditions.

Depression is a highly prevalent mental health condition among older adults. In a global health estimate by the World Health Organization in 2019, approximately 14% of individuals aged 60 years or older were reported to have mental health disorders, with depression being one of the most common[28]. A cohort study[29] indicated that sarcopenia increases the risk of developing depressive symptoms. The present study supports this finding, as depression rates were twice as high among older adults at risk of sarcopenia.

This study observed a prevalence of sarcopenia risk in more than half of the participants, underscoring age as a critical determinant. As highlighted in another study[30], many variables associated with sarcopenia in this research are modifiable through appropriate interventions, allowing for the development of strategies to promote the health of the older population.

CONCLUSION

The findings of this study indicate that variables such as advanced age, falls, cognitive decline, functional decline risk, nutritional risk, and depression are associated with sarcopenia risk among older adults. Most participants at risk for sarcopenia exhibited these characteristics upon evaluation.

Therefore, this study emphasizes the importance of monitoring and assessing older adults, focusing on key characteristics that define sarcopenia. Implementing necessary interventions can help reduce the occurrence or severity of sarcopenia, mitigating the challenges associated with this condition.

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MF: Conceptualization, writing – original draft, writing – revision and editing.
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MC: Conceptualization, writing – review and editing – visualization.
GT: Conceptualization, writing – review and editing – visualization.
BD: Methodology, supervision, validation.
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Table 1 – Sociodemographic characteristics of participants according to sarcopenia risk. Natal, 2024.[5555]

Sociodemographic variables		Sarcopenia risk		Total n (%)	p-value
		Yes n (%)	No n (%)		
Gender	Female	156 (36.9)	140 (33.1)	296 (70.0)	0.366
	Male	73 (17.3)	54 912.8)	127 (30.0)	
Age Group	60-79 years	79 (18.7)	123 (29.1)	202 (47.8)	<0.001
	≥ 80 years	150 (35.5)	71 (16.8)	221 (52.2)	
Race	White	101 (23.9)	76 (18.0)	177 (41.8)	0.306
	Non-white	128 (30.3)	118 (27.9)	246 (58.2)	
Literacy	Literate	92 (21.7)	61 (14.4)	153 (36.2)	0.063
	Illiterate	137 (32.4)	133 (31.4)	270 (63.8)	

Table 2 – Clinical characteristics according to sarcopenia risk. Natal, 2024.[ᐟᐟᐟ]

Clinical variables		Sarcopenia risk		Total n (%)	p-value
		Yes n (%)	No n (%)		
Fall Occurrence	No	100 (23.6)	86 (20.3)	186 (44.0)	0.891
	Yes	129 (30.5)	108 (25.5)	237 (56.0)	
Risk of Falls	No	67 (15.8)	97 (22.9)	164 (38.8)	<0.001
	Yes	162 (38.3)	97 (22.9)	259 (61.2)	
Polypharmacy	No	105 (24.8)	134 (31.7)	239 (56.5)	<0.001
	Yes	124 (29.3)	60 (14.2)	184 (43.5)	
Self-Reported Diseases	No	15 (3.5)	27 (6.4)	42 (9.9)	0.012
	Yes	214 (50.6)	167 (39.5)	381 (90.1)	
Cognitive Decline	No	97 (22.9)	142 (33.6)	239 (56.5)	<0.001
	Yes	132 (31.2)	52 (12.3)	184 (43.5)	
Depression	No	91 (21.5)	132 (31.2)	223 (52.7)	<0.001
	Yes	138 (32.6)	62 (14.7)	200 (47.3)	
Nutritional Risk	No	65 (15.4)	117 (27.7)	182 (43.0)	<0.001
	Yes	164 (38.8)	77 (18.2)	241 (57.0)	
Functional Decline Risk	No	31 (7.3)	93 (22.0)	124 (29.3)	<0.001
	Yes	198 (46.8)	101 (23.9)	299 (70.7)	
Frailty	No	27 (6.4)	79 (18.7)	106 (25.1)	<0.001
	Yes	202 (47.8)	115 (27.2)	317 (74.9)	
Vulnerability	No	67 (15.8)	101 (23.9)	168 (39.7)	<0.001
	Yes	162 (38.3)	93 (22.0)	255 (60.3)	