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ORIGINAL ARTICLE

CLINICAL-FUNCTIONAL FRAILTY AND SARCOPENIA IN AGED INDIVIDUALS IN PRIMARY HEALTH CARE

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ABSTRACT

Objective: to verify the clinical-functional frailty condition and its relationship with the sociodemographic characteristics and with the presence of sarcopenia in aged individuals. Method: a cross-sectional study, developed with 356 aged individuals in Primary Health Care. The data were collected between September 2018 and March 2019, through a sociodemographic data form and the Clinical-Functional Vulnerability Index. Pearson's Chi-square test was used for the analysis of the associations between the categorical variables, with a 0.05 significance level. Results: there were positive correlations between sarcopenia and the following variables: weight loss (p=0.000), Body Mass Index <22 (p=0.026), calf circumference <31 (p=0.007), gait speed >five seconds (p=0.018), marital status (p=0.003), schooling level (p=0.004), aged group (p=0.001), and frailty conditions (p=0.000). Conclusion: this study contributes to nurses' knowledge about the real needs of older adults seeking Primary Care.

DESCRIPTORS: Sarcopenia; Aged individual; Anthropometry; Primary Health Care; Older Adults' Health.

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INTRODUCTION

Sarcopenia is a predominantly geriatric condition, with gradual loss of musculoskeletal mass and of the muscle function. It is a multifactorial condition and one of the main health problems in aged individuals, leading to increased risk for disabilities, falls, injuries, hospitalization, limited independence and mortality[1].

The prevalence of sarcopenia varies from 5% to 13% in individuals aged from 60 to 70 years old, and its prevalence increases with age, affecting from 11% to 50% of the individuals aged more than 80 years old[2]. Its progression is related to various factors, among which aging, drug therapy, chronic diseases, genetics and sedentary lifestyle stand out. It is noted that its prevalence is distributed in the several sociodemographic characterizations[2].

Sarcopenia impairs the aged individuals' everyday life, causing a reduction in muscle strength and balance, which can favor functional disability among older adults, i.e., this condition exposes them to increased risk for adverse events related to their functionality. Some strategies are useful to delay this process, such as the adoption of preventive measures to reduce frailty in aged individuals and early identification of anthropometric changes in the primary care setting[3].

The evaluation of sarcopenia and of other factors related to frailty has not been routinely performed in the appointments with aged individuals and, when carried out, it results in low precision[4]. Consequently, nurses working in Primary Care play an important role in the conduction of preventive and screening actions regarding sarcopenia in older adults. It is recommended to use screening instruments in Primary Health Care that are rapid and easy to interpret so as to identify the aged population at risk; additionally, these instruments are important to standardize the classification of frailty[5].

Appropriate and timely screening of sarcopenia in aged individuals will allow Primary Health Care nurses to plan interventions that help reduce outcomes that are adverse to the aged individuals' health and, in a complementary manner, will help reduce the costs for health services, in addition to contributing to promoting successful aging[6-8].

Given the above, the study objective was to verify the clinical-functional frailty condition and its relationship with the sociodemographic characteristics and with the presence of sarcopenia in aged individuals.

METHOD

A quantitative and cross-sectional study, developed in the Family Health Strategy (FHS) units of a municipality from the inland of the state of Piauí, Brazil. The study population consisted of older adults aged ≥ 60 years old registered and monitored in the FHS units located in the urban area. The sample was calculated with a 50% outcome (P=50% and Q=50%), as this value provides a maximum sample size, adopting the significance level (α=0.05). The sample included 356 participants and was stratified with a proportional division among all the FHS units of the urban area from the municipality, which account for a total 25.

Selection of the participants was based on the following inclusion criteria: individuals aged ≥ 60 years old and with preserved verbal communication and cognitive ability to answer the tests, as verified by the Mini-Mental State Examination (MMSE), which was applied by the researchers during the interviews with the research participants. This is a cognitive assessment test that assists in the verification of possible deficits in individuals

who are at risk of developing some syndrome of dementia[9]. The instrument has a total score of 30 points and consists of questions gathered in seven categories designed to assess the cognitive function: orientation regarding time (five points), immediate memory (three points), attention and calculation (five points), evocation (five points), word recall (three points), language (eight points), and visual construction (one point)[9].

Aged individuals who were physically unable to perform the tests proposed in the MMSE and those with hearing and vision impairment that severely affected communication were excluded from the study.

Data collected took place from September 2018 to March 2019, using an instrument with socioeconomic and anthropometric variables and the Clinical-Functional Vulnerability Index (*Índice de Vulnerabilidade Clínico-Funcional*, IVCF-20) to assess the frailty condition.

IVCF-20 was developed and validated in Brazil. It is a multidimensional and interdisciplinary instrument that is fast to apply and encompasses aspects related to the older adults' health condition. It consists of 20 questions distributed into eight sections: age (one question); health self-perception (one question); functional disabilities (four questions); cognition (three questions); mood (two questions); mobility (six questions); communication (two questions), and multiple comorbidities (one question). Each segment has a specific score which, at the end, add up to a maximum value of 40 points. The higher the value obtained, the higher the risk of clinical-functional vulnerability in the aged individuals; those scoring up to six are classified as robust, those scoring from seven to 14 points are classified as at risk of frailty, and those scoring 15 or higher are classified as frail older adults[10].

Primary Care allows implementing multidisciplinary actions that promote the health of aged individuals, as well as nutritional therapeutic measures and physical activities able to promote muscle strength. The goal of these actions is to provide comprehensive care that exerts an impact on the health situation and its determinants, as the assistance provided to aged individuals in the Primary Care context involves challenges, such as the need to train nurses so as to broaden their knowledge and to improve their practices, directing them to the aged individuals' needs.

In order to characterize the sample, we used a structured questionnaire with objective questions and including the following variables: age, gender, marital status, schooling level, personal income, and aerobic/muscle capacity (unintended weight loss, Body Mass Index, gait speed, and calf circumference).

The assessment of aerobic and/or muscle capacity helps identify sarcopenia, by means of the presence of at least one of the following frailty indicators: unintended weight loss of 4.5 kg or 5% of body weight in the last year, or six kg in the last six months, or three kg in the last month; Body Mass Index (BMI) below 22 kg/m²; gait speed (four m) lower than five seconds; or calf circumference (CC) lower than 31 cm. Presence of any of these factors adds points to the final frailty score[11] and CC has been widely considered as a sensitive measure to assess and monitor muscle mass loss in older adults of both genders[12].

The data were tabulated and analyzed by means of descriptive statistics in the Statistical Package for the Social Sciences program, version 20.0. Pearson's Chi-square test was used for the study of the associations between the categorical variables, with a 0.05 significance level.

The study was approved by the Research Ethics Committee, under opinion No. 2,389,117.

RESULTS

The sample consisted in 356 older adults with a mean age of 72.8 years old: minimum of 60 and maximum of 99. There was prevalence of female aged individuals (227 [63.8%]), married or in stable unions (203 [57%]), brown-skinned (175 [49.2%]), and with up to eight years of study (156 [43.8%]).

Regarding the frailty condition, in line with the classification proposed by IVCF-20, 139 (39%) aged individuals were at risk of frailty, 137 (38.5%) were robust and 80 (22.5%) were frail. Table 1 present the aged individuals' clinical-functional profile according to the frailty indicators related to the older adults' aerobic and/or muscle capacity. There was a significant difference for all the variables analyzed, with CC < 31 cm standing out as the most frequent indicator in the older adults (85 [23.9%]), and found in 29 (36.3%) of the frail aged individuals.

Table 1 - Older adults' aerobic and/or muscle capacity and clinical-functional profile. Picos, PI, Brazil, 2019

Variables	Robust n (%)	At risk of frailty n (%)	Frágil n (%)	Frail n (%)	p-value*
Weight loss					0
No	133(97,1)	125(89,9)	60 (75)	318 (89,3)	
Yes	4 (2,9)	14 (10,1)	20 (25)	38 (10,7)	
BMI < 22					0,026
No	117(85,4)	116 (83,5)	57 (71,3)	290 (81,5)	
Yes	20 (14,6)	23 (16,5%)	23 (28,7)	66 (18,5)	
CC < 31					0,007
No	113(82,5)	107 (77)	51 (63,7)	271 (76,1)	
Yes	24 (17,5)	32 (23)	29 (36,3)	85(23,9)	
Gait speed > 5 s					0,018
No	126 (92)	126 (90,6)	64 (80)	316 (88,8)	
Yes	11 (8)	13 (9,4)	16 (20)	40 (11,2)	

* Chi-square association test (p<0.05).
Source: The authors (2019).

The presence of sarcopenia in aged individuals, defined as positive answers to one or more indicators of aerobic and/or muscle capacity, reached a frequency of 147 (41.3%) individuals, with a predominance of the female gender, 100 (68%), as shown in Table 2. Positive correlations are observed between all the variables analyzed.

Table 2 – Sociodemographic characteristics and sarcopenia. Picos, PI, Brazil, 2019

Variables	Sarcopenia n (%)	p-value*
Gender		0,16
Female	100 (68)	
Male	47 (32)	
Age group		0,001*
60 – 74	79 (53,8)	
75 – 84	45 (30,6)	
≥ 85	23 (15,6)	
Marital status		0,003*
Stable union/Married	68 (46,3)	
Widowed	57 (38,7)	
Single	22 (15)	
Schooling		0,004*
Illiterate	68 (46,3)	
Up to 8 years of study	65 (44,2)	
More than 8 years of study	14 (9,5)	

* Chi-square association test (p<0.05).
Source: The authors (2019).

Table 3 presents the frequency of sarcopenia according to the frailty levels. Among the aged individuals who presented sarcopenia, 56 (40.3%)were at risk of frailty and 52 (65.0%) were frail. There was a significant statistical association between the variables.

Table 3 - Frailty and sarcopenia conditions. Picos, PI, Brazil, 2019

Variables	Robust n (%)	At risk of frailty n (%)	Frágil n (%)	Frail n (%)	p-value*
Sarcopenia					0,000
Yes	39 (28,5)	56 (40,3)	52 (65,0)	147 (41,3)	
No	98 (71,5)	83 (59,7)	28 (35,0)	209 (58,7)	

Source: The authors (2019).

DISCUSSION

The results verified high frailty and risk for frailty conditions in the aged individuals, noticed in more than half of the participants. These clinical-functional conditions are worrying, as they exert a negative impact on the aged individuals' health and may lead to disability, increase use of the health services, worsen the degree of physical and social dependence, and increase the need for prolonged care[13]. Due to these conditions, frail aged individuals are at a considerable risk of falls, disability, hospitalization, mortality, malnutrition, reduced lean mass and muscle strength[14].

With regard to the frequency of frailty in aged individuals, in line with the data presented in this study, a cross-sectional survey conducted with 427 older adults in the city of Juiz de Fora, Minas Gerais, showed that 49.9% of the sample was identified as pre-frail, with predominance of the female gender (68%)[15].

As for the distribution of sarcopenia, the values obtained in the current study differed from those found in a cross-sectional research study developed in Salvador, Bahia, with 216 older adults living in long-term care facilities, where the prevalence of sarcopenia was 72.2%, and this condition was associated with the male gender[16]. In a study conducted with the Thai population, with a sample of 334 men and 498 women between 20 and 84 years of age, the prevalence of sarcopenia was 35.33%, a percentage similar to that obtained in the current study[17].

Sarcopenia in aged individuals is associated with impairment in quality of life, physical-functional capacity, nutritional status, comorbidities, and even increased risk of mortality[18]. The data presented in this study show a reduction in muscle strength, a considerable decrease in gait speed, and low tolerance to physical exercise, which exerts a negative impact on older adults' functional capacity. This reduction in muscle strength leads to a decrease in tolerance to physical exercise, consequently making aged individuals dependent due to the deficit in the performance of activities of daily living[19].

Among the frailty indicators related to the aged individuals' aerobic and/or muscle capacity, CC lower than 31 cm was the most frequent in the sample, being considered the best clinical indicator of sarcopenia, in addition to being related to functional disability and risk for falls[20]. In this context, CC seems to be a measure of interest to assess increased risk for disabilities and dependence in aged individuals; thus, it should be incorporated to the multidimensional assessment in this age group[21].

A cross-sectional study conducted with 132 aged individuals from Goiânia, Goiás, concluded that the assessment of CC can be a useful technology in nurses' clinical practice in order to identify and follow-up reduced muscle mass, monitor body weight losses, and early identification of sarcopenia. Therefore, its use is recommended in contexts of clinical practice in Primary Care using values of 33 cm in women and 34 cm in men to screen reduced muscle mass[22].

The sociodemographic characteristics can act as a protection or risk factor regarding the speed with which the sarcopenia condition installs in the body[23]. In this study, the frequency of sarcopenia was higher in the aged individuals that belonged to the age group between 60 and 74 years old, married or in stable unions, and with lower schooling levels.

Similarly, the frequency of sarcopenia was higher in the longer-lived older adults in a study conducted with patients from the Massachusetts General Hospital (MGH) Cancer Center with confirmed diagnosis of lung or non-colorectal gastrointestinal cancer, whose results indicated that more than a half (55.3%) of the older patients (66.66 years old vs. 61.63 years old, $p<0.001$) presented sarcopenia, them being men (65.6% vs. 39.6%, $p<0.001$), of non-Hispanic race (0.0% vs. 6.6%, $p=0.003$), and with schooling levels up to High School education (67.9% vs. 50.9%, $p=0.011$). The multiple logistic regression analyses showed that advanced age (odds ratio [OR]=1.05, $p=0.002$), white race (OR=5.03, $p=0.02$), and schooling level above high school (OR=1.95, $p=0.047$) were associated with a higher probability of sarcopenia, whereas female gender (OR=0.25, $p<0.001$) and higher Body Mass Index (BMI; OR=0.79, $p<0.001$) were associated with a lower probability of

sarcopenia[24].

In another study conducted in Japan, the researchers also identified an increase in the prevalence of sarcopenia as age increased in both genders[25]. Such increase was higher in the women aged from 75 to 79 years old (w=27.1% vs m=23.3%), and in the men aged from 80 to 84 years old (m=43.9% vs w=35.6%) and from 85 to 89 years old (m=75.0% vs w=54.3%).

The significant association ($p<0.001$) between sarcopenia and the frailty condition was also found in a population-based cross-sectional study developed based on data collected in the Toledo Study of Healthy Aging (TSHA)[26]. In this research, the prevalence of frailty among those with sarcopenia varied from 8.2% to 10.4%. These findings show that frailty and sarcopenia are different conditions, although they are correlated.

The study results bring about important contributions to the Nursing care provided to aged individuals in Primary Health Care. A quantitative cohort study conducted in Recife, Pernambuco, infers that measures such as practice of physical activity, reduction of polypharmacy, caloric and protein support and vitamin D replacement are interventions that can be performed in Primary Health Care and which exert a direct impact on the prevention and management of the health of aged individuals with sarcopenia[27].

A cross-sectional study conducted in Primary Health Care verified an association between the Frail Older Adult Syndrome and the correlated risk factors. Sarcopenia was present in 11.5% of the participants, a fact that have numerous repercussions for the aged individual's clinical conditions, including physical disabilities, mobility limitations, increased risk for falls, reduced quality of life, or even mortality[28].

These pieces of evidence denote the relevance of assessing aged individuals' frailty and sarcopenia in Primary Health Care (PHC), as the assistance provided at this complexity level allows for early screening of these diseases and exerts an impact on aged individuals' comprehensive care, promoting reestablishment of their functionality whereas recovering their autonomy and independence.

The significant association between sarcopenia and aged individuals' frailty found in the study reveal that PHC nurses should be attentive to both physical and physiological changes in the aging process and to the social and family context in which aged individuals are inserted. Thus, they are essential in the planning and implementation of short- and long-term early interventions capable of preventing disabilities and physical limitations, thus promoting independence and autonomy in aged individuals[28].

The research limitation lies in its cross-sectional design, which does not allow establishing any causality relationship. However, as the study had a significant stratified sample from one of the most densely populated municipalities in the state of Piauí, the results contribute to the knowledge of the reality of aged individuals' health in this territory and may help managers to define more strategies to promote more equal care for aged individuals in PHC.

CONCLUSION

It was noticed that the presence of sarcopenia is associated with the following: frail older adult, age group, marital status, schooling level and frailty indicators related to aerobic and/or muscle capacity. In the gerontological practice, nurses should use instruments that assist in the early identification of frail aged individuals presenting sarcopenia, which requires training and engagement of the multiprofessional team.

The instrument used in the research is fundamental to identify frailty in aged

individuals seeking Primary Health Care and may contribute for the improvement of the actions directed to the most vulnerable older adults. This study aims at raising awareness of the need to train Primary Health Care professionals in order for them to implement screening tools for sarcopenia in older adults' care, promoting disease prevention and early diagnosis actions.

Therefore, Primary Care nurses can detect and intervene early in the risk factors that impair aged individuals' functionality, through qualified listening, use of appropriate screening tools, and implementation of preventive actions with family support.

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