

ORIGINAL ARTICLE

Prevalence of older adults with low muscle mass living in a residential continuing care retirement community in Florida

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Received: August 5, 2018

Accepted: November 15, 2018

Online Published: November 23, 2018

DOI: 10.5430/cns.v7n1p83

URL: <https://doi.org/10.5430/cns.v7n1p83>

ABSTRACT

Muscle mass, strength, and function have been shown to decline with aging, and if of sufficient magnitude can result in sarcopenia. This study's objective was to determine the prevalence of low muscle mass in a group of adults living in a "premier" Florida residential continuing care retirement community. The sample consisted of 80 older adults, ranging from young old (65-74 years) to the oldest old (85+ years) with the oldest participant being 94 years. Skeletal muscle mass was assessed via bioelectrical impedance analysis. Skeletal muscle index values were calculated and compared with established cut-off values to classify each individual's muscle mass as normal or low (sarcopenic). The prevalence of sarcopenia among the males was 66% and among females was 73%. When examined by age, 56% of those in their 70s, 73% of those in their 80s, and 79% of adults in their 90s had low muscle mass indicative of sarcopenia. This study found a higher prevalence for sarcopenia in females and males, especially among the oldest groups, than previously reported in a nationally representative sample of adults. This study's findings also suggest the need for further studies examining whether the prevalence of low muscle mass among adults in either classification varies with socioeconomic status and ethnicity. Continuing care retirement communities may provide excellent environments for the screening, diagnosis, and implementation of exercise and nutritional programs for residents to help prevent or attenuate sarcopenia's deleterious effects. Nurse practitioners must incorporate screening for sarcopenia in their wellness package for their patients. Screening, nutritional education and support and exercise prescriptions are vital to prevent associated decline from sarcopenia.

Key Words: Sarcopenia, Exercise, Resistance exercise, Exercise prescription, Prevalence, Older adults

1. INTRODUCTION

Lean body mass peaks in young adulthood, between 18 and 20 years in females and 18 and 23 years in males.^[1] Losses of about 1%-2% of muscle mass per year begin occurring in adults at about middle-age (over 50 years), with losses as

great as 30% of lean body mass observed by the time individuals reach 80 years.^[2,3] Sarcopenia has been the term used classically to refer to an age-associated progressive decline in muscle mass, although the condition is now more often defined to also include reductions in muscle strength and/or

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physical function (performance).^[3,4]

Sarcopenia is associated with several adverse outcomes including decreased independence, early onset disability, and functional limitations. Increased risks of frailty, falls, and fractures have also been documented in individuals with sarcopenia.^[5-10] Increased risks of postoperative complications, as well as increased length of stay and likelihood of re-hospitalization are also found among hospitalized patients with sarcopenia.^[11-13] Moreover, in individuals with co-morbid conditions, including cancer and heart, renal, and respiratory diseases, reduced muscle mass is associated with increased mortality.^[14-19]

The relatively new (as of October 2016) ICD-10-CM code M62.84 provides the opportunity for practitioners to diagnose sarcopenia in patients.^[20] Yet, a lack of consensus among various study/working groups, including, for example, the European Working Group on Sarcopenia in Older People,^[21] the International Working Group on Sarcopenia,^[3,22] and the Foundation for the National Institutes of Health Sarcopenia Project,^[4] regarding the definition and diagnosis of sarcopenia remains problematic. The disharmony is associated primarily with the varying approaches used to determine the adequacy of the absolute muscle mass that is present.^[23,24] Moreover, the multitude of approaches has led to wide disparities in the reported prevalence of sarcopenia, which, for example, range from about 7% to over 59% in community-dwelling older adults living in the United States, although higher percentages in individuals in long-term and acute care settings have been evidenced.^[9,22,25-27] The new ICD-10-CM code permits all medical providers reimbursement for diagnosing sarcopenia. This is critical as now nurse practitioners can assess for this important disease process early to hopefully provide interventions that will combat this disease process.

Objective

The objective of this study was to determine the prevalence of low muscle mass (i.e. sarcopenia) among a group of older adults living in a Florida residential continuing care retirement community.

2. METHODS AND DATA COLLECTION

Adults over the age of 50 years were recruited from a retirement community with 384 residences located on 83 acres in South Florida. The community, which is marketed as a “premier” continuing care retirement community (CCRC), is home to more than 700 residents, who live in one of four environments: independent living, assisted living, skilled nursing, and at-home living. Recruitment for the study occurred by advertisements on the community’s in-house television

network and by flyers sent to residents in the independent living community. The project was explained to prospective participants, and informed consent was acquired from those interested in participation. Exclusions to project participation included individuals having any orthopedic or cardiovascular implants.

Demographic information, including gender, age, and ethnicity, was collected from participants. Height was measured using a vertical measuring tape, and weight was measured using an electronic scale (Health-O-Meter, Model 349KLX). Body mass index (BMI) was calculated for each participant as weight (kg)/height² (m). Participants were classified as underweight, normal, overweight, or obese according to Centers for Disease Control and Prevention definitions.^[28]

Body composition was assessed via bioelectrical impedance analysis (RJL Systems BIA-Quantum IV Analyzer[®]). First, participants were asked to lie down in a supine position on a portable physical therapy table. Once positioned on the table, electrodes were placed on their right hand and right foot to obtain both resistance and reactance values. Whole-body (total) skeletal muscle mass was calculated using the average resistance values (ohms) from three sequential BIA assessments and using the prediction equation of Janssen et al.^[9] This equation was developed and cross-validated against magnetic resonance imaging measures of whole-body muscle mass in a sample of 269 men and women ranging in age from 18 to 86 years and in BMI from 16 to 48 kg/m².^[9,29]

Skeletal muscle index (SMI) was calculated for each participant by dividing skeletal muscle mass (kg) by body weight (kg) and multiplying by 100; SMI adjusts for stature and non-skeletal muscle tissues (fat, organ, and bone mass).^[9] Each participant’s SMI value was then classified as normal or sarcopenic, either class I or II, based on cut-off values established from the Third National Health and Nutrition Examination Survey (NHANES III) data.^[9] An SMI was considered normal if it was greater than one standard deviation above the sex-specific mean for over 6,000 young adults (aged 18 to 39 years) from the NHANES III data. Class I sarcopenia was deemed present if the SMI was within one to two standard deviations, and class II sarcopenia was diagnosed if the SMI was below two standard deviations of young adult values.^[9]

3. RESULTS

Study participants included 80 older adults (32 males and 48 females) with an average age of 83.40 (\pm 5.30) years (males 83.97 \pm 5.31, and females 83.02 \pm 5.31). The participants’ ages ranged from 70 to 94 years, with 18 participants in their 70s, 48 participants in their 80s, and 14 participants in their

90s. The majority of the participants were Caucasian.

The BMI of the males and females averaged 26.0 and 24.2 kg/m², respectively. Based on BMI, the majority, 56%, of the males had a BMI in the overweight category, 38% were categorized as normal, and 6% were obese (see Table 1). Of the females, the majority, 67%, had a BMI in the normal category, 27% were overweight, 4% were obese, and 2% were underweight (see Table 1).

The prevalence of sarcopenia based on low muscle mass among the males and females was 66% and 73%, respectively (see Table 1). The overwhelming majority had class I sarcopenia, specifically 59% of the males and 65% of the females. Only 6% of males and 8% of females had class II sarcopenia. An examination of the prevalence of sarcopenia based on low muscle mass by age found that 56% of adults in their 70s had sarcopenia, 73% of those in their 80s had sarcopenia, and 79% of adults in their 90s had sarcopenia.

Table 1. Skeletal mass index by BMI of a group of older adults living in a continuing care residential community in Florida

	Skeletal Mass Index							
	Males				Females			
	n	Normal > 37%	Class I 31%–37%	Class II < 31%	n	Normal > 28%	Class I 22%–28%	Class II < 22%
Overall	32	11	19	2	48	13	31	4
BMI (kg/m²)								
• Underweight	0	-	-	-	1	1	-	-
• Normal	12	7	4	1	32	12	19	1
• Overweight	18	4	13	1	13	-	11	2
• Obese	2	-	2	-	2	-	1	1

4. DISCUSSION

The presence of sarcopenia among this group of older adults living in a “premier” residential continuing care retirement community in Florida was higher in both females at 73% (65% class I and 8% class II) and among males, 66% (59% class I and 7% class II) than found in previous investigations. These findings are potentially noteworthy especially for the males. Conclusions reached from the 4,504 adults aged 60 and older (average age 70 ± 7 years) from the NHANES III data reported 69% of the females (59% class I and 10% class II) and just 51% of the males (45% class I and 6% class II) were considered sarcopenic.^[9] The study by Janssen et al.^[9] provides an estimation of the prevalence of sarcopenia among a large, ethnically diverse group of older adults, including 2,298 women and 2,224 men aged 60 years and older, in the United States. The higher overall prevalence in the present study may be age-related with a 10-year older mean age of participants in the present study versus the NHANES sample. Muscle mass loss increases with age,^[30] although prevalence data on class I and II sarcopenia has been shown in earlier studies to remain constant among adults after the sixth decade.^[9,23]

Additionally, this study’s population, being primarily Caucasians, was not as ethnically and socioeconomically diverse as the NHANES III sample. Whether the prevalence of sarcopenia varies with ethnicity, it is difficult to ascertain from the published scientific literature possibly due to the

multiple approaches used for its diagnosis. An examination of ethnicity-related differences in skeletal muscle, however, showed the greatest declines with aging in the muscle mass of females occurring in African Americans, followed by Asians, Whites, and Hispanics.^[31] Among males, Hispanics exhibited the greatest decline in muscle mass per decade followed by African Americans and Whites.^[31] Earlier findings based on muscle mass suggest Caucasians may be at lower risk for muscle mass losses compared with other ethnic groups although this fact is not supported by the current study’s findings.

This study’s population also likely had a relatively high socioeconomic status based on their residence in a marketed “premier” CCRC in South Florida. In the United States, there are over 2,000 CCRCs, with entrance fees ranging from \$100,000 to \$1 million, and monthly fees averaging about \$3,000.^[32] Thus, while questions about income were not directly asked of the study participants, CCRC residents were thought to have fairly high socioeconomic means, especially in this “premier” facility. Studies examining the prevalence of sarcopenia based on socioeconomic status were not found in a review of the scientific literature. While BMI typically declines with aging,^[33] studies also have found that women of higher socioeconomic status tend to be thinner than those from lower socioeconomic status.^[34,35] It is also possible that while participants in this study were in the independent living section of the CCRC, they may have selected to re-

side in a CCRC because they were at “higher risk”; a factor which could contribute the higher prevalence. Higher levels of dieting have also been found among women with higher incomes.^[34–36] The prevalence of disordered eating among women, over 50 and 60 years of age, is increasing, with past diagnosis and stressors such as divorce or relationship problems, “empty-nest” syndrome, death of a parent, fears from aging, and desire to look younger, among others, associated with its onset in this age group.^[37] Poor dietary intake, especially without attention to energy and protein intakes, and insufficient physical activity, especially strength training exercises, can accelerate the loss of muscle mass and contribute to the development of sarcopenia and sarcopenic obesity. Low muscle mass was found in the present study among men and women with low (underweight), normal, as well as high BMIs (overweight and obese). Similar findings have been reported in other studies.^[38] Studies are needed examining whether the prevalence of low muscle mass varies among individuals based on socioeconomic status. Such studies should also evaluate key lifestyle habits including diet and exercise. With increased focus on lifestyle medicine for prevention and treatment of chronic disease, these facts are key for nurses and nurse practitioners providing wellness education and support. Sarcopenia is present in all populations and all patients must be screened.

5. CONCLUSIONS

This study’s findings indicate a high prevalence of sarcopenia in both males and females. Although somewhat consistent with those from a larger nationally representative sample of older adults living in the United States, this study illustrates that socioeconomic status may not be an independent predictor of sarcopenia. Additionally, a major consideration from this study and others is that it continues to be documented that the loss of muscle mass occurs in the majority of older adults. More studies are needed to examine whether or not the prevalence of sarcopenia varies significantly based on ethnicity or socioeconomic status. Research also should evaluate best screening modalities for the patient in their primary care setting. This would also include the pathways for prevention and treatment that would include dietary and exercise prescriptions from licensed dietitians and exercise physiologists. Nurses and nurse practitioners are vital to the process of screening, education and referrals to other trained professionals on the interdisciplinary team for patients to prevent and improve health. Given its adverse effects, it is recommended that all older adults be screened for sarcopenia. Moreover, CCRCs represent excellent environments for the implementation of exercise and nutritional education programs for its residents to help prevent and treat sarcopenia.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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