Psychosocial Factors Associated With Reduced Muscle Mass, Strength, and Function in Residential Care Apartment Complex Residents

Murad H. Taani, PhD, MPH, RN; Ellen Siglinsky, BS; Christine R. Kovach, PhD, RN, FAAN, FGSA; and Bjoern Buehring, MD

ABSTRACT

Sarcopenia is a major source of disability in older adults. However, limited data are available about sarcopenia components (i.e., muscle mass, strength, and function) and their relationship to psychosocial factors among older adults living in residential care apartment complexes (RCACs). The current study examined muscle mass, strength, and function and explored their relationship to self-efficacy for exercise, depressive symptoms, and social support in 31 RCAC residents. RCAC residents had lower muscle mass, strength, and function compared to values reported in studies of community-dwelling older adults. Men had higher muscle mass and strength than women. The current findings showed a trend for individuals with high self-efficacy, without depressive symptoms, and with strong social support to present numerically greater muscle mass, strength, and function. Further studies with larger samples are needed to confirm the current study findings and inform development of interventions implemented in RCAC settings. **[Res Gerontol Nurs. 2018; 11(5):238-248.]**

Sarcopenia is a geriatric syndrome characterized by a reduction in muscle mass, strength, and function in older adults (Bruyère et al., 2016). This reduction leads to negative outcomes, including reduced mobility and independence, falls, and fractures. Sarcopenia also increases the use of residential long-term care (LTC) facilities, hospitalization, morbidity, and mortality, all of which place a burden on the individual, his/her family, and the health care system (Bruyère et al., 2016; Clark & Manini, 2010; Hirani et al., 2015). Estimates indicate that sarcopenia and its negative consequences cost the U.S. health care system approximately $18.5 billion annually (Bruyère et al., 2016).

Dr. Taani is Assistant Professor, College of Nursing, University of Wisconsin–Milwaukee; Ms. Siglinsky is Certified Clinical Research Coordinator, Osteoporosis Clinical Research Program, University of Wisconsin–Madison, Dr. Kovach is Jewish Home and Care Center Research Professor in Aging, University of Wisconsin–Milwaukee, College of Nursing, and Dr. Buehring, is Assistant Professor of Medicine, Division of Geriatrics and Gerontology/Osteoporosis Clinical Research Program, University of Wisconsin–Madison, and Attending Physician, William S. Middleton Memorial Veterans Hospital, Madison, Wisconsin.

The authors have disclosed no potential conflicts of interest, financial or otherwise. The authors gratefully acknowledge funding from the Extendicare Foundation and Jewish Home & Care Center Foundation.

Dr. Kovach was not involved in the peer review or decision-making process for this manuscript.

Address correspondence to Murad H. Taani, PhD, MPH, RN, Assistant Professor, College of Nursing, University of Wisconsin–Milwaukee, 1921 East Hartford Avenue, Milwaukee, WI 53211; e-mail: mhtaani@uwm.edu.

Received: September 21, 2017; Accepted: June 20, 2018

doi:10.3928/19404921-20180810-02

The etiology of sarcopenia is multifactorial, comprising hormonal changes, endocrine issues, protein synthesis, proteolysis, inflammatory processes, physical inactivity, and malnutrition (Henwood, Keogh, Reid, Jordan, & Senior, 2014; Morley et al., 2010). Although these mechanisms and the role they play in the onset and progression of sarcopenia are well understood, other factors, including psychosocial factors, are less studied (Brady, Straight, & Evans, 2014; Henwood et al., 2014). For example, research has demonstrated reciprocal effects between decline in physical activity and loss of muscle mass, strength, and function (Bann et al., 2014; Gianoudis, Bailey, & Daly, 2014). Physical activity and exercise play a major role in preventing sarcopenia and improving physical function (Cruz-Jentoft et al., 2014). However, only 51.1% and 21.9% of older adults meet the recommended aerobic- and resistance-training guidelines, respectively (Brady & Straight, 2014). Although the influence of self-efficacy is rarely addressed in sarcopenia research (Brady et al., 2014; Goisser et al., 2015), it is crucial to explore whether self-efficacy for exercise underlies any effects of physical activity and exercise on muscle mass, strength, and function in older adults.

Sarcopenia and depressive symptoms seem to share several common risk factors, such as physical inactivity, malnutrition, hormonal dysregulation, and upregulation of inflammatory markers such as cytokines (Henwood et al., 2014; Hsu et al., 2014; Morley et al., 2010). However, recent studies have shown inconsistent results regarding the association between sarcopenia and depressive symptoms. Hsu et al. (2014) found that sarcopenia was associated with depressive symptoms, whereas Byeon, Kang, Kang, Kim, and Bae (2016) reported no association between depressive symptoms and sarcopenia among older adults.

Social support and sarcopenia also appear to share common risk factors. Whereas older adults who have strong social support are less likely to lead inactive lifestyles and be depressed, individuals with poor social support are prone to isolation, depressive symptoms, and inactivity (Wallace, Theou, Pena, Rockwood, & Andrew, 2015; Yeom, Fleury, & Keller, 2008). These outcomes may negatively impact muscle mass, strength, and function in older adults. To the best of the current researchers' knowledge, no previous research has been conducted to investigate the association between social support and sarcopenia in older adults. Therefore, further research is needed to examine the association between self-efficacy for exercise, depressive symptoms, social support, and poor muscle outcomes. A greater understanding of factors contributing to poor muscle outcomes is crucial to prevent sarcopenia and design interventions to decrease its potential consequences.

In addition, increased dependency and impairments are considered a major reason for transfer from residential care apartment complexes (RCACs) to more restrictive living environments, such as LTC facilities and nursing homes. Researchers have suggested that increased impairments may be related to a lack of appropriate assessment and treatment (Giuliani et al., 2008; Roberts et al., 2013). Most studies of RCAC residents report only general functional ability, such as activities of daily living (ADL), and no benchmarks exist for functional data (Giuliani et al., 2008; Roberts et al., 2013). Although measures of ADL are valuable for identifying disability level, they are not useful for detecting modifiable muscle function impairments that lead to disability (Gibson et al., 2010; Giuliani et al., 2008). Being able to precisely measure muscle health of older adults living in RCACs could potentially provide new information to better distinguish older adults at risk for placement into LTC facilities or nursing homes from those who are more likely to successfully age in their home environment. Knowledge of this at-risk group may also assist in developing interventions to maintain or improve muscle outcomes and physical performance, as well as to prevent or delay transfer to more restrictive living environments. In turn, having knowledge of and developing interventions for this at-risk group could subsequently improve quality of life and decrease use of expensive health care services (Fielding et al., 2011; Giuliani et al., 2008).

The purpose of the current study was to describe each component of sarcopenia (i.e., muscle mass, strength, and function) in an understudied sample of older adults living in one RCAC, and explore the relationship of self-efficacy for exercise, depressive symptoms, and social support to muscle mass, strength, and function.

THEORETICAL FRAMEWORK

The current study was guided by the Individual and Family Self-Management Theory (IFSMT) (Ryan & Swain, 2009). The IFSMT supports the relationship of context factors (i.e., depression) and self-management process factors (i.e., self-efficacy for exercise and social support) to physical activity self-management behaviors and health outcomes (i.e., muscle mass, strength, and function). Self-efficacy for exercise, depressive symptoms, and social support factors may complicate and hinder self-management behaviors and negatively impact health outcomes in older adults residing in RCACs. Inadequately addressing factors that can contribute to poor self-management behaviors has the ability to set off a complex series of events that lead to negative outcomes. Examination of the interplay between self-efficacy for exercise; depressive symptoms; and muscle mass, strength, and function will advance the science of self-management and lay the foundation for designing interventions to improve self-management behaviors and ultimately health outcomes, including improved muscle mass, strength, and function.

METHOD

Design, Setting, and Sample

The current study is a secondary analysis of data collected for a randomized crossover-design study to investigate the effectiveness of semi-recumbent vibration exercise on muscle mass, strength, and function in older adults. The current study used only the baseline data. Each participant signed an Institutional Review Board (IRB)–approved informed consent in accordance with the IRB of the University of Wisconsin–Milwaukee.

In the primary study, 31 older adults were recruited from one RCAC located in the Midwestern United States. Inclusion criteria were: (a) English-speaking adults ages ≥70; (b) no significant cognitive impairment; (c) ability to stand independently; and (d) free of any major illness, such as end-stage organ disease. Excluded were older adults who had any injury or surgery in the past 6 months that would limit their ability to perform muscle function tests. All 31 participants in the sample were White individuals and were included in the current secondary analysis.

Measurement

Independent Variables. Self-efficacy for exercise. The Self-Efficacy for Exercise (SEE) scale was used to assess participants' confidence in their ability to continue exercising despite barriers to exercise (Resnick & Jenkins, 2000). The SEE scale is a nine-item scale with a possible score range of 0 to 90. The score of each item ranges from 0 (*not confident*) to 10 (*very confident*), with lower values indicating lower self-efficacy. The reliability, validity, and internal consistency of the scale have been established in older adult populations (Resnick & Jenkins, 2000).

Depressive symptoms. The short form of the Geriatric Depression Scale (GDS-15) was used to assess depressive symptoms (Sheikh & Yesavage, 1986). The scale includes 15 *yes*/*no* questions with 1 point for each depressive symptom. The total score ranges from 0 to 15. Scores >5 indicate depressive symptoms (Marc, Raue, & Bruce, 2008). The scale had a Cronbach's alpha of 0.94, 92% sensitivity, and 89% specificity when evaluated against diagnostic criteria (Marc et al., 2008). A systematic review found a sensitivity of 0.89 and a specificity of 0.77 for the GDS-15 at the recommended cut-off score of 5 (Pocklington, Gilbody, Manea, & McMillan, 2016).

Social support. The abbreviated version of the Lubben Social Network Scale (LSNS-6) was used to measure perceived social support received by family and friends (Lubben et al., 2006). The scale comprises six items and has two subscales: family and friends. The validated LSNS-6 has been used widely and has established a cut-off point of 12 for best overall sensitivity (Lubben, 1988; Lubben et al., 2006; Rubinstein, Lubben, & Mintzer, 1994). The total score ranges from 0 to 30, with higher scores indicating greater social support. Individuals scoring ≤11 indicate a positive screen for social isolation and should be considered candidates for additional assessment and referral (Lubben et al., 2006). Participants who screen positive are considered socially isolated. Crohnbach's alpha for the subscales ranges from 0.84 to 0.89 (Lubben et al., 2006).

Dependent Variables. Muscle mass. A tetrapolar bioelectrical impedance spectroscopy (BIS) device was used to measure skeletal muscle mass (SM). BIS is a reliable method and is a more feasible, noninvasive, and portable tool for assessing muscle mass in older adults compared to other methods, such as dual energy X-ray absorptiometry (DXA) and magnetic resonance imaging (MRI) (Buckinx et al., 2015; Steihaug, Gjesdal, Bogen, & Ranhoff, 2016; Yamada et al., 2013). The details of BIS have previously been described (Steihaug et al., 2016; Yamada et al., 2013). Participants were positioned supine for a minimum of 10 minutes prior to acquisition. Arms and legs were not in contact with other parts of the body to allow for accurate BIS measurement. The skin was not cleaned before applying electrodes. Participants emptied their bladders and all metal jewelry was removed before measurement. Measurements were taken twice by a trained data collector (E.S.) with extensive experience using the device. The mean scores were used for analyses. Janssen equation was chosen to calculate the total SM, as it is one of the most well-known and used equations for estimating muscle mass in older adults using data from BIS (Janssen, Heymsfield, Baumgartner, & Ross, 2000). Using Janssen equation allows the current study to be comparable with other studies among institutionalized and community-dwelling older adults.

Janssen equation:

$$\text{SM (kg)} = ([\text{height}^2 / \text{R50} \times 0.401] + [\text{sex} \times 3.825] + [\text{age} \times -0.071]) + 5.102$$

R50 (resistance at frequency 50 kHz) was measured in ohms between the right wrist and ankle in a supine position (Janssen, Heymsfield, Baumgartner, et al., 2000), height in centimeters, weight in kilograms, and age in years. Regarding gender, men = 1 and women = 0 (Janssen, Heymsfield, Baumgartner, et al., 2000).

Muscle strength. Hand-grip strength was measured using a JAMAR® handgrip dynamometer, which is the accepted gold standard for measurement of grip strength (Mathiowetz, 2002). Participants used their non-dominant hand unless otherwise instructed. Three attempts were performed, with participants resting for 10 to 20 seconds between attempts and with the elbow flexed at 90°. The maximal achieved grip strength was used for analyses. According to the European Working Group on Sarcopenia in Older People (EWGSOP), the cut-off for grip strength for men is <30 kg and for women is <20 kg (Cruz-Jentoft, Landi, Topinkova, & Michel, 2010). Grip strength is a valid measure of muscle strength, correlating –0.611 to –0.843 with the Timed Up and Go test in older adults. Test–retest reliability over 12 weeks showed intraclass correlation coefficients of 0.954 and 0.912 for the left and right hands, respectively (Bohannon & Schaubert, 2005).

Muscle function/physical performance. Jumping mechanography (JM) and the Short Physical Performance Battery (SPPB) were used.

JM provides an objective quantification of muscle function parameters of the lower limbs, including weight-corrected jump power. The details of JM and procedures of countermovement jump test have previously been described (Beuhring, Krueger, & Binkley, 2010; Taani, Kovach, & Beuhring, 2017). Each participant performed three two-leg maximal countermovement jumps on a force plate. Participants were asked to jump as high as possible using both legs, attempting to touch the ceiling with their head. The jump with greatest height was chosen and weight-corrected maximum power of the jump was calculated. This test has good test–retest reliability with low intrasubject short-term error (3.6%) and a high test–retest correlation coefficient (r = 0.99) (Buehring et al., 2015; Taani et al., 2017).

The SPPB test was used to assess lower extremity function, which includes measures of standing balance, 4-meter gait speed, and time needed to rise from a chair five times (Guralnik et al., 1994). For balance, participants were asked to remain standing with their feet side by side, followed by the semi-tandem (heel of one foot alongside the big toe of the other foot) and tandem (heel of one foot directly in front of and touching the other foot) positions for 10 seconds each. For gait speed, the time required to walk 4 meters at a usual pace was measured. This test was performed twice, with the faster of the two walks used for analyses. For ability to rise from a chair, participants were asked to stand up and sit down five times as quickly as possible with arms crossed over their chests. This test was conducted only after participants demonstrated the ability to rise once without using their arms (Guralnik et al., 1994). Each component has a possible score of 0 to 4, and the total SPPB scores range from 0 to 12. Individuals can be classified as *low performance* (0 to 6), *intermediate performance* (7 to 9), and *high performance* (10 to 12) (Guralnik et al., 2000). For purposes of the current study, researchers used total SPPB score and the 4-meter gait speed (measured in meters per second). According to the EWGSOP, the cut-off for gait speed is ≤0.8 meters per second (Cruz-Jentoft et al., 2010). Test–retest reliability revealed intraclass correlation coefficients of 0.87 in older adults ages 65 to 74 (Gómez, Curcio, Alvarado, Zunzunegui, & Guralnik, 2013). The SPPB test is an indicator of disability, nursing home admission, and mortality, and is related to limitations in walking and climbing steps (Freire, Guerra, Alvarado, Guralnik, & Zunzunegui, 2012; Gómez et al., 2013; Guralnik et al., 1994).

Other measures. Height and weight were measured. Participants were barefoot and wearing light clothes while being measured. Weight was measured using a digital weighing machine. Height was measured by unstretched tape when participants were without shoes and in a standing position near to the wall. Body mass index was calculated as weight in kilograms divided by height in meters squared.

Procedures

Following consent and screening, the data collector (E.S.) interviewed participants to collect demographic data and administer the SEE scale, GDS-15, and LSNS-6. Then, hand-grip strength, BIS, SPPB, and JM testing were conducted by the data collector in a private room at the RCAC. Procedures were explained and demonstrated by the data collector prior to testing. Standardized instructions were given to all participants, as discussed in the measurement section of the current article. Data were collected in a single assessment for each participant, and in four waves over 9 months at the same location by the same data collector to minimize drift in measures. Several strategies were used to minimize participant fatigue/burden: (a) each questionnaire was brief and most questions were not complex or abstract; (b) the data collector administered the questionnaires by interview; and (c) every 10 minutes, participants were asked if they were fatigued and wanted to finish the questionnaires and other testing after a 1-hour break or on another day. All questionnaires and testing were well-tolerated and completed by each participant within 1 hour and no extra time was requested. Two staff members were present during testing to assure participant safety.

Data Analysis

SPSS version 23 was used for data analysis. Descriptive statistics, including means, standard deviations, frequencies, median, and ranges of scores, were used to describe the independent variables (i.e., self-efficacy for exercise, depressive symptoms, and social support) and dependent variables (i.e., muscle mass, strength, and function). Scatter plots were used to present the distributions of both genders (male and female) on their measures of muscle mass, strength, and function. A Mann–Whitney U test was used to determine whether differences existed in muscle mass, strength, and function based on gender. Self-efficacy for exercise, depressive symptoms, and social support were dichotomized. Low and high self-efficacy groups were created based on the mean score (Ellis et al., 2011). Depressive symptoms and social support were grouped based on established cut-off points for older adults (Allen & Annells, 2009; Lubben et al., 2006; Marc et al., 2008). SM, grip strength, jump power, gait speed, and SPPB scores are displayed as scatterplots for individuals with high and low self-efficacy, with and without depressive symptoms, and who are and are not socially isolated.

RESULTS

Sample Characteristics

Participants were predominately female (71%), which is consistent with the older adult population. Fifteen (48.4%) participants had low self-efficacy, four (12.9%) had depressive symptoms, and 10 (32.3%) were classified as socially isolated. All female (100%) and 8 male (89%) participants had low grip strength. Twenty-four (77.4%) individuals had slow gait speed, and 18 (58.1%) and 8 (25.8%) had low and intermediate SPPB performance, respectively (**Table**).

Men had higher SM and muscle grip strength compared to women (**Figure 1**). The Mann–Whitney U test showed that differences in grip strength and SM based on gender were statistically significant ($p < 0.001$ and $p = 0.001$, respectively). Although not statistically significant, the distribution of weight-corrected jump power for men appeared to be higher than for women. The distributions of gait speed and SPPB scores were similar in both genders.

Relationship Between Muscle Mass, Strength, and Function and Self-Efficacy, Depressive Symptoms, and Social Support. The distribution of scores display a trend for participants with higher self-efficacy to have higher mean and median scores on all muscle measurements than participants with lower self-efficacy (**Figure 2**). Participants without depressive symptoms had higher mean and median scores on all measurements than those with depressive symptoms (**Figure 3**). The findings also show a trend for individuals classified as not socially isolated to have higher mean and median scores on all measurements (except jump power) than those classified as socially isolated (**Figure 4**). None of the comparisons in the current small sample reached a level of statistical significance.

DISCUSSION

The current study is one of only a few conducted to date that use precise measures of muscle characteristics and examine the associations of muscle mass, strength, and function with self-efficacy for exercise, depressive symptoms, and social support among older adults living in RCACs. Findings showed that most participants had low gait speed and poor performance on the SPPB test. Participants also had lower SM, grip strength, SPPB scores, and gait speed values compared to previous research (Dietzel, Gast, Heine, Felsenberg, & Armbrecht, 2013; Landi et al., 2011; Senior, Henwood, Beller, Mitchell, & Keogh, 2015; Siglinsky et al., 2015; Tsubaki, Kubo, Kobayashi, Jigami, & Takahashi, 2009). This finding is likely due to the fact that the current study included primarily adults who were very old. In addition, the variability of inclusion and exclusion criteria across studies may also have had an important impact on findings. For instance, several studies included young individuals and excluded individuals with walking aids and those with any impairment of ADL (Dietzel et al., 2013; Tsubaki et al., 2009). Accordingly, it is not surprising that individuals in the current sample had low muscle mass, strength, and function scores, as the current study represented a vulnerable and understudied population of older adults.

Consistent with published values among older adults, a gender difference exists for muscle mass and strength (Janssen, Heymsfield, Wang, & Ross, 2000; Yorke, Curtis, Shoemaker, & Vangsnes, 2015). In the current study, men demonstrated higher muscle mass and grip strength than women. Similar to a previous study, which reported that men had significantly greater weight-corrected jump power compared to women (Siglinsky et al., 2015), the current findings show that men had numerically higher

TABLE

Sample Characteristics and Descriptive Results

Measure	Mean (*SD*)	*n* (%)	Median	Range
Age (years)	87.5 (6)	31 (100)	87.5	75 to 99
BMI (kg/m^2)	27.7 (5.1)	31 (100)	27.3	18.9 to 42.0
Gender				
Female		22 (71)		
Male		9 (29)		
SEE scale[a]	50 (26)		53	3 to 89
SEE <50		15 (48.4)		
SEE ≥50		16 (51.6)		
Depressive symptoms	3.0 (2.8)		2	0 to 13
GDS[b] score ≤5		27 (87.1)		
GDS[b] score >5		4 (12.9)		
Social support	14.7 (7)		6	2 to 25
LSNS[c] score ≤11		10 (32.3)		
LSNS[c] score >11		21 (67.7)		
Grip strength[d] (kg)	14 (5.9)	31 (100)	12	6 to 30
Male				
<30		8 (89)		
≥30		1 (11)		
Female				
<20		22 (100)		
≥20		0 (0)		
Gait speed[e] (m/s)	0.7 (1.8)	31 (100)	0.64	0.3 to 1.0
<0.8		24 (77.4)		
≥0.8		7 (22.6)		
SPPB[f] score	6.4 (2.7)	31 (100)	6	2 to 12
0 to 6		18 (58.1)		
7 to 9		8 (25.8)		
10 to 12		5 (16.1)		
Jump power[g] (watts/kg)	8.6 (5.5)	30 (96.8)	8.5	0.4 to 25.1
SM (kg)	17.5 (5.3)	31 (100)	16.8	5.3 to 28.4

Note. BMI = body mass index; SEE = Self-Efficacy for Exercise; GDS = Geriatric Depression Scale; LSNS = Lubben Social Network Scale; SPPB = Short Physical Performance Battery; SM = skeletal muscle mass.

[a] Total scores range from 0 to 90. The score of each item ranges from 0 (*not confident*) to 10 (*very confident*), with lower values indicating lower self-efficacy.

[b] Total score ranges from 0 to 15. Scores >5 indicate depressive symptoms.

[c] Total score ranges from 0 to 30, with higher scores indicating greater social support. Individuals scoring ≤11 indicate a positive screen for social isolation.

[d] Measured using a JAMAR® handgrip dynamometer. The cut-off for grip strength for men was <30 kg and for women was <20 kg.

[e] The time required to walk 4 meters at a usual pace was measured. This test was performed twice, with the faster of the two walks used for analyses. The cut-off for gait speed was ≤0.8 m/s.

[f] Total SPPB scores range from 0 to 12. Individuals can be classified as *low performance* (0 to 6), *intermediate performance* (7 to 9), and *high performance* (10 to 12).

[g] Each participant performed three two-leg maximal countermovement jumps on a force plate. Participants were asked to jump as high as possible using both legs, attempting to touch the ceiling with their head. The jump with greatest height was chosen and weight-corrected maximum power of the jump was calculated. One individual did not participate in the jump power test.

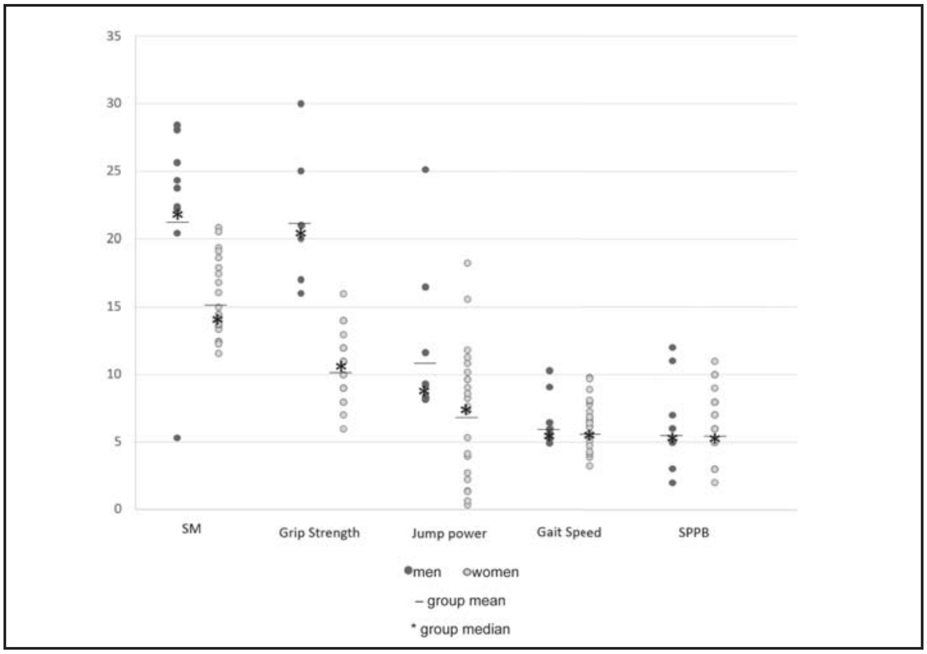

Figure 1. Distributions of skeletal muscle mass (SM), hand grip strength, weight-corrected jump power, gait speed, and Short Physical Performance Battery (SPPB) test scores for men and women.
Note. Gait speed was scaled by a factor of 10 for the graph.

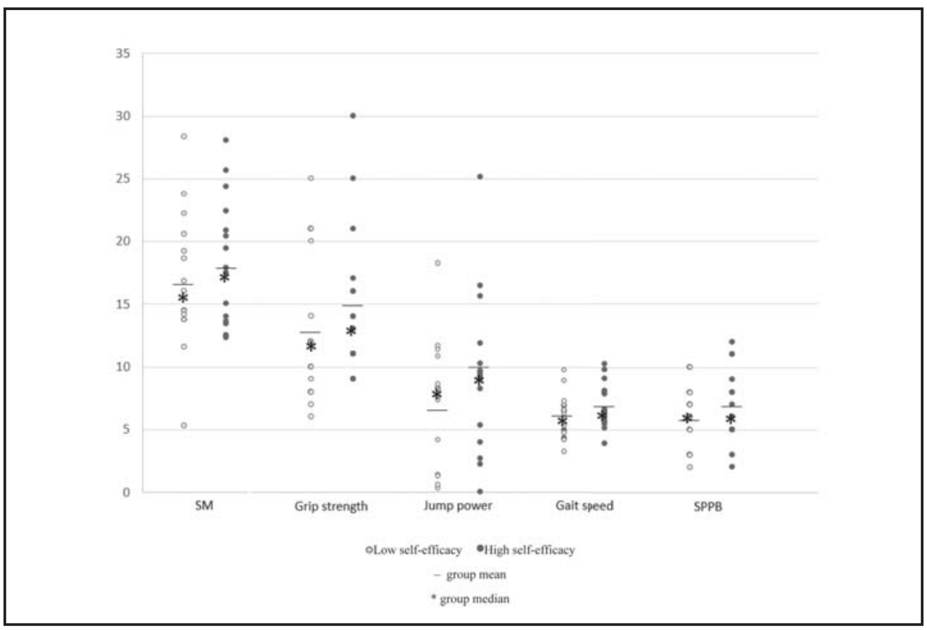

Figure 2. Distribution of muscle mass, strength, and function based on high and low self-efficacy.
Note. SM = skeletal muscle mass; SPPB = Short Performance Physical Battery. Gait speed was scaled by a factor of 10 for the graph.

jump power than women. In addition, whereas the current study showed that men and women had similar scores on the gait speed and SPPB tests, previous studies showed conflicting data regarding gender differences and physical function tests among community-dwelling older adults (Cooper, Hardy, et al., 2011; Fragala et al., 2012; Siglinsky et al., 2015).

Findings from the current study suggest a trend for individuals with high self-efficacy to have numerically better scores on all muscle mass, strength, and function measurements than those with low self-efficacy. This trend is consistent with results from a previous study, which found an association between self-efficacy for exercise and functional decline in older adults (Cooper, Huisman, Kuh, & Deeg, 2011). Despite the suggested protective effect of physical activity on muscle outcomes, physical activity behaviors and the practicality of exercise among older adults remain questionable (Pillard et al., 2011). Results of the current study suggest that self-efficacy for exercise can be a factor that may contribute to exercise self-management behaviors. In addition, physical, mental, and environmental barriers are poorly understood in older adults and may influence exercise behavior (Lee, Arthur, & Avis, 2008). Addressing the beliefs and contextual factors that influence physical activity and exercise self-management behaviors may prevent physical inactivity and onset or progression of sarcopenia.

Furthermore, individuals without depressive symptoms had numerically better muscle mass and strength, weight-corrected jump power, and scores on the gait speed and SPPB tests (although results were not significant). These findings are consistent with prior research, which indicated that older adults with depressive symptoms had lower muscle mass, strength, and function and had more physical dependence than older adults without depressive symptoms (Hsu et al., 2014). Kim et al. (2011) found similar results and reported a lower skeletal muscle mass in participants with depressive symptoms. Depression influences physical activity and exercise self-management behaviors and is a significant risk factor for development of a sedentary lifestyle and decreased levels of physical activity due to low motivation (Roshanaei-Moghaddam, Katon, & Russo, 2009). Nevertheless, the latest report from Byeon et al. (2016) did not identify an association between depressive symptoms and muscle mass, strength, and function. Although the association between depressive symptoms and poor muscle outcomes appeared inconsistent in previous research, the current findings add to growing evidence on the association between depressive symptoms and negative muscle outcomes in older adults.

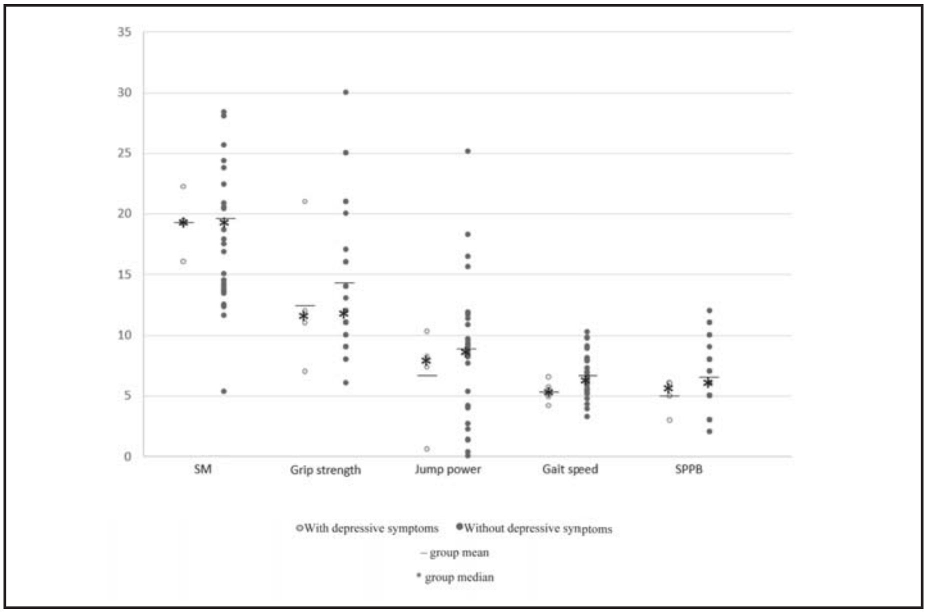

Figure 3. Distribution of muscle mass, strength, and function for individuals with and without depressive symptoms.
Note. SM = skeletal muscle mass; SPPB = Short Performance Physical Battery. Gait speed was scaled by a factor of 10 for the graph.

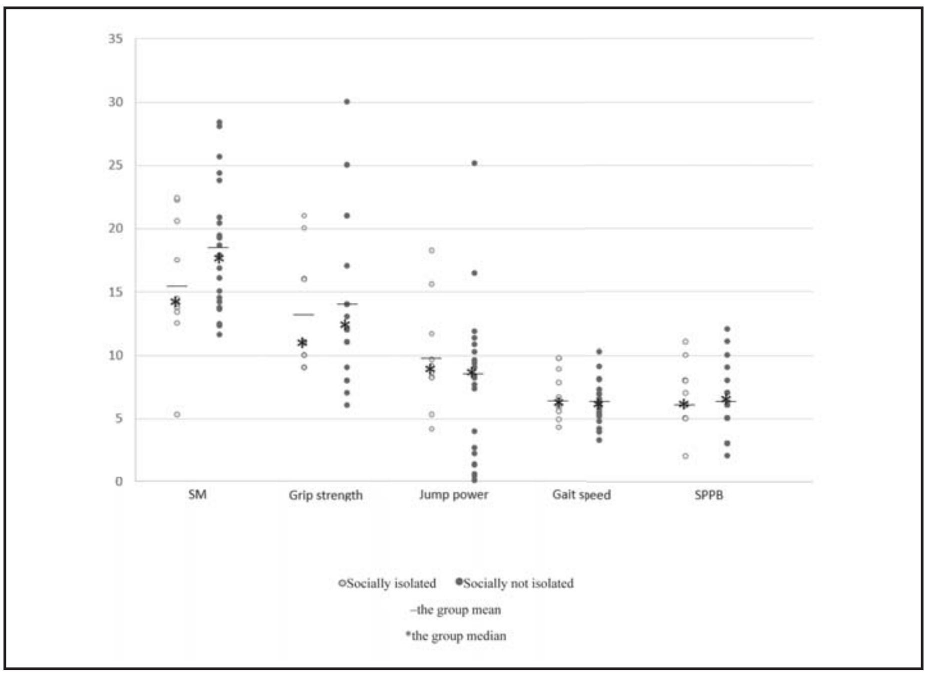

Figure 4. Distribution of muscle mass, strength, and function for individuals who were and were not socially isolated.
Note. SM = skeletal muscle mass; SPPB = Short Performance Physical Battery. Gait speed was scaled by a factor of 10 for the graph.

The current results also showed that individuals with strong social support systems had numerically greater muscle mass and hand grip strength and performed better on gait speed and SPPB tests than individuals who were classified as socially isolated. These findings are congruent with prior research that found a significant association between poor social support and low grip strength (Lamarca et al., 2013), which is a component of sarcopenia (Cruz-Jentoft et al., 2010; Fielding et al., 2011). The current results showed one unexpected finding—individuals classified as socially isolated had numerically greater jump power. Previous research indicated that strong social support is a protective factor against declines in physical function and is associated with the level of physical activity and physical health in older adults (Golden, Conroy, & Lawlor, 2009; Seeman & Chen, 2002; Wallace et al., 2015; Yeom et al., 2008). Findings from the current study and previous research suggest that social support may affect physical activity self-management behaviors and may be a countermeasure against the adverse impact of physical inactivity on muscle outcomes, including muscle mass, strength, and function.

LIMITATIONS

The current study has several limitations. The role of self-efficacy, depressive symptoms, and social support on physical activity and dietary self-management behaviors was not explored. Physical inactivity, malnutrition, and/or decline in food intake with aging contribute to muscle loss and play a role in the development of sarcopenia (Bruyère et al., 2016; Cruz-Jentoft et al., 2014). Future researchers must consider the potential role that self-efficacy, depressive symptoms, and social support might have on physical activity and dietary self-management behaviors and nutrition status in RCAC residents. Another limitation of the current study is that causality cannot be inferred given the cross-sectional design. Results are also based on a small convenience sample from one geographic region, which limits generalizability. There was a lack of control for potentially confounding variables, such as comorbidities and number of medications, and future studies should consider such variables. Furthermore, individuals with end-stage organ disease, cognitive impairment, recent injury or surgery that limit ability to move, and those who were unable to stand independently were excluded, which limits generalizability. Finally, although BIS is inexpensive, noninvasive, and well-correlated with MRI and DXA predictions, BIS may underestimate fat tissue, resulting in artificially high fat-free mass values due to the common problem of dehydration in older adults.

CLINICAL IMPLICATIONS

Findings from the current study caution health care providers to pay attention to muscle mass, strength, and function of RCAC residents and perform screenings to identify individuals at risk for or with poor muscle outcomes when providing care. Although further research is needed, all potential risk factors for poor muscle outcomes and physical function impairment should be accounted for, including psychosocial factors. Due to the substantial health and economic burden on patients, families, and the health care system, researchers should develop and test strategies targeted to prevent deterioration of muscle outcomes and improve physical function among RCAC residents. Cost–benefit analyses are important to consider, as well as the potential influence of these interventions on preventing comorbid conditions.

CONCLUSION

The current study provides a new understanding of muscle outcomes in RCAC residents and the relationship between self-efficacy for exercise, depressive symptoms, social support, and poor muscle mass, strength, and function. Future larger cohort studies are required to examine the potential risk factors for poor muscle outcomes and sarcopenia, including psychosocial factors, in RCAC residents. Understanding these factors can potentially contribute to implementation of successful interventions to improve muscle outcomes and prevent sarcopenia in this population.

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