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Association of sarcopenia with depressive symptoms and functional status among ambulatory community-dwelling elderly

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ABSTRACT

Objective: Sarcopenia, functional disability, and depression are common problems in the elderly. Sarcopenia is associated with physical disability, functional impairment, depression, cardiometabolic diseases, and even mortality. This study aims to determine the association of sarcopenia with depression and functional status among ambulatory community-dwelling elderly aged 65 years and older.

Materials and method: The sample of this cross-sectional study consisted of 28,323 people, aged 65 years and older, living in Bornova, Izmir. Multi-stage sample selection was performed to reach 1007 individuals. However, 966 elderly people could be reached, and 861 elderly people who can walk were included in the study. The data were collected by the interviewers at home through face-to-face interview.

Results: The mean age was 72.2 ± 5.8 (65–100) years. The prevalence of functional disability, depressive symptoms, and sarcopenia were 21.7%, 25.2%, and 4.6%, respectively. In multivariate analysis depression was associated with sarcopenia, being illiterate and divorced, perception of the economic situation as poor/moderate, increased number of chronic diseases, and having at least one physical disability. IADL associated functional disability with sarcopenia, being illiterate/literate and female, increased age and number of medications, and the BMI.

Conclusion: Sarcopenia in ambulatory community-dwelling elderly is significantly associated with depressive symptoms and functional disability. Elderly people at high risk of sarcopenia should be screened for functional disability and depression. Appropriate interventions should also be implemented.

1. Introduction

Geriatric syndromes are common in the elderly. They impair the quality of life, and increase morbidity and mortality (Anpalahan & Gibson, 2008; Cigolle, Langa, Kabeto, Tian, & Blaum, 2007). Geriatric syndromes include depression, sarcopenia, and functional disability are among (Inouye, Studenski, Tinetti, & Kuchel, 2007).

Sarcopenia is defined as the decrease in skeletal muscle mass and quality due to increasing age (Roubenoff, Heymsfield, Kehayias, Cannon, & Rosenberg, 1997). The European Working Group on Sarcopenia in Older People (EWGSOP) recommends that sarcopenia be defined through the presence of both low muscle mass and low muscle function (strength or performance) (Cruz-Jentoft et al., 2010).

Sarcopenia is associated with the disability in basic activities of daily living (ADL) (Hairi et al., 2010; Tanimoto et al., 2013) and instrumental activities of daily living (IADL) (Baumgartner et al., 1998; Da Silva, De Oliveira Duarte, Ferreira Santos, Wong, & Lebrao, 2014; Hairi et al., 2010; Janssen, Heymsfield, & Ross, 2002; Rolland et al., 2003; Tanimoto et al., 2012).

Depression is associated with several factors such as female gender, living alone, low income and education levels, poor social support, and disability on daily work (Lapid & Rummans, 2003; Tiemeier, 2003). Yesavage et al. reported that physical illness, malnutrition, and polypharmacy were also among the factors that triggered depression

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(Yesavage, 1993). Chang et al. have reported a positive association between sarcopenia and depression in their review (Chang, Hsu, Wu, Huang, & Han, 2017). Similarly, many studies have shown that depressive disorders were associated with sarcopenia (Hsu et al., 2014; Kim et al., 2011).

Sarcopenia is associated with physical disability, inactivity, cardiometabolic disease, and even mortality, as well as the depressive disorders that are strongly related to functional impairment and physical inactivity in elderly (Kim et al., 2011). There may be an association between sarcopenia, depression and functional status. However, few studies exist on the association of sarcopenia with functional status and depressive symptoms in elderly population. This study aimed to determine the association of depression and functional status with sarcopenia among ambulatory community-dwelling elderly.

2. Methods

2.1. Subjects

This study was conducted in Bornova District, Izmir, between February and March 2015.

The sample of this cross-sectional study consisted of 28,323 community-dwelling people aged 65 years and older who were living in an urban area, the center of Bornova District in Izmir. A multi-stage sample selection was performed. The prevalence of functional disability and depression is about 15% in the community-dwelling elderly, whereas the prevalence of sarcopenia is 10%. As the prevalence of sarcopenia is lower than the prevalence of functional disability and depression, the minimum sample size was calculated as 839 elderly people, assuming sarcopenia prevalence as 10%, at a 2% error and 95% confidence limit. Twenty percent of this minimum sample size was added for non-response. The aim was to reach 1007 individuals. The neighborhoods were stratified based on three different socio-economic characteristics, and a random neighborhood was selected from each layer. All the elderly people on the randomly selected streets were included in the study. The researchers tried to reach 2430 elderly people, but 222 of them refused to participate in the study, 965 were not at home, 205 had moved elsewhere, and 72 were identified to be exitus. As a result, 966 elderly people were reached and screened, and then 861 elderly people who can walk were included in the study.

The data were collected using a 46-item questionnaire prepared by the researchers. Sociodemographic characteristics such as age, gender, marital status, education status, living status, perceived economic situation, smoking status, alcohol intake, self-reported comorbidities (e.g., diabetes, arterial hypertension, cancer, heart disease, dementia, and depression), medications, and presence of disability (visual, hearing, and physical) were recorded. Body mass index (BMI) values were calculated by dividing weight (kg) by squared height (m^2).

2.2. Determination of depressive symptoms

The severity of depression was evaluated using the Turkish version of the 15-item Geriatric Depression Scale-Short Form (GDS-SF), which was standardized in 1997 after its reliability and validity were tested by Ertan, Eker, and Şar (1997) (Sheikh & Yesavage, 1986). The participants answered the questions as yes or no. A score of 0–5 was normal. A score higher than 5 suggested depression.

2.3. Assessment of functional status

2.3.1. Basic activities of daily living

Barthel index was used to assess basic ADL. The individual items were feeding, moving from wheelchair to bed and returning to wheelchair (including sitting up in bed), personal toilet habits (washing face, combing hair, shaving, and cleaning teeth), getting on and off toilet (handling clothes, wiping, and flushing), bathing self, walking on level surface, ascending and descending stairs, dressing (includes tying shoes and fastening fasteners), controlling bowels, and controlling bladder (Mahoney & Barthel, 1965). The total score ranged from 0 to 100. A score of 60 was determined to be the cutoff, and a score higher than 60 was accepted as the ability to function independently (Tuncay & Mollaoğlu, 2006).

2.3.2. Instrumental activities of daily living

Lawton–Brody index was used for IADL. A 5-score item was used for men (shopping, medication management, money management, transportation, and telephone), and an 8-score item was used for women (preparing meals, shopping, medication management, money management, transportation, telephone, housekeeping, and laundry). Each participant received a score of 1 for each item if his/her competence was at the minimal level or higher. If the total score was ≤ 6 for elderly women, they were classified as dependent. The elderly men were classified as a dependent if their score was between 0 and 3 (Lawton & Brody, 1969).

2.4. Sarcopenia diagnosis

The EWGSOP criteria were adopted. The diagnosis of sarcopenia required the documentation of low muscle mass plus either low muscle strength or low physical performance (Cruz-Jentoft et al., 2010).

2.4.1. Muscle mass measurement

The muscle mass was measured through the calf circumference (CC). If the CC was lower than 31 cm, muscle mass was classified as low (Rolland et al., 2003).

2.4.2. Muscle strength measurement

The muscle strength was measured using the Takei T.K.K. Grip D digital hand grip dynamometer (Takei Scientific Instruments Co. Ltd, Tokyo, Japan). The highest of the three measured values were taken as the final strength of the dominant hand. The cutoff points in the EWGSOP consensus paper were used for the muscle strength (Cruz-Jentoft et al., 2010). A muscle strength of < 30 kg for men and < 20 kg for women was classified as low (Lauretani et al., 2003).

2.4.3. Physical performance measurement

The physical performance was assessed using the 6-m walking test. The International Working Group defined the gait speed less than 1 m/s to be slow (Cruz-Jentoft et al., 2010).

2.5. Data collection

The data were collected by trained nutrition and dietetic students ($n = 15$) at home through face-to-face interviews. Prior to the study, the researcher provided the students with a standard training on the data collection forms, measurements and communication skills. After administering the questionnaire and measurements to each other and the researchers, they administered them to ten person aged 65 years or older from outside the study universe as a pilot study.

2.6. Statistical analysis

All statistical analyses were performed using the SPSS software version 17.0 (SPSS Inc., IL, USA). Continuous variables were presented as means ± standard deviation, and classified variables were presented as percentages. The t test or chi-square test (Fisher's exact test where necessary) was used to determine the factors that affect depression and functional disability scores in the univariate analyses. Logistic regression models were established to determine the factors that affect the presence of depression and functional disability. The presence of sarcopenia was modeled with variables that were significant in univariate analyses. A P value < 0.05 was accepted to be