SCREENING FOR SARCOPENIA IN ELDERLY WOMEN

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ABSTRACT
PURPOSE: The knowledge for the disease sarcopenia among the elderly population in Bulgaria is insufficient. Whole-body dual-energy X-ray (DXA) scans, anthropometric and clinical tests are used to diagnose it. Early screening of sarcopenia is an important strategy for the timely detection of this disease. The aim of the current study is to identify sarcopenia in the elderly through SARC-F questionnaire.
METHODS: Data were obtained based on a questionnaire conducted by the student nurses in the Faculty of Public Health and Health Care of the University "Prof. Dr. Assen Zlatarov"-Burgas. A five-component SARC-F questionnaire was used to assess muscle strength. A sum equal to or greater than 4 is predictive of sarcopenia. 113 women aged ≥65 with a mean age of 74.6 ± 6.7 years were included in the study.
RESULTS: 37% of the women had a total score corresponding to the risk of sarcopenia. The most common signs were a lack of muscle strength and an increased number of falls. The assessment of SARC-F might facilitate the physicians in the clinical practice to detect sarcopenia in the elderly population.
CONCLUSIONS: SARC-F is a reliable method for the assessment of sarcopenia in elderly women.

Key words: sarcopenia, muscle strength, screening, SARC-F

INTRODUCTION
The term, sarcopenia, was firstly used in 1988 to describe the condition with muscle wasting of the older people (1). In the next years, authors defined sarcopenia as appendicular muscle mass <2 standard deviations (SDs) below the mean of a young reference group assessed with dual energy X-ray absorptiometry (DXA). In previous published studies the prevalence and the severity of sarcopenia were reported to increase significantly with age and sarcopenia was associated with a physical disability (2). Through assessment with bioelectrical impedance analysis (BIA) people with functional impairment showed an estimated lean mass below 2 SDs of the mean (3). Obesity and loss of muscle mass were also attributed to worse outcomes. The term

'sarcopenic obesity' became popular (4). It was recognized that there are numerous causes of age-related sarcopenia, including loss of motor units innervating muscle, systemic inflammation, oxidative stress, and decline in anabolic hormones and decrease in the physical activity (5, 6).

PURPOSE
Sarcopenia and osteoporosis are often coexistent. There are different tools for the assessment of osteoporosis and fracture risk to make a decision if the patients should undergo DXA scan (7,8). Several sarcopenia screening tools have been developed to assess this condition. As a pioneer of these tools, the SARC-F has been validated in various studies and translated into different languages (9-11).

The SARC-F has 5 items: strength, assistance in walking, rising from a chair, climbing stairs, and falls, **(Figure 1)**

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Component	Question	Scoring
Strength	How much difficulty do you have in lifting and carrying 10 pounds?	None = 0 Some = 1 A lot or unable = 2
Assistance in walking	How much difficulty do you have walking across a room?	None = 0 Some = 1 A lot, use aids, or unable = 2
Rise from a chair	How much difficulty do you have transferring from a chair or bed?	None = 0 Some = 1 A lot or unable without help = 2
Climb stairs	How much difficulty do you have climbing a flight of 10 stairs?	None = 0 Some = 1 A lot or unable = 2
Falls	How many times have you fallen in the past year?	None = 0 1—3 falls = 1 4 or more falls = 2

Figure 1. SARC-F questionnaire

METHODS

Data were obtained based on a questionnaire conducted by the student nurses in the Faculty of Public Health and Health Care of the University "Prof. Dr. Assen Zlatarov"-Burgas. Five-component SARC-F questionnaire was used to assess muscle strength, the need of assistance in walking, the ability to rise from a chair and to climb stairs, and the incidence of falls. The score ranges from 0 to 10 points with 0 to 2 points for each component. A sum equal to or greater than 4 is predictive of sarcopenia. 113 women with a mean age of 74.6 ± 6.7 years were included in the study. The inclusion criteria were subjects of age ≥ 65 years. Other concomitant diseases were not evaluated. Subjects haven't undergone DXA scans or bioelectrical impedance analysis (BIA). SPSS version 19 was used to do statistical analysis of the data.

RESULTS

42/113 women (37%) were diagnosed with risk of sarcopenia (the sum of the SARC-F questionnaire was equal or above 4 points). The remain subjects-71/113 women (63%) didn't have risk sarcopenia (the sum of the SARC-F questionnaire was less than 4 points). The age of the subjects correlated with the incidence of sarcopenia. Sarcopenic women were significantly older (77.4 years) than non-sarcopenic (73.2 years), $p<0.05$. The most common signs of the women with sarcopenia were lack of muscle strength and increased number of falls, fig. 2. According to the component "assistant in walking" 43 women (38.1%) showed no difficulty in walking across a room, 61 women had some difficulty (53.9%) and 9 women (8%) had a lot of difficulty in walking across a room or were unable to walk. After assessing the subjects due to the criterion "rise from a chair" we

determined that 38 women (33.6%) were with no difficulty and 42 women (37.2%) were with some difficulty in transferring from a chair or bed. The remaining 33 women (29.2%) were unable to rise from a chair or bed without help. 42 subjects (37.2%) didn't show any difficulties in climbing 10 stairs, 54 subjects (47.8%) had some difficulties in doing this activity and 17 subjects (15%) were unable to climb 10 stairs. 58 women (51.3%) haven't fallen in the past year, 41 women (36,3%) had 1-3 falls and 14 women (12.4%) had 4 or more falls in the past year. 51 subjects (45.1%) had no difficulty in lifting and caring 10 pounds, 44 subjects (38.9%) had some difficulty and 18 subjects (15.9%) had a lot of difficulties or were unable to lift and carry 10 pounds, **Table 1.**

DISCUSSION

Despite the clinical importance of sarcopenia this disease remains poorly recognized in the clinical practice. Although some studies suggested that cutoff value of 3 of SARC-F reached the optimal Youden's index, sarcopenia is considered to be present if SARC-F ≥ 4 (12, 13). SARC-F is a simple method for screening of sarcopenia and could be helpful to detect high-risk patients for further examinations.

The prediction of the adverse outcomes is the most important factor in evaluating the function of screening scores. Tan et al. (14) detected negative health outcomes in patients at high risk of sarcopenia assessed with SARC-F. The results of the current study showed that SARC-F had a good performance in predicting sarcopenia and suggested that early exercise intervention for high-risk individuals detected with SARC-F might reduce the risk of adverse outcomes and improve prognosis.
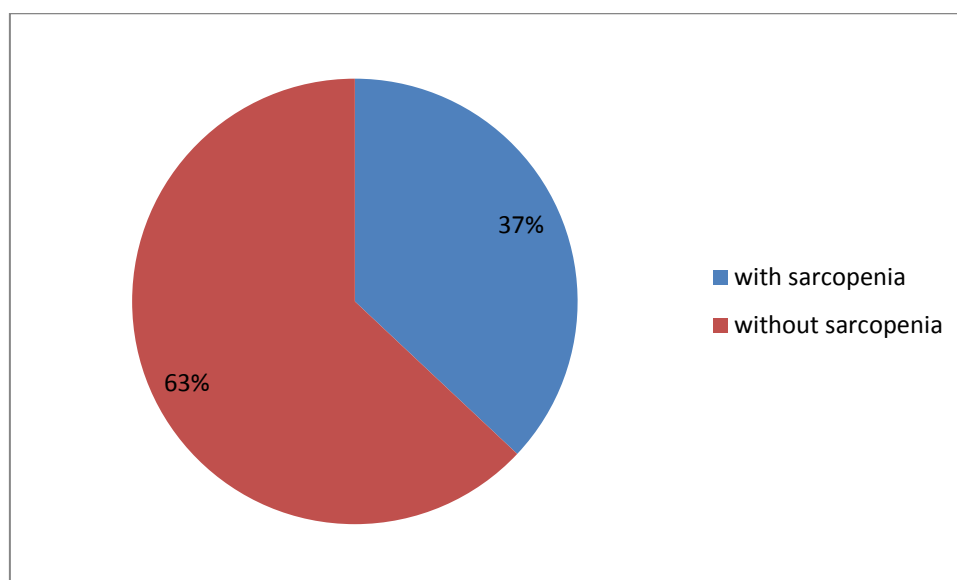
Figure 2. Percent of the women with and without risk of sarcopenia.

Table 1. *Number and percent of the women according to each separate component of SARC-F*

Components		Count of the women	% of the women
assistance in walking	No difficulty	43	38.1%
	Some difficulty	61	53.9%
	A lot of difficulty or unable	9	8.0%
rise from a chair	No difficulty	38	33.6%
	Some difficulty	42	37.2%
	A lot of difficulty or unable	33	29.2%
climb stairs	No difficulty	42	37.2%
	Some difficulty	54	47.8%
	A lot of difficulty or unable	17	15.0%
falls	0	58	51.3%
	1-3	41	36.3%
	4 or more	14	12.4%
strength	No difficulty	51	45.1%
	Some difficulty	44	38.9%
	A lot of difficulty or unable	18	15.9%

Some studies showed very low sensitivity of the SARC-F (15-17). One of them reported that SARC-F had a sensitivity of 35.6% and a specificity of 82.2% in 487 Mexican older adults (18).

In another study which compared SARC-F-3 with SARC-F was found that SARC-F-3 had even lower sensitivity and diagnostic accuracy than SARC-F. Low sensitivity means that subjects who have sarcopenia could be missed. An AUC area of > 0.9 indicates high accuracy, 0.7 to 0.9 indicates moderate accuracy, 0.5 to 0.7-low accuracy and 0.5 indicates chance result (19). In the study of Yang et al., the AUC of SARC-F was 0.894, whereas that of SARC-F-3 was 0.676 and this was the reason why the authors of this study suspected that SARC-F-3 may not be suitable for sarcopenia screening in community-dwelling older adults (20). The incidence of sarcopenia (37%) in our study was higher compared to those found in the studies of Yang et al.-15.9% (19), Smoliner et al.-25% (21) and Coin et al.-20% who assessed community-dwelling people in Italy (22). Masanes et al. evaluated community-dwelling elderly in Barcelona, Spain and found a similar prevalence of sarcopenia (33%) compared to our study (37%).

CONCLUSIONS
In the current study, we found a relatively high prevalence of sarcopenia compared to previous studies. Sarcopenic women were significantly older than non-sarcopenic.

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