

Original Article

Cross-cultural adaptation and validation of the Greek Version of the SARC-F for evaluating sarcopenia in Greek older adults

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Abstract

Objective: To translate and validate into Greek, the SARC-F questionnaire, a screening tool for sarcopenia. **Methods:** Questionnaire was back-translated and culturally adapted into Greek according to guidelines proposed by the World Health Organization. A convenience sample of 197 Greek elderly people (71.6±7.8 years, 68.5% women) was recruited, 64 of which were classified as persons at risk of sarcopenia according to the SARC-F. Internal consistency, test-retest and inter-rater reliability were evaluated. Validity (sensitivity, specificity, predictive positive value and predictive negative value) was assessed against the definition from the European Working Group of Sarcopenia in Older People (EWGSOP2), which is considered gold standard. Receiver-operating characteristic analysis was also performed to calculate the area under the curve. **Results:** SARC-F demonstrated high internal consistency (Cronbach's alpha of 0.93) and excellent inter-rater and test-retest reliability, with intraclass correlation coefficient (ICC) of 0.91 (95% CI 0.79-0.96), and 0.93 (95% CI 0.91-0.95), respectively. According to the definition of sarcopenia from the EWGSOP2, 53 (26.85) participants were identified as probable sarcopenic and 23 (11.6%) as sarcopenic. Sensitivity of the tool for sarcopenia was 34.4 and specificity was 93.2. Positive predictive values were 26.4 and negative predictive values were 66.6%. **Conclusion:** The SARC-F was successfully adapted into Greek language. The Greek SARC-F revealed low sensitivity but high specificity with EWGSOP2 sarcopenia definitions, indicating that it can detect with precision the absence of sarcopenia.

Keywords: Assessment, Reliability, SARC-F, Sarcopenia, Validity

Introduction

Sarcopenia is a progressive and generalized skeletal muscle disorder associated with adverse health outcomes such as falls, fatigue, fractures, physical disability, functional

decline, comorbidities, compromised quality of life and even mortality¹⁻³. One of the most critical issues in the field of sarcopenia research is its diagnosis. There are various international groups that have published different consensus diagnostic criteria for sarcopenia^{1,4-9}. Indeed, in 2010, the European Working Group on Sarcopenia in Older People (EWGSOP1), which is the predominant scientific group of sarcopenia worldwide, recommended that the diagnostic criteria of the syndrome must contain both low muscle mass and impaired muscle function (defined either by muscle strength or by physical performance parameters)⁵. In its revised definition, the European Working Group of Sarcopenia in Older People (EWGSOP2) used low muscle strength cut off points as the primary parameter of sarcopenia; muscle strength is presently the most reliable measure of muscle

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function. More specifically, according to EWGSOP2 probable sarcopenia is defined for patients with reduced hand grip strength (women <16 kg; men <27 kg). A sarcopenia diagnosis is confirmed by the presence of low muscle skeletal muscle index (women <5.5 kg/m²; men <7.0 kg/m²). When low muscle strength, low muscle quantity/quality and low physical performance are all detected, sarcopenia is considered severe¹.

A wide variety of tests and tools are also available for the clinical determination of sarcopenia in practice and in research^{1,10}. The clinical screening tools for sarcopenia can be divided into 4 broad categories: i) self-reported questionnaires, ii) anthropometric measurements, iii) combination of questionnaire and anthropometric measures, and iv) physical functional tests¹¹. Malmstrom and Morley (2013) developed a brief, inexpensive and easy-to-apply screening tool for sarcopenia via the symptom-based SARC-F questionnaire¹². SARC-F is a quick, inexpensive and convenient for sarcopenia self-reported risk screening tool¹. It includes five items based on cardinal features or consequences of sarcopenia: strength, assistance in walking, rising from a chair, climbing stairs, and falls¹². Answers in all components but falls are given on the following three-point scale: "No difficulty at all," "Some difficulty," and "Extreme difficulty or inability." Answers to the question on falls are given on the following three point scale: "None at all," "1-3 falls," and "4 or more falls." A score of 0, 1, or 2 points is given for each of the answers, respectively. The total score range is from 0 points to 10 points, and scores equal or above 4 indicate a risk of having sarcopenia. SARC-F has yielded good internal consistency reliability and validity¹³. The EWGSOP2 algorithm has incorporated the SARC-F questionnaire as a screening tool for sarcopenia and recommended its use as a way to elicit patient-reported clinical signs that are characteristic of sarcopenia^{1,14}. The tool is proposed to be used as an initial screening tool in order to identify persons at risk for sarcopenia¹.

SARC-F has originally been created in English; however, it has been translated and validated in various different languages, such as Chinese¹⁵, Japanese¹⁶, Spanish¹⁷, Turkish¹⁸, French¹⁹, German¹⁴, Korean²⁰ and Vietnamese²¹. To extend the availability and utilization of this screening tool, its translation and validation in other languages is necessary¹⁹. Furthermore, there is an initiative from a Special Interest Group (SIG) of the European Union Geriatric Medicine Society (EuGMS) for translation and cross cultural adaptation of the SARC-F into different languages²². In Greece, there aren't any quick screening tools available for evaluating sarcopenia. The only available tool is Sarcopenia Quality of life questionnaire - SarQoL²³, which is focusing on quality of life assessment (rather than sarcopenia risk)²⁴. Given the above, the purpose of this paper was to cross-culturally translate and validate the SARC-F into the Greek language and setting.

Material and methods

Study population and design

The participants involved in this cross sectional study were recruited from the University Hospital of Patras and the 2nd Open Care Centre of Patras for the Elderly. Any person entering both sites for whatever reason (appointment or visit), aged over 65 years of age and having the Greek language as their maternal language was requested to participate in the study. Eligible participants had to walk independently and be able to read and understand the purpose of the study. Participants were also administered a Mental State Examination (MMSE), to assess their cognitive function²⁵ and ensure orientation and cooperation. MMSE requires only 5-10 min to administer and a score of 25 and over (out of 30) indicates normal cognition²⁵. Participants with dementia (MMSE score below 25) and/or patients with a pacemaker, and/or patients with an amputated limb and/or patients with BMI >50 were excluded from the study because of the requirements of the device used for the measurement of muscle mass (Bioelectrical impedance analysis). All participants were informed about the study objective and procedures and signed an informed consent form prior to their inclusion. The study was approved by the Ethics Committee of the Technological Educational Institute of Western Greece.

Procedure

The translation process has been divided into two consecutive phases as suggested by the EUGMS SIG methodological report²². The first phase comprised of the translation procedure into Greek and the reliability evaluation (inter-rater and test-retest). In the second phase the clinical validation of the Greek SARC-F, was used to assess its performance according to and in relation to the gold standard for diagnosing of sarcopenia, the official diagnose of sarcopenia (from the European Working Group on Sarcopenia in Older People's, 2019)¹.

Phase 1. Greek translation and cross cultural adaptation of the SARC-F

For the translation of the SARC-F, official permission was given by Professor Morley, the questionnaire's developer. The translation part was articulated in the following stages, based on the guidelines proposed by World Health Organization²⁶ and the methodology presented in Bahat et al.'s paper, (2018)²².

1. The initial forward translation from English to Greek was conducted by two independent bilingual translators, who were both Greek native speakers.
2. The two forward translations were synthesized into one and produced the first consensus Greek version of the SARC-F. Both translators reviewed the joint translation and discussed its conceptual adequacy and clarity.
3. The joint translation was translated backwards into English by one bilingual translator having English as his mother tongue language and blinded to the original

version of the questionnaire.

4. All translators reviewed all translated versions as well as the original (English) SARC-F to reach a consensus on a satisfactory version of the Greek SARC-F (pre-final version).
5. Pre-final version as well as the backward version was e-mailed back to Prof. Morley, the questionnaire's developer for his approval.
6. The Greek SARC-F was then tested in a pilot study. It was administered face-to-face to 10 Greek elderly people of variable educational backgrounds, to confirm the comprehensibility and syntax of all questions. The participants were asked whether they fully understood all items and whether they had problems with the formulation of the questions and/or answers.
7. For the SARC-F's inter-rater reliability the questionnaire was administered twice to a sample of 20 elderly participants by two different clinical researchers.
8. The Greek SARC-F was also administered to 20 other subjects twice, with a 2 week interval by the same researcher to evaluate its test-retest reliability.

Phase 2. Clinical validity testing

Following its translation, a clinical validation study was performed to assess the Greek SARC-F's performance in regards to the diagnosis of sarcopenia. Through a cross-sectional study, the final version of the Greek SARC-F was administered to a sample of Greek elderly men and women. Demographic data, drug history, quality of life (EQ5D), nutritional status (Mini Nutritional assessment), history of falls, level of education, activities of daily living (Katz and Lawton) were collected²⁷⁻³⁰. Sensitivity (Se), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) of the SARC-F according to the operational definition of sarcopenia (EWGSOP2) was also assessed. Furthermore, a correlation between the SARC-F and external standards was performed in order to provide more information about the ability to detect sarcopenia defined according to muscle strength, muscle mass and functionality.

Clinical measurements based on sarcopenia definitions

Definitions of Sarcopenia:

Sarcopenia was evaluated with the current definition: European Working Group on Sarcopenia in Older People's 2 (EWGSOP2)¹. Sarcopenia according to the EWGSOP2 definition is based on low hand grip strength (Men <27 kg; Women <16 kg) (probable sarcopenia). Patients with additional low skeletal muscle mass index (Men <7 kg/m²; Women <5.5 kg/m²) were classified as sarcopenic.

Measurements:

Height (cm) was measured with a stadiometer without shoes.

Body weight (kg) was measured to the nearest 0.1 kg and height was measured to the nearest 0.1 cm.

Waist, and calf circumference (cm), were measured with

inelastic tape. Measurements of height and weight were used to calculate body mass index (BMI) (kg/m²).

Hand Grip Strength was assessed with a handheld dynamometer (Saehan Corporation, Seoul Korea). Participants were asked to apply their maximum grip strength 3 times on their dominant hand and the highest value was recorded as the subject's grip strength.

Muscle mass and appendicular lean mass was assessed using bioelectrical impedance analysis (BIA), with a Tanita BC-601 model body analysis monitor. Participants removed their socks, stood on two metallic electrodes on the floor scale barefoot, and held two metallic grip electrodes placed in the palm of their hand with their fingers wrapped around the handrails.

Fat free mass (FFM) was measured by BIA and skeletal muscle mass (SMM) was calculated by the following equation: $SMM (kg) = 0.566 \times FFM^{31,32}$.

Skeletal muscle mass index (SMMI) was calculated as skeletal muscle mass (kg/m²)^{31,32}.

Gait speed was assessed over a 4 meters distance starting from a standing position. Participants were informed to walk 4 m with their usual speed. All the measurements were performed by the same researcher.

Statistical analyses

Normality of variables was checked using the Shapiro-Wilk test. Descriptive statistics are reported as means and standard deviations for continuous variables and as frequencies and percentages for categorical variables. A t-test for independent samples was used to determine the differences between female and male participants.

Internal consistency has been measured by Cronbach's alpha coefficient. Cronbach's alpha level equal to or greater than 0.70 is considered satisfactory³³. Reliability (both interrater and test-retest) was tested by the intraclass correlation coefficient (ICC) and its 95% confidence interval (CI). ICCs was calculated based on a single measurement, absolute agreement, and two-way mixed-effects model. Reliability assessed by ICC estimates was defined as follows: ICC estimate (0.90: excellent reliability, between 0.75 and 0.9: good reliability, 0.5-0.75: moderate reliability, >0.5: poor reliability)³⁴.

Validity was assessed in terms of sensitivity, specificity, positive predictive value, negative predictive value. Sensitivity (Se) is calculated as the proportion of sarcopenic patients based on the reference clinical diagnosis when identified positive by the screening test. Specificity (Sp) is calculated as the proportion of participants without sarcopenia based on the reference clinical diagnosis when identified negative by the screening test. The positive predictive value (PPV) represents the probability of somebody to actually present sarcopenia when the test is positive, and negative predictive value (NPV) refers to the probability of somebody to not actually present sarcopenia when the test is negative^{14,19}. Sensitivity, Specificity and predictive values are based

Table 1. Participants' characteristics.

Variable	Total (n=197)	Female (n=135)	Male (n=62)	P value
	Mean \pm SD			
Age (years)	71.6 \pm 7.8	71.3 \pm 7.9	72.2 \pm 7.6	NS
BMI (kg/m ²)	26.0 \pm 3.6	25.8 \pm 3.9	26.5 \pm 2.8	p \leq 0.05
Drugs (number)	2.7 \pm 1.5	2.7 \pm 1.0	2.6 \pm 1.6	NS
Comorbidities (number)	2.1 \pm 1.1	2.1 \pm 1.0	2.0 \pm 1.1	NS
Hand Grip Strength (kg)	21.8 \pm 6.7	19.2 \pm 3.9	27.5 \pm 8.1	p \leq 0.001
4meters test (sec)	3.9 \pm 0.9	4.0 \pm 0.9	3.7 \pm 0.8	NS
SMMI (kg/m ²)	7.4 \pm 1.7	6.7 \pm 1.3	8.9 \pm 1.5	p \leq 0.05
Calf measurement (cm)	35.0 \pm 2.4	34.3 \pm 2.2	36.4 \pm 2.3	NS
Waist measurement (cm)	99.2 \pm 13	98.8 \pm 1.1	100 \pm 0.9	NS
Quality of Life (EQ-5D)	6.9 \pm 1.7	7.0 \pm 0.6	6.8 \pm 2.7	NS
KATZ total score	9.3 \pm 2.3	9.0 \pm 1.1	9.3 \pm 4.0	NS
Lawton total score	7.8 \pm 1.2	7.6 \pm 3.1	7.9 \pm 1.0	NS
SARC-F	2.8 \pm 1.9	2.7 \pm 1.8	2.9 \pm 10.9	NS
Variable	Total (n=197)	Female (n=135)	Male (n=62)	P value
	Number and percentage (%)			
Level of education				
Primary school	28 (14.2%)	18 (13.3%)	10 (16.1%)	
Secondary	77 (39%)	71 (52.5%)	6 (0.09%)	
Higher	92 (46.7%)	46 (34%)	46 (74.1%)	p \leq 0.001
Smoking				
Yes	22 (11%)	15 (9%)	7 (8.8%)	p \leq 0.001
Falls				
Yes	51 (25.9%)	42 (31.1%)	9 (14.5%)	p \leq 0.001
Mini Nutritional Assessment				
Malnutrition	6 (3%)	6 (3%)	0 (0%)	p \leq 0.001

BMI: Body Mass Index; SMMI: Skeletal Muscle Mass Index; NS: Non-significant differences.

on the following formulas³⁵: Sensitivity=[a/(a+c)]x100; Specificity=[d/(b+d)]x100; Positive predictive value (PPV)=[a/(a+b)]x100; Negative predictive value (NPV)=[d/(c+d)]x100.

The sample was divided into sarcopenic and non-sarcopenic subjects based on the SARC-F questionnaire's scores. Se, Sp, PPV and NPV were calculated according to: 1) the reference standard sarcopenia EWGSOP2 definition for sarcopenia and 2) the EWGSOP2 definition for probable sarcopenia. The receiver operator curve (ROC) was applied to calculate the area under the curve for the 2 conditions (sarcopenia and probable sarcopenia). The higher area under the curve (AUC) value indicates a better diagnostic ability of the SARC-F, with the cut-off of high (AUC \geq 0.9), moderate (0.7 \leq AUC <0.9), and low (0.5 \leq AUC <0.7)³⁶. Pearson's correlation coefficient was used to explore the relationship between HGS and the other variables. Pearson-r categorization was made according to Cohen (r=0.10 small, r=0.30 medium and r=0.50 large)³⁷.

Statistical results were considered significant at the 5% critical level (p<0.05). All the analyses were performed using IBM SPSS Statistics 20.0.

Results

Phase 1. Translation, cross cultural adaptation of the Greek SARC-F

The translation of the SARC-F from English into Greek was performed without any difficulties and approved from Prof Morley of the original publication.

Step 6 resulted in minor modifications. The "item" "strength" was evaluated by asking for difficulties lifting or carrying 10 lb. The weight specification was converted into kg (5 kg). The initial pilot, performed on 10 Greek elderly (5 men, 5 women, aged 72.3 \pm 3.5 years) reported no problems in understanding the five questions of the Greek SARC-F.

Inter-rater reliability was performed on 20 other elderly participants (13 women, aged 74.2 \pm 3.14 years). A total ICC of 0.91 (0.79-0.96) was found, which indicated an excellent inter-rater reliability.

Test-retest reliability was performed on another 20 participants (11 women, 9 men, 73.2 \pm 6.1 years). All participants completed the final version of the questionnaire twice within 14 days and they were questioned about

Table 2. Performance of the Greek version of the SARC-F questionnaire.

Definitions EWSOP2	Sensitivity	Specificity	PPV	NPV
Sarcopenia	34.4	93.2	26.4	66.6
Probable sarcopenia	28.4	69.2	30.2	54.7

PPV, positive predictive value; NPV, negative predictive value.

Table 3. Pearson's correlation coefficient matrix of SARC-F and other measures related to sarcopenia (n=197).

	Age	BMI	HGS	SMMI	Gait speed	Calf CC	Comorbidities (n)	QoL	KATZ	LAWTON
SARC-F	r=0.46**	r=0.28*	r=0.51*	r=0.55**	r=0.14*	r=0.49**	r=0.43**	r=0.21*	r=0.21*	r=0.22*

**p<0.05, ** p<0.001. HGS: Hand Grip Strength; SMMI: skeletal muscle mass index; Calf CC: Calf circumference; BMI: Body Mass Index; QoL: Quality of Life; KATZ: KATZ questionnaire total score; LAWTON: LAWTON questionnaire total score.*

having any health change between the first and second administration during the past 2 weeks. The results of the participants who did not report any health difference over this 2-week interval were used in analysis (n=20). A total ICC of 0.93 (0.91-0.95) was found, indicating a good test-retest reliability of the SARC-F after a 2-week interval.

The Cronbach's alpha coefficient of the Greek version of the SARC-F questionnaire was 0.93, indicating a high level of internal consistency.

Phase 2. Clinical validity testing

A hundred and ninety-seven (197) participants (71.6±7.8 years; 62 men and 135 women) were included in this validation analysis of the Greek-translated SARC-F tool. Table 1 presents the characteristics of the participants. According to EWGSOP2, probable sarcopenia was defined for patients with reduced HGS (men <27 kg and women <16 kg). Patients with additional low SMMI were classified as sarcopenic (men <7 and women <5.5 kg). The prevalence rate for sarcopenia was 11.7 % (n=23) and the prevalence rate for probable sarcopenia was 26.8% (n=53). SARC-F identified 64 (32.3 %) participants with at risk of sarcopenia.

The sensitivities, specificities, positive predictive values, and negative predictive values of the SARC-F determined using EWGSOP2 definition of sarcopenia (HGS and SMMI assessment) as the reference standard are presented in Table 2. Sensitivity of the tool for sarcopenia was 34.4 and specificity was 93.2.

The AUC was higher than 0.7 (AUC 0.71, 95% CI: 0.63-0.79 for probable sarcopenia and higher than 0.8 (AUC 0.86, 95% CI:0.78-0.94) for sarcopenia.

A Pearson's correlation coefficient matrix for SARC-F and all variables were performed. Strong correlations were recorded with HGS (r=0.51; p≤0.05) and SMMI (r=0.55; p≤0.001). Moderate correlations were recorded for age

(r=0.46; p≤0.001), calf circumference (r=0.49; p≤0.001) and comorbidities (r=0.43; p≤0.001). All the other variables had low correlations with the SARC-F score. Correlations between SARC-f and the variables used for sarcopenia diagnosis are presented in Table 3.

Discussion

This is the first study to cross-culturally adapt and validate the newly developed Greek version of the SARC-F questionnaire, a quick and simple instrument to aid the evaluation of sarcopenia in elderly population. Considering the global aging population, sarcopenia assessment has become a public health priority. Its early detection is expected to prevent or decrease adverse outcomes through initiation of therapeutic or preventive interventions; however diagnosing sarcopenia is a daunting task. SARC-F questionnaire stands as one of the best tools for evaluating sarcopenia in everyday practice¹⁹. The purpose of this cross-sectional study was, therefore, to contribute to this area by developing a Greek version of the SARC-F that could be used amongst Greek speaking population. This study strongly supports the reliability and validity of the instrument in clinical settings and research within Greece.

The translation and validation process was performed according to rigorous published guidelines established for cross-cultural adaptation of the SARC-F. These guidelines ensure accuracy in the cross-cultural adaptation procedure between the initial English version and the translated one¹⁹. The process of cross-cultural adaptation was presented with no major issues arising, resulting in a thorough, complete and comprehensible Greek SARC-F version. Additionally, the back-translation was sent to the author of the SARC-F development to check for discrepancies compared to the original version; thus giving his consent of the Greek version (February 23, 2018).

Overall, the results showed satisfactory psychometric characteristics of the translated Greek version of the SARC-F questionnaire. The test-retest reliability was excellent for the total score 0.93 (91% CI 0.91-0.95), which is more or less similar to the French (0.86)¹⁹ and the Spanish (0.80) version¹⁷. Lower but good reliability showed the German¹⁴, Turkish¹⁹ and Japanese versions, the latter of which was administered in a diabetic outpatient elderly sample¹⁶.

An important criterion of an ideal screening test is also to demonstrate a reasonable accurate sensitivity and specificity^{19,35,38}. Sensitivity and specificity, were assessed against the EWGSOP2 diagnostic criteria. In early 2018, EWGSOP advised the use of the SARC-F questionnaire or clinical suspicion to find sarcopenia associated symptoms¹. From the results of the previous validation studies, it has been clear that the SARC-F has low sensitivity and high negative predictive values^{14,19}. Results of the Greek version of the SARC-F also show high specificity and high negative predictive value, which makes it a useful tool for efficiently ruling out sarcopenia. As expected, the sensitivity of the Greek version of the SARC-F was low. Sensitivity depends on the percentage of patients screened positive on SARC-F and that means that patients with sarcopenia could not be identified. Therefore, attention is needed in the evaluation process of sarcopenia based only on SARC-F results. In the revised EWGSOP2 definition on sarcopenia, screening patients with the SARC-F before initiating the diagnostic algorithm (muscle strength, muscle mass and gait speed) is recommended¹. The SARC-F is proposed as an effective tool for selecting persons who should undergo further testing for confirming a diagnosis of sarcopenia¹⁶.

However, the specificity of the SARC-F is good to excellent, indicating that the SARC-F is capable of determining the absence of sarcopenia with great precision¹⁹. Results of the present study show that PPV is weak, and NPV is high and the same observations were made in the previous validation studies^{14,19,39,40} qualifying the tool for ruling out sarcopenia. Receiver-operating characteristic analysis was performed, evaluating whether SARC-F is suitable to detect sarcopenia based on EWGSOP2. Both conditions of sarcopenia and probable sarcopenia show a significant AUC (0.86 and 0.71 respectively). In the German study researchers recorded a significant AUC (0.78) for probable sarcopenia and lower AUC for sarcopenia (0.58). Given the differences in population characteristics and the relatively low number of sarcopenic patients according to the EWGSOP2 definition, further validity evaluation it would be of a great value. All these results suggest that a 5-item SARC-F could not be enough for screening sarcopenia. However, it seems reasonable to consider the SARC-F as a first simple step within a hierarchical screening procedure^{41,42}. They also suggest that an alternative item that is significantly associated with the condition could increase the sensitivity¹⁴.

In the current study, SARC-F was correlated with other measures related to sarcopenia. The strongest correlation, as reasonably expected, was recorded with HGS and SMMI ($r=0.5$; $p\leq 0.001$); which refer to the predominant clinical measures of sarcopenia according to EWGSOP2. There

were moderate correlations with age, calf circumference and number of comorbidities. These results partly agree with previous reports. The study conducted by Drey et al.¹⁴ recorded correlations with HGS, gait speed, peak torque for knee extension and Short Physical Performance Battery test. In the study conducted in Japan, researchers reported a correlation between the presence of sarcopenia according to the SARC-F and fear of falling¹⁶. The association of sarcopenia measured by the SARC-F with other variables such as activities of daily living time to complete 5 rises and returns from a chair, gait speed, grip strength, and peak force for knee extension, may depend on the population (e.g. prevalence rates of sarcopenia) analyzed^{13,17}.

A wide variety of screening tools are available for sarcopenia, such as the screening grid from Goodman⁴¹, the score chart from Ishii⁴² and the prediction equation from Yu⁴³. EWGSOP2 recommends use of the SARC-F and/or the Ishii screening tool or use in clinical populations where sarcopenia is likely. SARC-F is self-reported by the patient, reflecting perceptions of outcomes that matter to the patient. The advantages of the SARC-F tool are that it is a simple, quick, inexpensive and convenient method for sarcopenia risk assessment¹. The thorough evaluation of sarcopenia (apart from varying definitions) is time and cost consuming⁴⁴. EWGSOP2 calls health professionals to take actions that will promote early detection of sarcopenia¹. However, in future studies it could be beneficial to evaluate and compare the psychometric performance of SARC-F questionnaire against the different screening methods utilized.

The present study has important clinical implications. Firstly, it is the first study to perform a thorough cross-cultural adaptation of the SARC-F into Greek, thus, making it available for assessing sarcopenia to clinicians and researchers working among Greek speakers. Secondly, the SARC-F is a quick, simple to use, short questionnaire to fill in, thus making its use very practical for clinical or research purposes among health professionals¹.

Limitations

One limitation is that, the study participants constitute a convenience sample of Greek elderly of volunteers, which may not be fully representative of the whole Greek elderly population. The second limitation was that, the sensitivity to change (i.e. the ability of a questionnaire to detect clinical changes over time) was not assessed⁴³. This would require a treatment intervention on a sarcopenic sample, which was unable to be conducted in this study due to ethical and practical considerations. Further studies should evaluate patient prognosis and the responsiveness of the Greek SARC-F will need to be verified in future longitudinal and interventional studies.

Conclusions

The SARC-F scale was cross-culturally adapted and validated to be used in the clinical setting, in community-dwelling Greek older adults. Overall, the Greek version of the

SARC-F demonstrated good psychometric properties and can be used both for clinical practice and research in the Greek speaking environment for the assessment of sarcopenia. Its sensitivity was low and the sensitivity was high, indicating that the Greek SARC-F should be used for selecting persons who should undergo further testing for confirming a diagnosis of sarcopenia.

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