Aging Clinical and Experimental Research (2023) 35:137–145
https://doi.org/10.1007/s40520-022-02255-0

ORIGINAL ARTICLE

Validation of the Persian version of the sarcopenia-specific quality of life questionnaire (SarQoL®-IR)

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Received: 26 June 2022 / Accepted: 11 September 2022 / Published online: 26 October 2022

Abstract

Background The sarcopenia quality of life (SarQoL)® questionnaire is a specific tool to measure QoL in sarcopenia. The aim of this study was to validate the SarQoL® questionnaire for evaluation of sarcopenia-related quality of life in Iranian community-dwelling older adults.

Methods Validity (discriminative power, construct validity), reliability (internal consistency, test–retest reliability), and floor/ceiling effects of SarQoL® *questionnaire* were evaluated in the current study. Moreover, the SarQoL® questionnaire was compared with the Short-Form 36-item (SF-36) and the EuroQoL 5-Dimensions (EQ-5D) questionnaires.

Results Among 501 community-dwelling older adults, 128 elderly participants (including 88 sarcopenic individuals) were recruited for validation. Participants with sarcopenia had lower quality of life than non-sarcopenic individuals (Total Score: 39.37 ± 7.45 vs. 65.09 ± 7.85, $p < 0.001$). Also, the findings demonstrated a high internal consistency (Cronbach's alpha of 0.881), excellent test–retest reliability (ICC = 0.995, 95% CI 0.990–0.998)*, and no floor/ceiling effect of* SarQoL® questionnaire.

Conclusion This is the first study to confirm the reliability and validity of the Persian version of the SarQoL® for the measurement of quality of life among Iranian sarcopenic older adults.

Keywords Quality of life · Sarcopenia · SarQoL · Validation · Persian

Introduction

Aging is associated with impaired vital functions, inability to adapt to environmental factors [1], functional and structural changes, and mental health deteriorations due to changes in age-related neurological mechanisms [2]. Reduction of age-related muscle mass, strength, and function is one of the most important changes in old age, which is known as sarcopenia [1]. Sarcopenia is associated with loss of independence, changes in movement patterns, increased

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long-term care, and psychological changes, including anxiety and depression [3]. Moreover, increased mortality, falls and fractures, and hospitalization rates have been reported in sarcopenic individuals [4–7]. Thus, considering these adverse consequences of sarcopenia, recent evidences showed sarcopenia has been associated with poor quality of life in the elderly [3, 8–10].

Quality of life is related to health, social, psychological and physical aspects of life [1], which health and education services, adequate nutrition, physical activity and exercise are aspects that affect the quality of life [1]. Therefore, poor quality of life can play a significant role in fall prevalence and mortality [3].

Therefore, it is advocated that a thorough evaluation should be performed for older adults with sarcopenia to provide complete information about the quality of life of patients [11–13]. In this regard, it is necessary to evaluate the quality of life in these patients through appropriate tools [13, 14]. Although two questionnaires (SF-36 and EQ-5D) are commonly used to assess the quality of life in all individuals, these two questionnaires do not cover all of the physical disorders associated with sarcopenia. Thus, it is necessary to evaluate the influence of sarcopenia on quality of life using a specific questionnaire for sarcopenic older adults [15].

SarQoL® (sarcopenia and quality of life) is a sarcopenia-specific quality of life questionnaire that was initially developed and validated by Beaudart et al. in French language [4–6, 16, 17]. The questionnaire was later translated and validated into English and various other languages [18]. Although the Persian translation of the SarQoL® questionnaire is available, at www.sarqol.org, this questionnaire has not been validated for Iranian population so far. Therefore, the purpose of this cross-sectional study was to evaluate the validity and reliability of the Persian version of the SarQoL® questionnaire (SarQoL®-IR).

Materials and methods

Study population

The present study was the sub-group of the previous cross-sectional population-based study which conducted on Iranian community-dwelling older adults. Briefly, the 501 community-dwelling older adults were selected by multistage sampling according to the geographic region. The results showed that the overall prevalence of sarcopenia was 20.8%, of which 104 were sarcopenic and 397 were non-sarcopenic [19–22]. In the current study, 128 community-dwelling older adults were enrolled. Sampling in this study was performed in a non-probabilistic (available) method, in which eligible sarcopenic older adults from the original study were examined. The number of samples for sarcopenic participants was 4 times the number of questions ($n = 88$) [23]. The number of participants in the control group was determined according to the protocol provided by the SarQoL team [24] and other similar studies conducted in this field [15, 25] (Fig. 1). The non-sarcopenic participants in the control group were matched with the sarcopenic participants in terms of variables such as gender, education level, and smoking history.

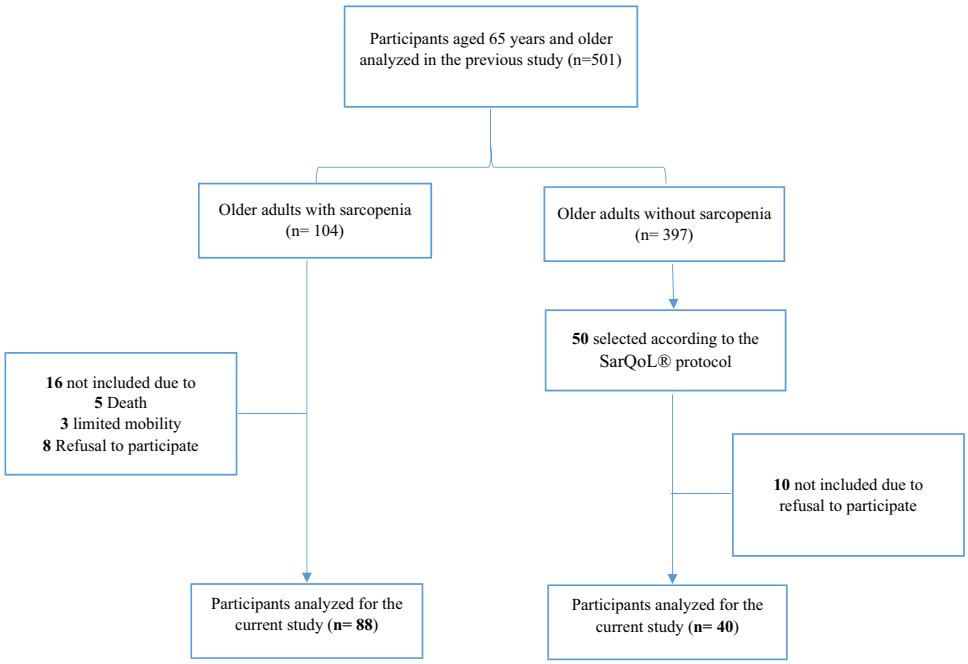

Fig. 1 Flow diagram of the participants' recruitment

The participants of this study included healthy elderly aged 65 years and older without cognitive problems, who were diagnosed with sarcopenia and without sarcopenia. Furthermore, the exclusion criteria included reluctance to participate in the study and incomplete questionnaire responses.

Assessment of sarcopenia

According to the Asian Working Group for Sarcopenia (AWGS) guidelines, participants with low skeletal muscle mass and function (including low muscle strength and/or low physical performance) were considered to have sarcopenia. [19–22]. Individuals with sarcopenia were included in the study if their sarcopenia was diagnosed by a physician, and non-sarcopenic subjects without sarcopenia were selected based on inclusion criteria.

Body composition was determined using a segmental multifrequency Bioelectrical Impedance Analysis (BIA) InBody S10 analyzer (BioSpace Co., Ltd., South Korea) [19–22]. Skeletal Muscle mass Index (SMI) was defined as Appendicular Skeletal Muscle mass (ASM) (as the sum of segmental muscle mass values of the legs and arms) divided by the square of height (in meter). The SMI values of less than 7.0 kg/m^2 for males and less than 5.7 kg/m^2 for females were considered as a low muscle mass [19–22, 26].

Muscle strength, Handgrip (HG), was evaluated using a Hydraulic hand dynamometer (model MSD, Sihan, Korea) in both hands. The references value less than 18 kg for females and less than 26 kg for males were defined as a low muscle strength [19–22, 26].

Muscle performance was also evaluated by a 4 m independent walking test, where Gait Speed (GS) less than 0.8 m/s was defined as a low physical performance [19–22, 26].

Content validity

Ten professorial and faculty members with educational research experience in the field of aging and muscle health were invited to check the content validity of the questionnaires based on its clarity, necessity, and congruity between its words and the relating culture. These experts belonged to nutrition, endocrine and metabolism, social medicine, geriatrics, and psychology of geriatrics.

Face and content validity were applied in two phases including Content Validity Ratio (CVR) and Content Validity Index (CVI) [27]. To acquire these, we sought help from 10 experts who stated their opinion about the questions of the questionnaire.

Content validity ratio (CVR) is an approach to ascertaining the relationship of individual sections within an instrument by considering some experts. This item was suggested by Lawshe in 1975 [28]. For each item, respondents answered the questions by choosing one of the three-point Likert questions: "It is necessary", "It is useful but not necessary" and "It is not necessary". We applied the Content Validity Ratio (CVR) for each question using Lawshe's approach. This method is a proportional level of agreement on how many proficient have graded an item "It is necessary" [27, 29].

Content validity index (CVI) is based on ratings of each item where the experts have given to them based on the content relevance of an instrument. To obtain the Content Validity Index (CVI), all the proficient should have graded one of the four Likert questions (It is not relevant = 1; It is relatively relevant = 2; It is relevant = 3; It is highly relevant = 4) [27, 30].

Discriminative power

Discriminative power, also as known group validity, was used to test a tool's ability to distinguish between two distinct groups: participants with and without sarcopenia. In this regard, after controlling the effects of confounding factors, the difference of quality of life score was evaluated between two groups.

Construct validity

The methodology for the validation of the SarQoL®-IR was completed in several steps. Construct validity was checked using Concurrent validity. The total scores obtained from each questionnaire were entered into the analysis, and if the correlation was in the range of 0.6–0.8, a strong correlation was considered.

In accordance with previously published SarQoL® validation studies [13, 15, 31], the quality of life was assessed using SF-36 and EQ-5D questionnaires, which were supposed to have similar dimensions (convergent validity) or different dimensions (divergent validity). Therefore, sarcopenic patients should also fill three questionnaires.

For convergent construct validity, we hypothesized strong correlations between the total score of SarQoL®-IR and the mobility and usual activities questions of the EQ-5D, as well as with the SF-36 physical functioning, role limitations due to physical health, bodily pain, general Health, vitality, and PCS. For divergent construct validity, we hypothesized to find weak or non-existent correlations between the total score of SarQoL®-IR and the self-care, pain/discomfort, and anxiety/depression questions of the EQ-5D, as well as the SF-36 social functioning, role limitations due to emotional problems, mental health, and MCS.

Instrument

The SarQoL® questionnaire initially was developed and validated by Beaudart et al. in French language [3–6]. This questionnaire includes 22 questions and seven domains including physical and mental health, locomotion, body composition, functionality, activities of daily living, leisure activities, and fears. Total scoring of this questionnaire is in the range of 0 (worst imaginable health) to 100 (best imaginable health) [3–6]. For the scoring, the access database obtained from SarQoL team used to encode the SarQoL questionnaire and calculate its scores. The instructions for using this database were completely explained by SarQoL team.

The SF-36 Questionnaire has 36 questions and consists of 8 subscales, which each subscale consists of 2–10 items. The eight subscales of this questionnaire are: Physical Functioning (PF), Role limitations due to Physical health (RP), Bodily Pain (BP), General Health (GH), Vitality (VIT), Social Functioning (SF), Role limitations due to Emotional problems (RE), and Mental Health (MH). By merging the subscales, two general subscales called Physical Component Score (PCS) and Mental Component Score (MCS) are obtained which providing reliable and valid summaries of a respondent's physical and mental status. In this questionnaire, a lower score indicates a lower quality of life and a higher score demonstrates a higher quality of life (from 0, reflecting the worst quality of life, to 100 reflecting the best quality of life) [25, 32]. The Persian version of this questionnaire has been validated among Iranian individuals [33].

The EQ-5D Quality of Life Questionnaire consists of 5 domains including mobility, self-care, usual activities, pain/discomfort, and each score contains five severities. For scoring the five dimensions of the EQ-5D questionnaire using scoring software (provided by [34]), a 5-part Likert scale was applied for each item as follows: level 1 no problem, level 2 mild, level 3 moderate, level 4 severe, and level 5 extreme problems or unable to do. [32, 34, 35]

Test–retest reliability

After a 2-week interval, sarcopenic participants were asked to fill in the questionnaire a second time for the evaluation of the test–retest reliability of the SarQoL®-IR questionnaire. The test–retest reliability was assessed using the intraclass coefficient correlation (ICC) between the first and the retest scores of the whole questionnaire and of the individual domains of the SarQoL®-IR. A score over 0.7 was considered an acceptable reliability. This test was only conducted among sarcopenic patients reported no change in their general health (physical and mental) over the 2-week period.

Internal consistency

Cronbach's alpha coefficient was calculated for measuring of internal consistency, which a value of more than 0.7 demonstrates a high level of internal consistency [31].

Floor and ceiling effects

Floor- and ceiling effects were *considered significant if* greater than 15% of subjects had the lowest or highest score, respectively [31].

Statistical analysis

All analyses were done using SPSS version 24.0. Statistical significance was set, a priori, at $p < 0.05$. The Kolmogorov–Smirnov test was used to assess the normality of continuous variables. The basic characteristics were reported as mean ± standard deviation for quantitative variables, and frequency (percentage) for qualitative variables. To compare these demographic and clinical characteristics of two study groups, the independent-sample *t*-test used for numerical variables and chi-square test used for categorical variables.

Analysis of covariance (ANCOVA) was applied to compare two groups (subjects with sarcopenia and no sarcopenia), adjusted for age and economic status which were significantly different between groups in demographic characteristics.

For evaluation of construct validity in sarcopenic subjects, Pearson or Spearman's correlation coefficients were used to assess the correlation between the total score of SarQoL®-IR with the scores of each domain of three questionnaires. Pearson's correlation coefficient was used for evaluating the correlation between data obtained from the SarQoL®-IR and SF-36 (the data of which were normally distributed), whereas the correlation between the SarQoL®-IR and the EQ-5D questionnaire (the data of EQ-5D were expressed as Likert scale) was assessed using Spearman's correlation coefficient.

Test–retest reliability was also evaluated using ICC and the Cronbach's alpha coefficient was used for determining of internal consistency. Cronbach's alpha and ICC were considered to determine the reliability of SarQoL®-IR in sarcopenic subjects.

To calculate the CVR using experts 'opinions, each question (items) is examined using a 3-part Likert scale, then the experts' answers are quantified, and the content validity ratio is determined based on following formula: $\mathrm{CVR} = \frac{n_e - \left(\frac{N}{2}\right)}{\frac{N}{2}}$.

The CVR is the content validity ratio, n_e is the number of proficient people who answered "It is necessary", and N

is the total number of proficient people [27, 29]. After that, based on the Lawshe table, the valid value for our study was equal to and greater than 0.62.

Quantitative methods were used to examine CVI using the opinion of 10 experts (faculty members) to obtain the question of whether the present questionnaire was properly designed or not. For this purpose, the relevance criterion was calculated using a 4-part Likert scale for each item and then we got the average of "It is highly relevant, and It is relevant" for 10 experts [27, 36]. So, the value of the accepted number is equal to and greater than 0.79.

Results

In the present study, 128 older adults including 88 sarcopenic individuals and 40 non-sarcopenic participants were enrolled. The demographic and clinical characteristics of the study population are demonstrated in Table 1.

Content validity ratio (CVR) and content validity index (CVI)

These obtained values (The Content Validity Ratio: 0.8–1 and The Content Validity Index = 1) which are higher than determined cut points suggest an appropriate and acceptable

Table 2 Content validity ratio (CVR) and content validity index (CVI) questionnaire questions

Question	CVR	CVI
	0.62	0.79
1	1	1
2	1	1
3	1	1
4	1	1
5	0.8	1
6	0.8	1
7	0.8	1
8	1	1
9	1	1
10	1	1
11	1	1
12	1	1
13	0.8	1
14	0.8	1
15	1	1
16	0.8	1
17	1	1
18	1	1
19	1	1
20	1	1
21	1	1
22	1	1

Table 1 Characteristics of study population ($n = 128$)

Characteristics	All ($n = 128$)	Sarcopenia ($n = 88$)	Without sarcopenia ($n = 40$)	*P*-value
Age (years)	74.78 ± 5.05	76.05 ± 5.16	72.00 ± 3.47	< 0.001
Sex				0.828
Female	53(41.4%)	37(42.0%)	16(40.0%)	
Male	75(58.6%)	51(58.0%)	24(60.0%)	
Educational level				0.243
< Diploma	92(71.9%)	66(75.0%)	26(65.0%)	
≥ Diploma	36(28.1%)	22(25.0%)	14(35.0%)	
Economic status				0.003
Low income[a]	48(37.5%)	36(40.9%)	12(30.0%)	
Average income	57(44.5%)	43(48.9%)	14(35.0%)	
High income	23(18.0%)	9(10.2%)	14(35.0%)	
History of smoking				0.740
Yes	41(32.0%)	29(33.0%)	12(30.0%)	
No	87(68.0%)	59(67.0%)	28(70.0%)	
SMI (kg/m^2)	6.72 ± 1.12	6.13 ± 0.74	8.01 ± 0.62	< 0.001
Gait speed (m/s)	0.78 ± 0.19	0.69 ± 0.10	0.99 ± 0.20	< 0.001
Handgrip strength (kg)	40.63 ± 18.52	32.32 ± 12.38	58.91 ± 16.64	< 0.001

Values are presented as mean ± standard deviation for quantitative variables and frequency (percentage) for qualitative variables

SMI skeletal muscle mass index

[a]Income classification was done based on the economic status of Iran (low: less than 30 million IRR per month; average: between 30–60 million IRR per month; and high: more than 60 million IRR per month)

content validity for the Persian translated version of the questionnaire (Table 2).

Discriminative power

Participants with sarcopenia have higher total scores than individuals without sarcopenia. It has also been shown that scores of all domains including the physical and mental health, locomotion, body composition, functionality, and activities of daily living domains, except fear domain, were significantly lower in sarcopenic subjects than non-sarcopenic counterparts (Table 3).

To compare the quality of life score between the two groups, after controlling the effect of confounding variables including age and economic status the results showed a lower score in sarcopenic group than non-sarcopenic group for all domains. Also, sarcopenic individuals had weaker quality of life than non-sarcopenic individuals, which indicates that the Persian version of SarQoL® questionnaire have good discriminative power (Table 3).

Construct validity

The significant correlations were found between the total score of the SarQoL®-IR and some domains of the SF-36, which were theorized to possess similar dimensions, such as physical functioning ($r=0.780$, $p<0.001$), general health ($r=0.553$, $p<0.001$), vitality ($r=0.558$, $p<0.001$), and PCS ($r=0.551$, $p<0.001$). The strong correlations were also reported between the total score of the SarQoL®-IR and some domains of the EQ-5D, which should possess similar dimensions, such as mobility ($r=-0.675$, $p<0.001$) and usual activities (-0.668, $p<0.001$).

Furthermore, the weak correlations were found between the total score of the SarQoL®-IR and some domains of the SF-36 questionnaire, which were posited to have different dimensions, such as role of limitation due to emotional problems (0.219, $p<0.001$) and MCS (0.306, $p=0.004$). The weak correlations were also reported between the total score of the SarQoL®-IR and some domains of the EQ-5D questionnaire, that different dimensions were expected, such as pain/ discomfort (-0.312, $p=0.003$) and anxiety/depression (-0.283, $p=0.008$) (Table 4).

Despite the SF-36 scoring, negative scores were obtained from EQ-5D domains associated with specific EQ-5D scoring methods. In this questionnaire, lower score is related to better quality of life.

Test–retest reliability

An excellent agreement was found between test–retest of the SarQoL®-IR for both the total score and the individual domains. Therefore, it seems that the stability of the questionnaire was evident across time. For individual domains, ICC ranged from 0.936 to 1 (the lowest related to D7: 0.943, the highest related to D6: 1.000) (Table 5).

Internal consistency

A Cronbach's alpha value of 0.881 was found, suggesting a high degree internal consistency. Deletion of one domain at a time led to Cronbach's alpha values ranging between 0.840 (for the domain 1 ''Physical and mental health'') and 0.898 (for the domain 6 ''leisure activities'') (Table 6). There was a positive significant correlation between the total SarQoL-IR® value and each domain values (Table 6).

Floor and ceiling effects

Our findings showed no floor- or ceiling effects for SarQoL-IR®.

Discussion

Sarcopenia is considered as a degenerative disease that affects various aspects of health, including quality of life. However, generic quality of life questionnaires, such as the

Table 3 Discriminative power of the SarQoL®-IR questionnaire

Items	Sarcopenia ($n=88$)	No sarcopenia ($n=40$)	*P*-value
D1 physical and mental health	37.66 ± 10.75	66.18 ± 7.39	< 0.001#
D2 locomotion	32.86 ± 13.73	60.94 ± 12.03	< 0.001#
D3 body composition	49.71 ± 9.51	69.89 ± 10.73	< 0.001#
D4 functionality	50.78 ± 7.51	78.87 ± 9.07	< 0.001#
D5 activities of daily living	28.82 ± 7.54	55.34 ± 16.14	< 0.001#
D6 leisure activities	17.37 ± 5.58	26.59 ± 15.43	< 0.001#
D7 fears	72.30 ± 6.41	76.25 ± 19.57	0.146#
Total score	39.37 ± 7.45	65.09 ± 7.85	< 0.001#

Values are presented as mean ± standard deviation

#Data were adjusted for age and economic status

Table 4 Construct validity of the SarQoL®-IR questionnaire

Items	Total SarQoL®-IR scores	*P*-value
Convergent validity		
SF-36		
D1-physical functioning[a]	0.780	< 0.001
D2-role limitations due to physical health[a]	0.358	0.001
D3-bodily pain[a]	0.446	< 0.001
D4-general Health[a]	0.553	< 0.001
D5-vitality[a]	0.558	< 0.001
SF-36 PCS[a]	0.551	< 0.001
EQ-5D		
Mobility[b]	−0.675	< 0.001
Usual activities[b]	−0.668	< 0.001
Divergent validity		
SF-36		
D6-social functioning[a]	0.561	< 0.001
D7-role limitations due to emotional problems[a]	0.219	0.001
SF-36 mental health[a]	0.466	< 0.001
SF-36 MCS[a]	0.306	0.004
EQ-5D		
Self-care[b]	−0.652	< 0.001
Pain-discomfort[b]	−0.312	0.003
Anxiety-depression[b]	−0.283	0.008

[a]Pearson's correlations (the data were normally distributed)

[b]Spearman's correlations (the data were not normally distributed)

Table 5 Test–retest reliability of the SarQoL®-IR

Items	ICC	95% CI	P-value
Domain 1 (test vs retest)	0.998	0.997–0.999	< 0.001**
Domain 2 (test vs retest)	0.974	0.947–0.988	< 0.001**
Domain 3 (test vs retest)	0.952	0.901–0.977	< 0.001**
Domain 4 (test vs retest)	0.974	0.947–0.988	< 0.001**
Domain 5 (test vs retest)	0.989	0.976–0.995	< 0.001**
Domain 6 (first vs test–retest)	1.000	1.000–1.000	< 0.001**
Domain 7 (test vs retest)	0.943	0.884–0.972	< 0.001**
Total Score (test vs retest)	0.995	0.990–0.998	< 0.001**

**Correlation is significant at the 0.05 level

ICC intraclass correlation coefficient; *CI* confidence interval

SF-36, used before the development of SarQol, are insufficient to fully address the impact of sarcopenia on quality of life. Indeed, it has been reported that the SF-36 questionnaire cannot show all the changes related to quality of life in patients with sarcopenia [3–6, 18, 37]. Therefore, the use of appropriate tools is recommended to evaluate the impact of interventions on quality of life, as well as periodic changes in quality of life, in patients with sarcopenia [18].

Findings from the present study showed higher content validity, consistent construct validity, and excellent test–retest reliability, suggesting that the translated Persian version of the SarQoL® quality of life questionnaire is a valid and reliable tool to assess the quality of life in Iranian

Table 6 Correlations between overall and domain scores and Cronbach's alpha

Items	*r*	*P*-value	Cronbach's alpha if domain deleted	Overall Cronbach's alpha
SarQoL D1 physical and mental health	0.884	< 0.001**	0.840	0.881
SarQoL D2 locomotion	0.828	< 0.001**	0.878	
SarQoL D3 body composition	0.752	< 0.001**	0.858	
SarQoL D4 functionality	0.916	< 0.001**	0.849	
SarQoL D5 activities of daily living	0.796	< 0.001**	0.864	
SarQoL D6 leisure activities	0.236	0.027**	0.898	
SarQoL D7 fears	0.360	0.001**	0.891	

**Correlation is significant at the 0.05 level (two tailed)

patients with sarcopenia. Various SarQoL® validation studies are available in different languages, such as English, French, Greek, Romanian, and other languages [4–6, 15, 16, 25, 38–40], all of which have concordant results with the findings derived from the present study.

Compared to non-sarcopenic older adults, the findings of the current study showed that people with sarcopenia have a lower global quality of life. These results are similar to the findings of other studies related to the validity of the SarQoL® questionnaire [4–6, 18, 25, 39]. Hence, the discriminative power of the SarQoL®-IR questionnaire is confirmed.

All domains of the SarQoL®-IR questionnaire, including physical and mental health (D1), locomotion (D2), body composition (D3), functionality (D4), activities of daily living (D5), and the leisure activities domain (D6), except fears (D7), were significantly lower in individuals with sarcopenia than non-sarcopenic counterparts. In other translated and validated publications, similar results have been demonstrated. It has been shown that in different versions, sarcopenic individuals had significantly lower scores in most domains. For instance, non-significant domains including D4 and D6 (functionality and leisure activities) [39] were reported in the Romanian version, D4, D6 and D7 (functionality, leisure activities, fear) [25] in the Polish version, D2 (locomotion) [41] in the Spanish version, D3, D6 and D7 (body composition, leisure activities, fear) [4, 5, 6] in the English version, D6 (leisure activities) [31] in the Turkish version, and D6 (leisure activities) in the Chinese version [18]. The construct validity analysis indicated a strong correlation with some domains of the SF-36, which have similar dimensions including physical functioning, vitality, and general health. In addition, we also found a strong correlation with some domains of the EQ-5D, which have similar dimensions such as mobility and usual activities. Moreover, these correlations support the consistent construct validity of the SarQoL®-IR.

The correlation coefficient *has been* differently interpreted in various publications. For instance, correlation *coefficients* above 0.81 have been considered excellent, 0.61–0.80 as very good, 0.41–0.60 as good, 0.21–0.40 as acceptable, and less than 0.20 as insufficient. However, *coefficients* between 0.82 and 0.55 were expressed as strong/good correlation, and values below this value were expressed as weak correlation in the English version, coefficients between 0.89 and 0.57 were expressed as strong/good and coefficients of 0.68–0.42 were expressed as weak in the Dutch version, and *coefficients* with a magnitude of 0.59 or greater were considered as strong/good and *coefficients* below 0.59 were considered as weak correlations in the Turkish version [31]. Based on these findings, as well as according to the Chinese and Greek versions [4–6, 18], we considered correlation coefficients > 0.5 as a strong correlation, 0.35–0.5 as a moderate correlation, and 0.2–0.34 as a weak correlation.

In the present study, test–retest reliability was excellent, which was correspondent to the results obtained from studies in French, English, Dutch, Polish, and Greek version [3–6, 25, 40, 42]. Therefore, the reliability of the questionnaire, regardless of the language, appears to be high [15].

Conclusion

In conclusion, the psychometric validation analyses in the present study indicated that the SarQoL®-IR is a valid, consistent, and reliable tool to evaluate the quality of life in sarcopenic patients. A better understanding of the sarcopenia on quality of life, as well as a therapeutic outcome indicator in research, may be obtained using this instrument.

Acknowledgements The authors would like to thank Olivier Bruyere, Fabienne Damblon and other SarQoL Team for their assistance to validate the SarQoL®-IR questionnaire.

Declarations

Conflict of interest The authors declared no conflicts of interest.

Statement of human and animal rights The study procedure was approved by the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran (IR.SUMS.REC.1399.1329).

Informed consent All eligible participants completed written informed consent forms before the study phase.

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