

Validation of the SarQoL[®], a specific health-related quality of life questionnaire for Sarcopenia

Charlotte Beudart^{1*}, Emmanuel Biver², Jean-Yves Reginster³, René Rizzoli², Yves Rolland⁴, Ivan Bautmans⁵, Jean Petermans⁶, Sophie Gillain⁶, Fanny Buckinx¹, Nadia Dardenne¹ & Olivier Bruyère¹

¹Department of Public Health, Epidemiology, and Health Economics, University of Liège, Quartier Hôpital, Liège, Belgium; ²Division of Bone Diseases, Geneva University Hospitals and Faculty of Medicine, Geneva 14, Switzerland; ³Cartilage and Muscle Metabolism Unit and Chair of the Department of Public Health Sciences, CHU Liège, Liège, Belgium; ⁴Gérontopôle de Toulouse, Institut du Vieillessement, Centre Hospitalo-Universitaire de Toulouse (CHU Toulouse); UMR INSERM 1027, University of Toulouse III, Toulouse, France; ⁵Vrije Universiteit Brussel, Brussels, Belgium; ⁶Geriatric Department, CHU Liège, Chénée, Belgium

Abstract

Background A specific self-administrated health-related quality of life questionnaire for sarcopenia, the Sarcopenia and Quality Of Life (SarQoL[®]), has been recently developed. This questionnaire is composed of 55 items translated into 22 questions and organized into seven domains of quality of life. The objective of the present work is to evaluate the psychometric properties (discriminative power, validity, reliability, floor and ceiling effects) of the SarQoL[®] questionnaire.

Methods Sarcopenic subjects were recruited in an outpatient clinic in Liège, Belgium and were diagnosed according to the algorithm developed by the European Working Group on Sarcopenia in Older People. We compared the score of the SarQoL[®] between sarcopenic and non-sarcopenic subjects using a logistic regression after adjustment for potential confounding variables. Internal consistency reliability was determined using Cronbach's alpha coefficient; construct validity was assessed using convergent and divergent validities. Test-retest reliability was verified after a two-week interval using the intra-class correlation coefficient (ICC). At last, floor and ceiling effects were also tested.

Results A total of 296 subjects with a median age of 73.3 (68.9–78.6) years were recruited for this study. Among them, 43 were diagnosed sarcopenic. After adjustment for potential confounding factors, the total score and the scores of the different dimensions of the SarQoL[®] questionnaire were significantly lower for sarcopenic than for non-sarcopenic subjects (54.7 (45.9–66.3) for sarcopenic vs. 67.8 (57.3 – 79.0) for non sarcopenic, OR 0.93 (95%CI 0.90–0.96)). Regarding internal consistency, the Cronbach's alpha coefficient was 0.87. The SarQoL[®] questionnaire data showed good correlation with some domains of the Short-Form 36 (SF-36) and the EuroQoL 5-dimension (EQ-5D) questionnaires and with the mobility test. An excellent agreement between the test and the retest was found with an ICC of 0.91 (95% CI 0.82–0.95). At last, neither floor nor ceiling effects were detected.

Conclusions The SarQoL[®] questionnaire is valid, consistent, and reliable and can therefore be recommended for clinical and research purposes. However, its sensitivity to change needs to be assessed in future longitudinal studies.

Keywords Sarcopenia; Quality of life; SarQoL[®]; Psychometric validation; Questionnaire

Received: 9 October 2015; Revised: 12 April 2016; Accepted: 9 August 2016

*Correspondence to: Charlotte Beudart, Quartier Hôpital, Avenue Hippocrate 13—CHU B23, 4000 Liège, Belgium. Fax: +32 4 366 28 12, Email: c.beudart@ulg.ac.be

Introduction

Sarcopenia is defined by a progressive and generalized loss of muscle mass and muscle function with advancing age.^{1,2}

Because of its association with many adverse clinical outcomes (e.g. physical impairment, limitation of mobility, increased risk of falls, depression, hospitalization, mortality, etc.),^{3–8} sarcopenia is now recognized as a major clinical

problem for older people and as a real public health issue for the society.⁹

However, consequences of sarcopenia on individual quality of life are still poorly understood. One of the main reasons appears to be that studies assessing quality of life in sarcopenia are using generic questionnaires, such as the Short-Form 36 questionnaire (SF-36). Because of the physical and mental consequences associated with sarcopenia,^{3–8} the decline of quality of life in sarcopenic subjects is intuitively evident. However, two studies using the SF-36 questionnaire for this purpose failed to show a reduced quality of life in sarcopenic subjects.^{10,11} The SF-36 questionnaire has also been used in two other studies^{12,13} showing a reduced quality of life in sarcopenic subjects only for some specific domains of quality of life, such as physical function and vitality. The other domains of quality of life did not differ between groups. These results highlight that only some specific domains of quality of life are impacted by sarcopenia and, therefore, generic tools may not be able to detect subtle effects of this specific condition on quality of life.¹⁴ A specific tool could thus be more appropriate to accurately assess the impact of sarcopenia on quality of life.

Recently, the Sarcopenia and Quality of Life (SarQoL[®]), a specific quality of life questionnaire for sarcopenia, has been developed by our team¹⁵ (Appendix S1, also available on www.sarqol.org). Before using a questionnaire for clinical and research purposes, one has to ensure that the questionnaire has the appropriate psychometric properties for the intended application. The objective of the present work was therefore to evaluate the psychometric properties (discriminative power, validity, reliability, floor and ceiling effects) of this new quality of life measure for sarcopenia. We decided to test the hypothesis that the SarQoL[®] questionnaire discriminates well the sarcopenic and the non-sarcopenic subjects, presents a good correlation with other questionnaires presenting a similar concept, presents a low correlation with other questionnaires presenting a dissimilar concept, is reliable after a two-week interval, and does not present any floor nor ceiling effect.

Methods

Identification of patient population

Subjects were recruited in an outpatient clinic in Liège, Belgium within the SarcoPhAge cohort (Sarcopenia and Physical impairment with advancing Age),¹² which is a prospective longitudinal study of Belgian voluntary subjects aged 65 years and older. Inclusion criteria included age ≥ 65 years and French mother tongue. Subjects with an amputated limb were excluded and, because of the requirements of the device measuring appendicular lean mass (Dual Energy X-Ray

Absorptiometry), subjects with a body mass index (BMI) above 30 kg/m² were also excluded. Subjects had to read and sign an informed consent after having been informed of the objectives and methods of the research project. The study has been approved by the Ethics Committee of the University Teaching Hospital of Liège (number 2013/6).

To diagnose sarcopenia, we applied the definition of the European Working Group on Sarcopenia in Older People (EWGSOP).¹ Sarcopenia was defined by the following:

- An appendicular muscle mass/height² (SMI) < 5.5 kg/m² for women and < 7.26 kg/m² for men assessed by Dual-Energy X-Ray Absorptiometry and
- A muscle strength < 20 kg for women and < 30 kg for men assessed by a hand dynamometer (acquired from Saehan Corporation, MSD Europe Bvba, Belgium) or a physical performance ≤ 8 points for the Short Physical Performance Battery (SPPB) test.

Development of the SarQoL[®]

The method used for the development of the questionnaire has been described elsewhere.¹⁵ Briefly, the development was articulated in the following four stages: (i) item generation—based on literature review, sarcopenic subjects' opinion, experts' opinion, focus groups; (ii) item reduction—based on sarcopenic subjects' and experts' preferences; (iii) questionnaire generation—developed during an expert meeting; and (iv) pre-test of the questionnaire—based on sarcopenic subjects' opinion.

A total of 43 sarcopenic subjects and 12 experts (three geriatricians, three rheumatologists expert in the field of bone and muscle, one physiotherapist, one epidemiologist, one linguist expert in the French language, two experts in methodology of questionnaires, and one statistician) were involved in the development of the questionnaire.

The final version of the SarQoL[®] is composed of 55 items translated into 22 questions rated on a 4-point Likert scale. The questionnaire is scored on 100 points. Higher score reflects a higher quality of life. Items are organized into seven domains: domain 1 'Physical and Mental Health' with 8 items; domain 2 'Locomotion' with 9 items; domain 3 'Body Composition' with 3 items; domain 4 'Functionality' with 14 items; domain 5 'Activities of daily living' with 15 items, domain 6 'Leisure activities' with 2 items, and, at last, domain 7 'Fears' with 4 items. It takes approximately 10 min for patients to fill in the questionnaire.

Validation of the SarQoL[®]

The psychometric properties verification consisted of one discriminative power analysis, and the assessment of reliability

(internal consistency and test–retest reliability), validity (construct validity), and floor and ceiling effects. Because the purpose of the discriminative power analysis is to assess the ability of the questionnaire to differentiate quality of life in regards of sarcopenia status, this analysis has been performed on the whole study population. However, to validate the SarQoL® as a specific tool for measuring quality of life in sarcopenia, all other validation analyses have been performed on the sarcopenia population.

Discriminative power

The ability of the questionnaire to discriminate subjects with different sarcopenia status was assessed by the comparisons between the total score of the SarQoL® questionnaire and between the individual domains scores, for non sarcopenic and sarcopenic subjects. Adjusted logistic regressions were performed for two-group comparison (sarcopenic vs. non sarcopenic subjects). Analyses were adjusted for clinical characteristics, which were significantly different between groups in univariate statistics.

Reliability

Internal consistency. Internal consistency is the estimation of item homogeneity. Internal consistency reliability was determined using Cronbach's alpha coefficient.¹⁶ A value greater than 0.70 indicates a high level of internal consistency.¹⁷ We also tested the impact of each domain on the reliability.

We also assessed the correlation of each domain with the total score of the SarQoL® using Spearman's correlations. A correlation above 0.81 was considered as excellent, between 0.61 and 0.80 as very good, between 0.41 and 0.60 as good, between 0.21 and 0.4 as acceptable, and at last, less than 0.20 as insufficient.¹⁸

Test–retest reliability. To analyse the test–retest stability of the SarQoL® questionnaire, sarcopenic subjects were asked to fill in the questionnaire a second time after a two-week interval. To avoid finding changes unrelated to the reliability of the questionnaire between the first and the second administration of the SarQoL, participants were asked if they felt any change in their general health (physical and mental health; e.g. sickness, fall, hospitalization, tiredness, etc.) during the past two weeks. Test–retest reliability was only performed among those who reported no change in their general health over this two-week period. The intra-class coefficient correlation (ICC) was used to test the reliability between the first and the retest scores of the total questionnaire and of the individual domains of the SarQoL®. An ICC over 0.7 was considered as an acceptable reliability.¹⁹

Construct validity

Construct validity was assessed using convergent validity and divergent validity. For the convergent validity, Spearman's correlations were used to evaluate the correlation between the SarQoL® and other questionnaires, which had similar dimensions. Regarding divergent validity, Spearman's correlations were used to evaluate the correlation between the total score of the SarQoL® and other questionnaires, which had different dimensions.

Besides completing the SarQoL® questionnaire, sarcopenic subjects also completed three other questionnaires:

- 1/ the generic Short Form-36 questionnaire²⁰ which is composed of 36 items measuring eight health-related quality of life domains (physical functioning, role limitation because of physical problems, bodily pain, general health, vitality, social functioning, role limitation because of emotional problem, and mental health) scored on a scale from 0 (worst quality of life) to 100 (best quality of life). The SF-36 questionnaire was used to measure convergent validity between the SarQoL questionnaire and the domains of physical functioning, general health, and vitality;
- 2/ the EuroQoL 5-dimension (EQ-5D) questionnaire²¹ which records the level of self-reported problems according to five dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression). Utility score of the EQ-5D questionnaire as well as dimensions of usual activities and mobility has been used to measure the convergent validity with the SarQoL questionnaire. The dimension of pain/discomfort has been used to measure the divergent validity with the SarQoL questionnaire;
- 3/ the Mobility–Tiredness scale which is designed to estimate fatigue following daily life activities for elderly subjects.²² The scale assessed whether the participants were in need of help to transfer, walk indoors, go outdoors, walk outdoors in nice weather, walk outdoors in poor weather, and climb stairs. Participants who were able to manage the tasks independently were then asked if they felt tired after performing these tasks. Fatigue on these six individual tasks were summed for a total fatigue score (range 0–6), with higher scores indicating higher levels of fatigue. The Mobility–Tiredness scale has been used to measure convergent validity with the SarQoL questionnaire.

Moreover, the participants also had a Mini Mental State Examination (MMSE)²³ which consists of a 30-point questionnaire to assess cognitive function. The score of the MMSE has been used to measure convergent validity with the SarQoL questionnaire.

Floor and ceiling effects

Floor and ceiling effects were considered to be present when a high percentage of the population had the lowest or the highest score respectively. Floor and ceiling effects higher than 15% were considered to be significant.

Statistical analysis

Normality of quantitative variables was tested by the Shapiro–Wilk test. Because the variables did not present a normal distribution, quantitative variables were expressed as median (P25–P75) and qualitative variables were reported as absolute and relative frequencies (%). Differences of characteristics between sarcopenic and non-sarcopenic subjects were tested with Mann–Whitney *U* test for quantitative variables and with a χ^2 for qualitative variables.

To measure the discriminative power of the questionnaire, a logistic regression model was performed. The model was adjusted for clinical characteristics which were significantly different between groups in univariate analyses (adjusted on age and BMI).

Reliability has been measured by Cronbach's alpha coefficient to test the internal consistency and ICC to test the reliability between the first and the retest scores of the SarQoL[®] questionnaire. Finally, Spearman's correlations were used to evaluate the construct validity of the SarQoL questionnaire and so, to measure the correlations between the SarQoL[®] questionnaire and the domains of physical functioning, vitality and general health of the SF-36 questionnaire, the utility score of the EQ-5D questionnaire as well as the questions related to mobility, usual activities, and pain/discomfort of the EQ-5D questionnaire and the Mobility–Tiredness scale.

Analyses were performed using Statistica (version 10 for Windows) and SAS (version 9.3 for Windows; used only for the internal consistency analysis). Results were

considered statistically significant at the 5% critical level ($p < 0.05$).

Results

Subjects

A total of 296 subjects with a median age of 73.3 (68.9–78.6) years were recruited. Among them, 169 were women, which represent 57.1% of the population. Based on the algorithm developed by the EWGSOP, 43 subjects (i.e. 28 women and 15 men) were diagnosed sarcopenic. Characteristics of the population and of sarcopenic subjects are presented in *Table 1*.

Sarcopenic subjects were older and had lower BMI ($\text{BMI} = \text{weight}/\text{height}^2$) than the non-sarcopenic subjects ($p < 0.001$ and $p < 0.001$, respectively). No differences were observed regarding sex, number of concomitant diseases, number or drugs consumed, alcohol consumption, smoking habits, depression, and cognitive function.

All subjects self-completed the questionnaire on a paper format. No clarification has been requested by the subjects.

Discriminative power

Table 2 presents the total score and the individual domains scores of the SarQoL questionnaire for sarcopenic and non-sarcopenic participants.

Sarcopenic subjects presented a quality of life score of 54.7 (45.9–66.3) compared to a score of 67.8 (57.3–79.0) for non sarcopenic participants. The logistic model adjusted for age a BMI showed an OR of 0.93 (95% CI 0.9–0.96) indicating a lower total score for sarcopenic subjects in comparison to non-sarcopenic one (*Table 3*). Moreover, all domains presented scores lower for sarcopenic subjects compared to non-sarcopenic ones. This was confirmed by the logistic analysis model. The discriminant power of the questionnaire is thereby confirmed (*Tables 2* and *3*).

Table 1 Clinical characteristics of the included population

	All (<i>n</i> = 296)	No sarcopenia (<i>n</i> = 253)	Sarcopenia (<i>n</i> = 43)	<i>p</i> -Value*
Age (years)	73.3 (68.9–78.6)	72.4 (68.7–77.7)	77.1 (73.2–82.5)	<0.001
Sex				
Women	169 (57.1)	141 (55.7)	28 (65.1)	0.25
BMI (kg/m^2)	26.8 (23.8–30.1)	27.2 (24.5–30.4)	23.1 (21.1–25.2)	<0.001
Number of concomitant diseases	4.0 (3.0–6.0)	4.0 (3.0–6.0)	4.0 (3.0–6.0)	0.17
Number of drugs	5.0 (3.0–8.0)	5.0 (3.0–8.0)	6.0 (5.0–9.0)	0.07
Alcohol consumption				
Yes	154 (52.0)	135 (53.4)	19 (44.2)	0.27
Smoking				
Yes	27 (9.12)	23 (9.09)	4 (9.30)	0.96
MMSE score (/30 points)	29.0 (28.0–30.0)	29.0 (28.0–30.0)	29.0 (28.0–30.0)	0.36
Depression (/15 points)	2.0 (1.0–5.0)	2.0 (1.0–5.0)	3.0 (2.0–7.0)	0.19

*: *p*-value between sarcopenia and no sarcopenia.

BMI, body mass index; MMSE, Mini Mental State Examination.

Table 2 Results of the SarQoL® questionnaire for sarcopenic and non-sarcopenic subjects

	No sarcopenia (n = 253)	Sarcopenia (n = 43)
Total score	67.8 (57.3–79.0)	54.7 (45.9–66.3)
D1 Physical and Mental Health	63.3 (54.4–76.7)	56.7 (45.6–63.3)
D2 Locomotion	61.1 (50.0–83.3)	52.8 (30.6–66.7)
D3 Body Composition	60.0 (50.0–70.8)	50.0 (41.7–60.0)
D4 Functionality	75.0 (61.5–85.7)	65.4 (53.8–75.0)
D5 Activities of daily living	66.1 (54.5–80.0)	48.3 (40.0–57.7)
D6 Leisure activities	66.6 (33.2–66.7)	50.0 (33.2–66.7)
D7 Fears	87.5 (87.5–100.0)	87.5 (75.0–100.0)

Table 3 Discriminative power of the SarQoL® questionnaire

	Sarcopenia (vs. no sarcopenia)		
	OR	95% CI	p-Value*
Total score	0.93	0.90–0.96	<0.001
D1 Physical and Mental Health	0.96	0.94–0.99	0.003
D2 Locomotion	0.97	0.95–0.98	<0.001
D3 Body Composition	0.97	0.95–0.99	0.027
D4 Functionality	0.95	0.93–0.98	<0.001
D5 Activities of daily living	0.93	0.91–0.96	<0.001
D6 Leisure activities	0.97	0.95–0.99	0.013
D7 Fears	0.95	0.91–0.98	0.002

*Adjusted for age and BMI.

Internal consistency

The Cronbach's alpha coefficient of the SarQoL® questionnaire was 0.87. This indicates a high level of internal consistency. When deleting one domain at a time, we found a Cronbach's alpha varying between 0.84 for domain 1 'Physical and Mental Health' to 0.89 for domain 6 'Leisure activities'.

All individual domains were significantly and positively correlated with the total score of the SarQoL® ($p < 0.001$ for all domains) (Table 4).

Construct validity

Quality of life did not differ between sarcopenic subjects and non-sarcopenic subjects in terms of utility score assessed with the EQ-5D questionnaire as well as for all the domains of the SF-36 questionnaire at the exception of the domain of physical functioning where the score for sarcopenic subjects (55.0 (35.0–71.25)) was significantly lower than the score of non-sarcopenic subjects (75.0 (50.0–90.0)) ($p = 0.001$).

As expected, the total score at the SarQoL® questionnaire was positively correlated with some domains of the SF-36 questionnaire: physical functioning ($r = 0.49$, $p < 0.001$), vitality ($r = 0.72$, $p < 0.001$), and general health ($r = 0.67$, $p < 0.001$). Good correlations were also found between the total score of the SarQoL® questionnaire and the utility score

Table 4 Results of the correlation between each domain and the total score of the SarQoL® and of the test–retest reliability of the SarQoL® total score and individual domain scores

	Correlation		Test–retest reliability	
	r	p-Value	ICC	95% CI
Total score	1	.	0.91	0.82–0.95
D1 Physical and Mental Health	0.78	<0.001	0.84	0.69–0.92
D2 Locomotion	0.84	<0.001	0.65	0.39–0.81
D3 Body Composition	0.56	<0.001	0.52	0.21–0.73
D4 Functionality	0.86	<0.001	0.88	0.78–0.94
D5 Activities of daily living	0.89	<0.001	0.79	0.60–0.89
D6 Leisure activities	0.52	<0.001	0.76	0.55–0.88
D7 Fears	0.58	<0.001	0.42	0.092–0.67

ICC, intra-class correlation coefficient.

of the EQ-5D questionnaire ($r = 0.47$, $p = 0.002$), questions of the EQ-5D questionnaire related to usual activities ($r = -0.57$, $p < 0.001$) but also between the total score of the SarQoL® questionnaire and the Mobility-test questionnaire ($r = 0.77$, $p < 0.001$) which confirmed the convergent validity. A low but significant correlation has been found between the SarQoL® questionnaire and the questions of the EQ-5D questionnaire related to mobility ($r = -0.35$, $p = 0.023$).

For the divergent validity, very low correlations were found between the SarQoL® questionnaire and the MMSE test ($r = 0.02$, $p = 0.89$) but also between the SarQoL® questionnaire and the questions of the EQ-5D related to pain/discomfort ($r = -0.12$, $p = 0.45$).

Test–retest reliability

Among sarcopenic subjects who completed, a second time, the SarQoL® questionnaire after an interval of two weeks, 30 reported no change of health during this period. We found an excellent agreement between the test and retest with an ICC of 0.91 (95% CI 0.82–0.95). Regarding the seven domains, we also found an excellent test–retest reliability for domain 1 'Physical and Mental Health' and for domain 4 'Functionality'. A good reliability was found for domain 2 'Locomotion', domain 5 'activities of daily living', and domain 6 'leisure activities'. Finally, for domain 3 'body composition' and 7 'fears', a low reliability was found with respectively an ICC of 0.52 (95% CI 0.21–0.73) and 0.42 (95% CI 0.09–0.67) (Table 4).

Floor and ceiling effects

No sarcopenic subject presented either the lowest score or the highest score at the SarQoL® questionnaire. Consequently, there was neither floor nor ceiling effects.

Discussion

To our knowledge, the SarQoL® questionnaire is the first specific quality of life questionnaire developed for sarcopenia.

Even if no clear recommendation currently exists for the management of sarcopenia in daily practice, this questionnaire can, however, enhance the accuracy of assessment of well-being and physical function, psychological, and social implications of sarcopenic subjects by clinicians. Moreover, because of the increasing development of therapeutic intervention targeting sarcopenia, this tool can be used to assess the relevance of these interventions and their effectiveness in terms of change in quality of life.

The psychometric property analyses showed first that the questionnaire discriminates between sarcopenic subjects and non-sarcopenic ones. Contrarily to the generic tools, such as the SF-36 and the EQ-5D, the SarQoL[®] questionnaire is composed exclusively of questions related to sarcopenia. For the development of the questionnaire,¹⁵ literature was carefully searched for items related to sarcopenia. Moreover, several experts coming from various French speaking countries, but also sarcopenic subjects, were asked to define some items of quality of life related to sarcopenia. This list of items was then reduced to the most pertinent ones based on experts' and/or sarcopenic subjects' opinion. The inclusion of sarcopenic subjects at these different steps of development ensured the content validity of the SarQoL[®] questionnaire. A valid questionnaire implies that the scores obtained by sarcopenic subjects are significantly lower than scores obtained by non-sarcopenic ones, even after adjustment for potential confounding variables. We also measured, in an exploratory analysis, the scores for the severe-sarcopenic subjects (presence of low muscle mass, low muscle strength, and low physical performance). The scores obtained by severe sarcopenic subjects ($n=16$) were even lower than those obtained by the sarcopenic subjects, which indicates that the SarQoL[®] questionnaire can capture the severity of sarcopenia.

The results of the validation of the questionnaire also show a high internal consistency. This value is greater than 0.7 and lower than 0.9 which indicates a good internal consistency and a non-redundancy of items.¹⁹ Moreover, it appears that the deletion of one domain at a time did not have a particular impact on the reliability. We also tested the correlation of each domain with the total score, and we found that each domain was positively and strongly correlated with the total score.

Regarding construct validity, we found strong correlation between the SarQoL[®] questionnaire and the domain of vitality and general health of the SF-36 questionnaire. Because the SF-36 is a quality of life questionnaire, we did not expect very low correlations between any domains of this questionnaire and the SarQoL[®]. Therefore, we only used the SF-36 questionnaire to measure convergent validity, and we tested only the domains which we hypothesized as having a strong correlation with the SarQoL[®] because of their potential association with sarcopenia. Regarding the EQ-5D questionnaire, we found a strong correlation with the question related to

usual activities but we found a lower correlation than expected with the question related to mobility. However, this question related to mobility in the EQ-5D concerns only walking activity, which may explain why we did not find the expected strong correlation with the SarQoL[®] questionnaire.

To confirm the reliability of the questionnaire, we measured the test-retest reliability after a two-week interval in 43 sarcopenic subjects. We found an ICC of 0.88 (95% CI 0.77–0.94). When keeping only the 30 sarcopenic subjects than did not report any modification of health between the test and the retest, this ICC increased to 0.91 (95% CI 0.82–0.95), which indicates an excellent test-retest reliability.¹⁹ With the sarcopenic subjects who did not report any change in their health, we found low ICC for domain 3 'Body composition' and domain 7 'Fears'. This could partly be explained by the low number of items included in these domains, 3 and 4 items, respectively. The two-week interval was geared to the subject population. It seems a good compromise between the stability of the measure and the absence of memory bias.

Our study presented some limitations. First, the sensitivity to change of the SarQoL[®] questionnaire was not assessed. Indeed, as with all developments of health-related quality of life questionnaires, this study is cross sectional, and this parameter can only be tested in a longitudinal study. However, as the subjects included in the present study are part of the SarcoPhAge study,¹² which is a prospective longitudinal study, we will be able, in the future, to record longitudinal data and to correlate the evolution of sarcopenia, or of muscle mass, muscle strength and physical performance of subjects, with the evolution of the SarQoL[®] score. A second limitation concerned the assessment of the discriminant validity. Indeed, we did not include questionnaires, which would present a totally dissimilar concept other than quality of life. So, we used one question of the EQ-5D questionnaire as well as the MMSE, but it would have been interesting to have a questionnaire exclusively focused on a topic not affected by sarcopenia to assess more appropriately the divergent validity. Finally, our study population was mainly composed of voluntary subjects. These subjects could feel a priori more concerned by muscle disorders than a random sample of the population. This potential bias may have been associated with a decreased score of the non-sarcopenic subjects. We should also acknowledge that the psychometric analyses have only been assessed in the SarcoPhAge cohort, and they should be confirmed in other cohorts to ensure external validity. At the present time, SarQoL[®] has only yet been developed and validated in French.

Conclusions

The SarQoL[®] questionnaire, the first specific quality of life questionnaire for sarcopenia, has been developed and has

been shown to be understandable by the target population. The SarQoL® is valid, consistent, and reliable and can therefore be proposed for clinical and research purposes. The questionnaire still needs to be validated regarding the sensitivity to change.

Acknowledgement

The authors certify that they comply with the ethical guidelines for authorship and publishing of the Journal of Cachexia, Sarcopenia, and Muscle.²⁴

CB and EB have received the 'Young Investigator Research Grant' for this research from the International Osteoporosis Foundation and Servier.

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Online supplementary material

Supporting information may be found in the online version of this article.

Appendix S1. French version of the SarQoL

Conflicts of interest

None declared in relation with this work.