Alian *et al.*
Egyptian Rheumatology and Rehabilitation (2023) 50:42
https://doi.org/10.1186/s43166-023-00209-6

Egyptian Rheumatology and Rehabilitation

RESEARCH

Open Access

Cultural adaptation and validation of the scleroderma health assessment questionnaire into Arabic language

Samah Mahmoud Alian[1*], Enass Abdel-kader Eliwa[1], Sohair Atia Ahmed[2] and Manar Ibrahim Abd El-Fattah Ibrahim[3]

Abstract

Background Systemic sclerosis is an autoimmune multisystem disorder which affects the patients' physical and psychological functioning. Scleroderma health assessment questionnaire used to measure physical disability in systemic sclerosis patients. It consists of Health Assessment Questionnaire Disability Index plus five visual analogue scores related to systemic sclerosis symptoms. There is no Arabic questionnaire specifically measuring physical disability in Arabic systemic sclerosis patients; therefore, this study aimed to translate the scleroderma health assessment questionnaire, culturally adapt it, and test its reliability and validity.

Method The scleroderma health assessment questionnaire was translated into Arabic according to translation and cross-cultural adaptation guidelines. Convergent validity is measured by correlation of scleroderma health assessment questionnaire scores for 56 patients with short-form health survey scores, while discriminate validity is tested by stratifying clinical manifestations of patients and disease subtypes. Reliability measured by the intraclass correlation coefficient by interviewing patients twice 14 days apart.

Results There was a strong correlation between the short-form health survey scores: physical component score and Health Assessment Questionnaire Disability Index and scleroderma health assessment questionnaire global scores ($r = -0.659^{**}, -0.727^{**}$), while a moderate correlation between the short-form health survey scores physical component score, and scleroderma health assessment questionnaire, visual analogue scores, and all scleroderma health assessment questionnaire visual analogue score subtypes except for Raynaud's and digital ulcer, was found ($r = -0.495^{**}, -0.458^{*}, -0.495^{**}, -0.403^{*}$). The mental component score of the short-form health survey scores was moderately correlated with Health Assessment Questionnaire Disability Index and scleroderma health assessment questionnaire global scores ($r = -0.507^{**}, -0.51^{**}$), while it was mildly correlated with scleroderma health assessment questionnaire visual analogue score and only its subtype overall severity score ($r = -0.398^{*}, -0.375^{*}$). Also, statistically significant association is between diffuse disease type and digestive visual analogue score ($p = 0.001$). The Arabic edition of scleroderma health assessment questionnaire has a Cronbach's alpha of 0.845.

Conclusion The translated Arabic version is a valid and reliable questionnaire to assess Egyptian systemic sclerosis patients' functional disability.

Keywords Systemic sclerosis, Functional disability, Scleroderma health assessment questionnaire, Predictors of disability

*Correspondence:
Samah Mahmoud Alian
dr_r18@yahoo.com
Full list of author information is available at the end of the article

Introduction

Systemic sclerosis (SSc) is an autoimmune disease of unknown etiology with multiorgan affection and heterogeneous clinical picture [1].

SSc causes an increased mortality and morbidity, depressive symptoms, and disability [2].

Fries et al. [3] developed the Health Assessment Questionnaire Disability Index (HAQ-DI) which is used for assessing functional disability in rheumatic diseases, but it is not sufficient for measuring the specific organ affection in SSc. Also, Elattar et al. [4] translated the mouth handicap in systemic sclerosis questionnaire into Arabic, but it measures only one aspect of the disease-specific functional disability. Steen and Medsger [5] developed five additional scales to the HAQ-DI to create the scleroderma health assessment questionnaire (SHAQ); they combine the HAQ-DI with five visual analogue scales (VAS) related with SSc symptoms (SHAQ VAS), so it measures all aspects of systemic sclerosis functional disability.

S-HAQ has proved to be valid and reliable [5]; also, it was translated and culturally adapted into multiple languages, e.g., French [6], Italian [7], and Japanese [8], but not translated into Arabic yet, so this study aimed to translate and adapt this SHAQ version in Arabic Egyptian culture and test its validity and reliability.

Method

Patients

We included fifty-six patients diagnosed with SSc fulfilling the American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) classification criteria in this study [9]. We excluded patients with significant cognitive impairment as exclusion criteria. This work was accepted in the research protocol number (ZU-IRB no.10118) by the local Institutional Review Board (……..University, ……). Consent was taken from each patient.

Clinical assessment

Full history and clinical examination were done. We assessed the degree of skin tightness by the modified Rodnan's score [10]. Patients were classified into either diffuse or limited cutaneous SSC according to LeRoy's classification [11].

Gastrointestinal affection is manifested by dysphagia, gastroesophageal reflux disease, malabsorption, and anal incontinence. Lung involvement was assessed by ground-glass opacities and honey combing on high-resolution computed tomography and restrictive pattern in pulmonary function test, while cardiac affection is manifested by the presence of pericarditis, valve lesion, and/or myocardial dysfunction by echocardiography. Pulmonary artery hypertension was diagnosed by systolic pressure of pulmonary artery more than 45 mmHg measured on echocardiography. Musculoskeletal affection was manifested by arthralgia. Vascular affection presented by Raynaud's, digital pitting scars, ulceration, and/or gangrene and also telangiectasia and calcinosis were detected by examination.

Definitions of the questionnaires

➢ *SHAQ*: It consists of the standard HAQ-DI questionnaire with its eight domains (dressing and grooming, arising, eating, walking, hygiene, reach, grip, and activities) with total 20 item plus five questions "In the past week, how much have your—Raynaud's phenomenon, digital ulcers, gastrointestinal symptoms, lung symptoms, and overall scleroderma symptoms—interfered with your activity?"

➢ *HAQ-DI*: The response for each question is either without any difficulty (0), with some difficulty (1), with much difficulty (2), and unable to do (3). The score of each domain is the highest score for any question in that domain unless aids or devices are required; the score then is raised to 2. The total HAQ-DI score is calculated by taking the average of the 8 domains scores which range from 0 to 3; higher score means more disability [12].

➢ *SHAQ VAS*: The patient marked on a VAS with a length of 15 cm. At one end of the line is "does not interfere" 0, and the other end is "very severe limitations" [13]. The final VAS score is calculated by multiplying the value by 0.2. The score ranges between 0 and 3 (minimum and maximum) limitation. Each VAS score value is reported separately [14]. The SHAQ-global score was calculated by this equation [8 HAQ-DI domains + 5 SSc VAS)/13] [14].

➢ Short-form health survey score questionnaire 36 (SF-36): We used the validated Arabic version. It is a self-applied questionnaire used to measure health-related quality of life, consists of two main components physical and mental component scores (PCS, MCS, respectively), and under them, there are eight main scales with 36 questions: general health, physical functioning, physical role, pain, vitality, social functioning, emotional problems, and mental health. Score of each scale ranges from 0 to 100. The higher scores indicate better health-related quality of life [15].

Translation-adaptation

According to guidelines of cultural adaptation of self-administrated questionnaires, we translated the SHAQ [13]. Firstly, we translate the original version of SHAQ from English into Arabic using two translators; one was blind about the use of the questionnaire, and the other was informed. Then, we compare the two translated versions to conclude a common translation. We translated back the questionnaire into English by another two blind translators; their native language is English. Then, we discuss all the translations to correct any conflicts. Afterwards, we compare the original questionnaire with the back translations, and a final Arabic version was formed. It was clear and understandable. We perform a cognitive evaluation of the translated Arabic version; through 28 patients, we ask them if the meaning of each question is reaching them or not. We rephrased the conflicting questions to coincide with our culture while preserving the same meaning.

We asked the patients to fill in the Arabic-translated SHAQ and SF-36 questionnaires while they are in their follow-up visit. They complete it in almost 20 min. After 2 weeks, all patients refilled the SHAQ questionnaire again.

Validation of the psychometric properties of the Arabic SHAQ

Each patient filled in the HAQ-DI and the five SHAQ VAS questions and in addition to the SF-36v2 questionnaire. The patients were supervised by a trainee who supplied a good explanation about the questionnaires.

Convergent validity

We assessed the convergent validity by finding the correlation between the HAQ-DI and SHAQ VAS scores with SF-36v2 health-related quality-of-life domains. If there is statistically significant correlation between them, then a good convergent validity of the questionnaire is present.

Discriminant validity

We compare the values of HAQ-DI, SHAQ VAS, and SF-36v2 physical item scores between patients with and without SSc-related organ affection and both disease subtypes (diffuse and limited). If there is statistically significant association between them, then a good discriminant validity of the questionnaire is present.

Test–retest reliability of SHAQ

We assessed it by asking the patients to fulfill SHAQ at baseline and 2 weeks later by the same physician. We use intraclass correlation coefficient (ICC) to assess the agreement between repeated interviews, with ICC equal to or more than 0.7 indicating a high degree of agreement [6]; we assessed the internal consistency of the SHAQ by the Cronbach's alpha coefficient.

Statistical analysis

All data were collected and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Quantitative data were presented by mean ± SD, while qualitative data were presented by number and percentage. Qualitative variables were compared using chi-square and Fisher's exact test; while quantitative nonparametric data were compared using "Mann–Whitney test." The Spearman's rank correlation coefficient was used to test the correlation between parametric data. Correlations less than or equal to 0.29 were considered to be low, between 0.30 and 0.49 as moderate, and greater than or equal to 0.50 as high. All tests were two-sided differences and were considered statistically significant when *P*-values were < 0.05.

Results

Fifty-six patients completed the SHAQ and SF-36 v2. The mean patient's age was 41.4 ± 11.57 years, and 85.7% of them were females, with mean disease duration 5.5 ± 5.4 years. A total of 46.4% of studied patients had limited type of diseases; only one patient had family history of SSc. All SSc patients had Raynaud's phenomenon and skin thickness. The highest percent of them had puffiness (89.3%), and gastrointestinal manifestation (85.7%) with dysphagia was the highest manifestation (67.85%), pitting scars, calcinosis, arthritis, cardiac manifestation, respiratory manifestation in the form of cough, and exertional dyspnea with percentage of 82.1%, 17.9%, 78.6%, 67.9%, and 60.7%, respectively, and the least manifestation was friction rub (3.6%) among studied patients. The median range of the number of organ involvement is 4; the mean of modified Rodnan score is 18.43 ± 6.5.

The mean of social functioning of studied patients was 42.4 followed by mental health which was 37, and then physical functioning was 34.28. All patients had limitation with regard to physical and emotional health. The mean of the HAQ-DI score, SHAQ VAS score, and SHAQ global score was 1.56 ± 0.69, 0.99 ± 04:00, and 1.34 ± 0.54, respectively, among studied patients (Fig. 1A, B).

Convergent validity

There was statistically significant negative correlation between HAQ-DI score and all health-related quality-of-life domains SF-36 ($p < 0.05$) except mental health domain ($p = 0.627$). Also, there was statistically significant

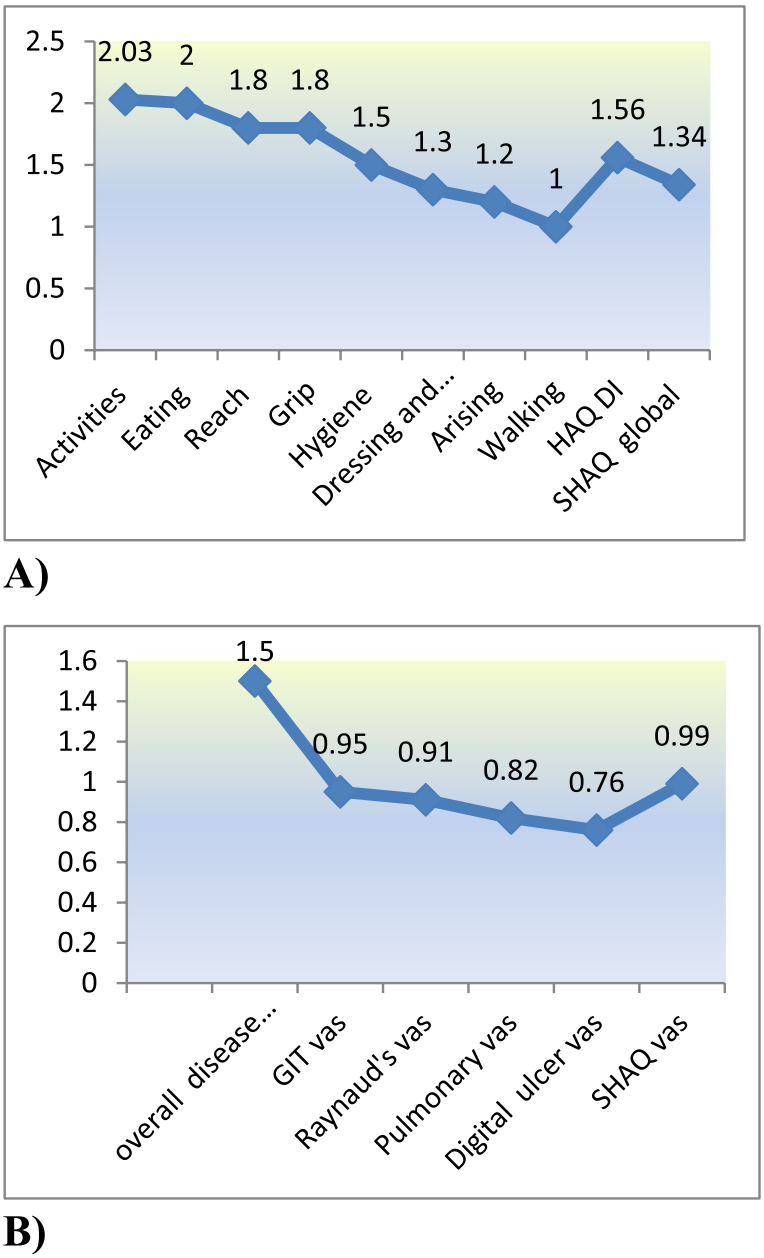

Fig. 1 **A** Mean of functional disability via SHAQ. **B** Mean of VAS types of studied patients

negative correlation between SHAQ-VAS score and all health-related quality-of-life domains SF-36 ($p<0.05$) except mental health domain ($p=0.563$). Moreover, global SHAQ showed statistically significant negative correlation and all health-related quality-of-life domains SF-36 ($p<0.05$) except mental health domain ($p=0.433$) (Table 1).

There was statistically significant negative correlation between overall severity VAS score and digestive VAS score and all health-related quality-of-life domains SF-36 ($p<0.05$) except mental health domain ($p=0.14$, 0.89). Moreover, pulmonary VAS showed statistically significant negative correlation and all health-related quality of life domains SF-36 ($p<0.05$) except general health ($p=0.35$), vitality ($p=0.051$), mental health ($p=0.91$), and social functioning ($p=0.17$); Raynaud's VAS was statistically significant negative correlation only with physical component summary score ($p=0.006$) and physical functioning ($p=0.008$) (Table 2).

Table 1 Assessment of convergent validity by correlation between the HAQ-DI, SHAQ VAS, and SHAQ global scores with health-related quality-of-life domains SF-36 ($n=56$)

Domains	HAQ-DI		SHAQ-vas		SHAQ global	
	(*r*)	*p*	(*r*)	*p*	(*r*)	*P*
Physical component summary score	−0.659[b]	0.0001	−0.495[b]	0.0001	−0.727[b]	0.0001
• Physical functioning	−0.646[b]	0.0001	−0.435[b]	0.001	−0.688[b]	0.0001
• Role limitation due to physical problem	0		0		0	
• bodily pain	−0.664[b]	0.0001	−0.470[b]	0	−0.692[b]	0.0001
• General health	−0.455[b]	0.0001	−0.364[b]	0.006	−0.490[b]	0.0001
Mental component summary score	0−.507[b]	0.0001	−0.398[b]	0.002	−0.510[b]	0.0001
• Role limitation due to emotional problem	0		0		0	
• Vitality	−0.639[b]	0.0001	−0.268[a]	0.046	−0.644[b]	0.0001
• Mental health	0.066	0.627	−0.079	0.563	0.107	0.433
• Social functioning	−0.665[b]	0.0001	−0.402[b]	0.002	−0.663[b]	0.0001
Health-related QoL SF-36	−0.627[b]	0.0001	−0.524[b]	0.0001	−0.698[b]	0.0001

(*r*) Correlation coefficient

QoL Quality of life, *HAQ-DI* Health Assessment Questionnaire Disability Index, *SHAQ VAS* Scleroderma health assessment questionnaire visual analogue scale

[a] Significant < 0.05

[b] Significant < 0.01

Table 2 Assessment of convergent validity by correlation between the SHAQ VAS scores with health-related quality-of-life domains SF-36 ($n=56$)

	Overall severity VAS score		Digestive VAS score		Pulmonary VAS		Raynaud's VAS		Digital ulcer VAS	
	(r)	*p*	*(r)*	*p*	*(r)*	*P*	*(r)*	*P*	*(r)*	*P*
Physical component summary score	−0.458[b]	0.0001	−0.495[b]	0.0001	−0.403[b]	0.002	−0.365[b]	0.006	0.051	0.707
• Physical functioning	−0.348[b]	0.008	−0.454[b]	0.0001	−0.386[b]	0.003	−0.351[b]	0.008	0.081	0.552
• Role limitation due to physical problem	.0		.0		.0		.0		.0	
• Bodily pain	−0.452[b]	0.0001	−0.414[b]	0.002	−0.372[b]	0.005	−0.256	0.057	−.055	0.685
• General health	−0.579[b]	0.0001	−0.282[a]	0.035	−0.125	0.359	−0.112	0.412	−.028	0.839
Mental component summary score	0.375[b]	0.004	−0.317[a]	0.017	−0.321[a]	0.016	−0.244	0.07	0.124	0.362
• Role limitation due to emotional problem	.0		.0		.0		.0		.0	
• Vitality	−0.334[a]	0.012	−0.346[b]	0.009	−0.262	0.051	−0.207	0.126	0.22	0.104
• Mental health	−0.199	0.142	−.018	0.893	−.017	0.901	0.003	0.984	0.236	0.079
• Social functioning	−0.383[b]	0.004	−0.335[a]	0.012	−0.186	0.17	−0.111	0.414	−0.159	0.243
Health-related QoL	−0.458[b]	0.0001	−0.486[b]	0.0001	−0.443[b]	0.001	−0.39[b]	0.003	0.043	0.752

(*r*) correlation coefficient

VAS Visual analogue scale

[a] Significant < 0.05

[b] Significant < 0.01

Finally, there was statistically significant positive correlation between SHAQ global with HAQ-DI scores of studied patients.

Discriminant validity

There was statistically significant positive correlation between number of organs affected of studied patients and all HAQ-DI domains except activities ($p=0.385$). Also, there is statistically significant positive correlation between number of organs affected and pain VAS and digestive VAS ($p=0.0001$). Moreover, there was statistically significant positive correlation between number organs affected and total score of HAQ-DI, SHAQ VAS, and SHAQ global ($p=0.0001$) (Table 3).

Table 3 Assessment of discriminant validity by correlation between number of organs involved with HAQ-DI, SHAQ VAS and SHAQ global scores ($n=56$)

	Number organs involved	
	(r)	*P*
HAQ-DI	0.636[a]	0.0001
• Dressing and grooming	0.423[a]	0.001
• Arising	0.593[a]	0.0001
• Eating	0.415[a]	0.001
• Walking	0.477[a]	0.0001
• Hygiene	0.496[a]	0.0001
• Reach	0.569[a]	0.0001
• Grip	0.499[a]	0.0001
• Activities	0.118	0.385
SHAQ VAS	0.587[a]	0.0001
• Pain VAS	0.701[a]	0.0001
• Digestive VAS	0.596[a]	0.0001
• Pulmonary VAS	0.247	0.067
• Raynaud's VAS	0.195	0.149
• Digital ulcer VAS	0.096	0.483
SHAQ global	0.721[a]	0.0001

HAQ-DI Health Assessment Questionnaire Disability Index, *SHAQ VAS* scleroderma health assessment questionnaire visual analogue scale

[a] Highly significant

There was statistically significant relation between disease type and digestive VAS ($p=0.001$), which was high among diffuse disease type (Table 4).

Reliability

The inter-rater reliability of digestive VAS, pulmonary VAS, Raynaud's VAS, digital ulcer VAS, and SHAQ VAS was good reliable measures, while pain VAS, HAQ-DI, and SHAQ global was excellent measurements to assess patients. Cronbach's alpha that used to measure the internal consistency (reliability of used tool) was 0.875 for *HAQ-DI* and 0.845 for HAQ global, while HAQ VAS was 0.676 (Table 5).

Discussion

SSc is manifested by multiorgan affection which causes physical disability and limiting their social, work, and daily living activities. One of the aims of medical care is to decrease disability and to improve the functional ability [16].

SHAQ used to measure physical disability in systemic sclerosis patients and has proved to be valid and reliable [5].

The objective of our study was to translate SHAQ into Arabic language and then perform an adaptation and validation of this Arabic version.

There was a strong correlation between the SF-36v2 PCS and HAQ-DI, and SHAQ global scores, while a moderate correlation between the SF-36v2 PCS and SHAQ VAS score, and all SHAQ VAS subtypes except for Raynaud's

Table 4 Comparison between diffuse type and limited type regarding the functional disability via SHAQ for studied patients ($n=56$)

	Diffuse $n=30$ Median (range)	Limited $n=26$ Median (range)	*U*-test	*p*
HAQ-DI	1.88 (0.5–2.63)	1.63 (0.75–2.63)	0.959	0.338
• Dressing and grooming	1 (0–3)	1 (0–3)	1.458	0.145
• Arising	1 (0–3)	1 (0–2)	1.205	0.228
• Eating	2 (1–3)	2 (1–3)	0.574	0.566
• Walking	1 (0–3)	1 (0–2)	0.927	0.354
• Hygiene	2 (0–3)	2 (0–3)	1.512	0.130
• Reach	2 (0–3)	1 (0–3)	1.681	.093
• Grip	2 (0–3)	2 (0–3)	1.245	0.213
• Activities	2 (0–3)	2 (0–3)	0.384	0.701
SHAQ VAS	1.06 (0.09–2.38)	0.53 (0.15–1.98)	1.546	0.122
• Pain VAS	1.64 (0.3–2.84)	1.56 (0.36–2.54)	0.494	0.621
• Digestive VAS	1.58 (0–3)	0 (0–2.38)	3.357	.001*
• Pulmonary VAS	0.9 (0–3)	0.0 (0–2.4)	1.898	.058
• Reynaud's VAS	0.5 (0–3)	0.44 (0–2.48)	0.848	0.397
• Digital ulcer VAS	0 (0–3)	0.54 (0–2.5)	1.157	0.247
SHAQ global	1.5 (0.34–2.15)	1.06 (0.65–2.25)	1.613	0.107

U-test Mann–Whitney test

HAQ-DI Health Assessment Questionnaire Disability Index, *SHAQ VAS* scleroderma health assessment questionnaire visual analogue scale

* $p<0.05$ statistically significant

Table 5 Assessment of intra-rater and inter-rater reliability of HAQ-DI, SHAQ VAS, and SHAQ global

	[a]Intraclass correlation coefficient (ICC)			Repeatability outcome
	Intraclass correlation coefficient (ICC)	95% confidence interval		
		Lower limit	Upper limit	
Intra-rater reliability				
Pain VAS	0.864	0.765	0.921	Good
Digestive VAS	0.837	0.723	0.904	Good
Pulmonary VAS	0.875	0.788	0.927	Good
Reynaud's VAS	0.916	0.855	0.951	Excellent
Digital ulcer VAS	0.890	0.813	0.936	Good
HAQ-DI	0.918	0.858	0.953	Excellent
SHAQ VAS	0.890	0.812	0.936	Good
SHAQ global	0.901	0.824	0.943	Excellent
Inter-rater reliability				
Pain VAS	0.926	0.874	0.957	Excellent
Digestive VAS	0.841	0.729	0.907	Good
Pulmonary VAS	0.829	0.707	0.900	Good
Reynaud's VAS	0.848	0.740	0.911	Good
Digital ulcer VAS	0.838	0.723	0.905	Good
HAQ-DI	0.999	0.998	0.999	Excellent
SHAQ VAS	0.880	0.796	0.930	Good
SHAQ global	0.917	0.858	0.951	Excellent
Tool			**Cronbach's alpha**	**No. of items**
HAQ-DI			0.875	8
SHAQ global			0.845	13
SHAQ VAS			0.676	5

HAQ-DI Health Assessment Questionnaire Disability Index, *SHAQ VAS* scleroderma health assessment questionnaire visual analog scale

[a] Intraclass correlation coefficient (ICC), was used to measure the strength of agreement between repeated measures

and digital ulcer were found. The PCS of SF-36v2 was moderately correlated with SHAQ DI and SHAQ global scores, while it was mildly correlated with SHAQ VAS score and only its subtype overall severity score.

Similarly, Karadag et al. [14] found a moderate correlation when compared Turkish SHAQ to the SF-36v2. There was a moderate convergent validity between the SF-36v2 PCS and SHAQ global, Raynaud's phenomenon, digital ulcer, and pulmonary VAS scores.

Also, Rocha et al. [17] found that the Brazilian SHAQ had a high convergent validity with the SF-36 physical items, particularly the overall disease severity VAS. Moreover, moderate convergent validity between the SF-36 MCS and both digestive VAS and overall disease severity VAS was also demonstrated.

In agreement with us, Georges et al. [18] found that the HAQ-DI and the French SHAQ scores showed higher convergent validity with SF-36 physical-related scores than with mental-related domains.

Also, Xinyi et al. [19] found that the English SHAQ demonstrated moderate to strong correlation when compared to the SF-36 v2. SHAQ also had a strong correlation with SF-36v2 PCS compared to MCS. The SHAQ VASs also had moderate to strong convergent validity with SF-36v2 PCS.

The discriminant validity in our study was not a strong difference between dcSSc and lcSSc except for the digestive VAS which was significantly higher in patients with the diffuse subtype compared to the patients with limited subtype, but with number of organs affected, we found significant positive correlation between number of organs affected of studied patients and HAQ-DI, SHAQ VAS, overall severity VAS and digestive VAS, and SHAQ global scores.

In agreement with us, Rocha et al. [17] and Georges et al. [18] have not found a differences between lcSSc and dcSSc by SHAQ.

Karadag et al. [14] also have not found a strong difference between dcSSc and lcSSc, except that the digital ulcer VAS was significantly higher in patients with the diffuse subtype compared to the patients with limited subtype.

Karadag et al. [14] showed satisfactory correlations between HAQ-DI, SHAQ-global, digital ulcer VAS, and pulmonary VAS and higher number of organs affected, while Rocha et al. [17] showed that there was statistically positive significant high correlation between number of organs involved with HAQ-DI, digestive VAS, and over all disease severity VAS and pulmonary VAS.

Moreover, we examined the test–retest reliability of the HAQ-DI and SHAQ global and demonstrated excellent reproducibility and found that they were excellent measurements to assess the patients, while SHAQ VAS is a good measurement to assess the patients.

Our results coincided with Karadag et al. [14] who examined the test–retest reliability of the HAQ-DI, and all of the SHAQ scores had demonstrated good reproducibility.

Limitations

Lastly, the present study has some limitations that require consideration including relatively small sample size and monocentric design.

Conclusion

We culturally adapted a valid and reliable Arabic version of self-administered scleroderma health assessment questionnaire (SHAQ) to be used for measuring functional disability in Arabic-speaking Egyptian SSc patient's studies.

Abbreviations

SSc	Systemic sclerosis
HAQ-DI	Health Assessment Questionnaire Disability Index
SHAQ	Scleroderma health assessment questionnaire
VAS	Visual analogue scales
SHAQ VAS	Visual analogue scales related with SSc symptoms
ACR/EULAR	American College of Rheumatology/European League Against Rheumatism
PCS	Physical component scores
MCS	Mental component scores
ICC	Intraclass correlation coefficient
SPSS	Statistical Package for Social Sciences

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43166-023-00209-6.

Additional file 1. Translated arabic form of scleroderma health assessement questionnaire (SHAQ).

Acknowledgements

The authors thank all staff members and colleagues in the Rheumatology Department, Zagazig University Hospitals, Egypt, for their helpful cooperation and all the study participants for their patience and support.

Authors' contributions

All authors had contributed to all stages of this study from preparing of the idea to collecting data and writing the manuscript.

Funding

No fund.

Availability of data and materials

Available.

Declarations

Ethics approval and consent to participate

An official permission was obtained from Institutional Review Board (IRB) at the Faculty of Medicine, Zagazig University Hospitals, and from the Rheumatology and Rehabilitation Department.

Consent for publication

I confirm that all authors accept the manuscript for submission.

Competing interests

The authors declare that they have no competing interests.

Author details

[1]Rheumatology and Rehabilitation, Faculty of Medicine, Zagazig University, Zagazig, Egypt. [2]Community Medicine, Faculty of Medicine, Zagazig University, Zagazig, Egypt. [3]Rheumatology and Rehabilitation, Mit Ghamr General Hospital, Ministry of Health and Population, Dakahlia Governorate, Egypt.

Received: 5 June 2023 Accepted: 4 August 2023
Published online: 29 August 2023

References

1. Jimenez SA (2013) Role of endothelial to mesenchymal transition in the pathogenesis of the vascular alterations in systemic sclerosis. ISRN Rheumatology
2. Pattanaik D, Brown M, Postlethwaite BC (2015) Pathogenesis of systemic sclerosis, front. Immunol 6:272
3. Fries JF, Spitz P, Kraines RG (1980) Measurement of patient outcome in arthritis. Arthritis Rheum 23:137–145
4. Elattar EA, Balata MG (2020) and El Mallah R (2020) The reliability and validity of the Arabic version of the Mouth Handicap in SystemicSclerosis (MHISS) questionnaire in Arabian systemic sclerosis patients. Egypt Rheumatol Rehabil 47:37
5. Steen VD, Medsger TA (1997) The value of the Health Assessment Questionnaire and special patient-generated scales to demonstrate change in systemic sclerosis patients over time. Arthritis Rheum 40:1984–1991
6. Johnson SR, Hawker GA, Davis AM (2005) The Health Assessment Questionnaire Disability Index and scleroderma health assessment questionnaire in scleroderma trials: an evaluation of their measurement properties. Arthritis Rheum 53:256–262
7. Montagna G, Cuomo G, Chiarolanza I et al (2006) HAQ-DI Italian version in systemic sclerosis. Reumatismo 58:112–115
8. Kuwana M, Sato S, Kikuchi K et al (2003) Evaluation of functional disability using the Health Assessment Questionnaire in Japanese patients with systemic sclerosis. J Rheumatol 30:1253–1258
9. Van den Hoogen F, Khanna D, Fransen J (2013) Classification criteria for systemic sclerosis: an American College of Rheumatology/ European League Against Rheumatism collaborative initiative. Ann Rheum Dis 72(11):1747–1755
10. Clements PJ, Lachenbruch PA, Seibold JR et al (1993) Skin thickness score in systemic sclerosis: an assessment of interobserver variability in 3 independent studies. J Rheumatol 20(11):1892–1896 (PMID: 8308774)
11. LeRoy EC, Black C, Fleischmajer R (1988) Scleroderma (systemic sclerosis): classification, subsets and pathogenesis. J Rheumatol 15:202–205
12. Köse S, Derya Ö, Kutlay S (2010) Psychometric properties of the Health Assessment Questionnaire Disability Index (HAQ-DI) and the Modified Health Assessment Questionnaire (MHAQ) in patients with knee osteoarthritis. Turkish J Rheumatol 25. https://doi.org/10.5152/tjr.2010.19
13. Beaton DE, Bombardier C, Guillemin F, Ferraz MB (2000) Guidelines for the process of cross-cultural adaptation of selfreport measures. Spine 25(24):3186–3191

14. Karadag DT, Karakas F, Tekeoglu S (2019) Validation of Turkish version of the scleroderma health assessment questionnaire. Clin Rheumatol 38(7):1917–1923
15. Al Sayah F, Ishaque S, Lau D et al (2013) Health related quality of life measures in Arabic speaking populations: a systematic review on cross-cultural adaptation and measurement properties. Qual Life Res 22(1):213–229
16. Kwakkenbos L, Jewett LR, Baron M (2013) The Scleroderma Patient-centered Intervention Network (SPIN) cohort: protocol for a cohort multiple randomised controlled trial (cmRCT) design to support trials of psychosocial and rehabilitation interventions in a rare disease context. BMJ Open 3(8). https://bmjopen.bmj.com/content/3/8/e003563
17. Rocha LF, Marangoni RG, Sampaio-Barros PD (2014) Crosscultural adaptation and validation of the Brazilian version of the scleroderma health assessment questionnaire (SHAQ). ClinRheumatol 33:699–706
18. Georges C, Chassany O, Mouthon L (2005) Validation of French version of the scleroderma health assessment questionnaire (SSc HAQ). ClinRheumatol 24:3–10
19. Xinyi NG, Thumboo Julian, Low Andrea H. L (2012) Validation of the scleroderma health assessment questionnaire and quality of life in English and Chinese speaking patients with systemic sclerosis). Int J Rheum Dis. 15:268–276

Publisher's Note