Received: 10 December 2019 | Accepted: 6 February 2020

DOI: 10.1111/1756-185X.13812

ORIGINAL ARTICLE

International Journal of Rheumatic Diseases | WILEY

Translation, validation and cross-cultural adaptation of the mouth handicap in systemic sclerosis questionnaire into the Turkish language

Nurten Gizem Tore[1] | Fulden Sarì[1] | Zeynep Tunà[1] | Hamit Kucuk[2] | Seminur Haznedaroglu[3] | Deran Oskay[1]

[1]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Gazi University, Ankara, Turkey

[2]Ankara Etlik İhtisas Education and Research Hospital, Ankara, Turkey

[3]Division of Rheumatology, Department of Internal Medicine, Faculty of Medicine, Gazi University, Ankara, Turkey

Correspondence
Nurten Gizem Tore, Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Gazi University, Ankara, Turkey.
Email: gizemtore@hotmail.com

Abstract

Aim: The aim of this study was to translate and adapt the Mouth Handicap in Systemic Sclerosis (MHISS) Questionnaire into the Turkish language and evaluate its validity and reliability in Turkish systemic sclerosis (SSc) patients.

Method: The MHISS was translated according to Beaton guidelines. Patients being diagnosed with SSc, being between 18-65 years old and receiving no treatment between test-retest assessments were included to study. Test-retest reliability was evaluated, comparing the results of two administrations, with Spearman's correlation. Internal consistency was assessed by Cronbach's α. Validity of the questionnaire was assessed by comparison with mouth opening, total scores of Disabilities of Arm, Shoulder and Hand Questionnaire (DASH) and Health Assessment Questionnaire (HAQ). Construct validity was tested by factor analysis.

Results: Forty-five SSc patients were included in the study. The Turkish version of the MHISS (MHISS-T) met set criteria of reliability and validity. Internal consistency (Cronbach's α = 0.863) and test-retest reliability were excellent (r = .88). The correlations between MHISS-T and inter-incisor distance, MHISS-T and HAQ and MHISS-T and DASH were negatively and statistically significant (r = −0.739, P < .001), very good and statistically significant (r = .664, P < .001), good and statistically significant (r = .570, P < .001), respectively. Regarding factor analysis, MHISS-T has three subscales.

Conclusion: Our results demonstrated that the Turkish version of the MHISS-T has excellent test-retest reliability and very good validity. As a result of this study we determined that MHISS-T is a valid and reliable instrument to measure mouth disabilities in Turkish-speaking SSc patients.

KEYWORDS

disability, mouth, questionnaire, systemic sclerosis, Turkish version

© 2020 Asia Pacific League of Associations for Rheumatology and John Wiley & Sons Australia, Ltd

1 | INTRODUCTION

Systemic sclerosis (SSc) or scleroderma is a multisystemic connective tissue disease characterized by excessive collagen deposition, vascular hyper-reactivity and microvascular obliteration. It leads to retraction and atrophy in various tissues like skin, tendons, joints and vessels.[1]

Skin is one of the most affected tissues; it becomes harder and thicker by infiltration of dermis with collagen. Skin and especially face involvement is responsible for oral complications and results in esthetic changes and reduction of self-confidence. The face becomes amimic, wrinkles disappear, vertical furrows develop around the mouth. Telangiectasia, sicca syndrome, reduction of mouth width and opening besides osteolysis of mandibula and fibrosis of soft tissues are also seen in these patients.[2] Limited range of mouth opening, along with other symptoms such as dry mouth, can lead to difficulties with oral hygiene and eating. Such facial involvements also make the patient's self-image impaired, limit expression and cause disability and decrease in health-related quality of life. Thus, outcome measures reliably assessing handicaps are mandatory to properly evaluate patients and to follow-up disease evolution and treatment efficacy.[2]

Global disability in SSc patients is usually measured by the Health Assessment Questionnaire (HAQ). However, more body region-specific disability scales can be used like Cochin Hand Function Scale.[2] These specific scales are useful to clinicians in assessing the impact of certain locations of the disease and the efficacy of treatment. Therefore, due to significant oral disability, a mouth-specific self-assessment tool was developed for these patients. Mouth Handicap in Systemic Sclerosis (MHISS) scale is the first tool available to quantify the handicap associated with mouth disability in SSc patients. Although mouth disability seems to have less weight than hand disability in total disability, the MHISS score explained up to 36% of the variance of the HAQ score, which highlights the need to specifically assess disability involving the mouth in patients with SSc when evaluating treatment efficacy.[2]

To sum up, MHISS is a validated tool for measuring the handicap associated with mouth disability and the quality of life, that explores problems not assessed by HAQ and the Short Form-36.[2] Therefore, cross-cultural adaptation of the scale is needed to use in different languages. The aim of our study was to validate the Turkish version of MHISS (MHISS-T) and to assess its reliability and validity.

2 | MATERIALS AND METHODS

Permission was received from the author who had developed the MHISS questionnaire. The study was approved by the Local Ethics Commission (2017-411) and conducted between January 2018 and June 2019.

2.1 | Translation procedure

The translation and cross-cultural adaptation of the MHISS were performed according to the Beaton guidelines.[3] Two translations from English to Turkish were done by two native Turkish speakers who were also fluent in English. To achieve better conceptual equivalence between the original version and translation of the questionnaire, one of the translators had knowledge about the purpose of the study. The other translator was uninformed about the study for the purpose of gathering unexpected meanings from the original version of the questionnaire. Both Turkish translations were synthesized by these translators. Then the Turkish translation was retranslated back to English by two independent professional bilingual translators who were completely blind to the original version of the questionnaire. A committee, consisting of 4 translators, a Turkish linguist and a methodologist, investigated both English translations and compared with the original version of the MHISS to check for inconsistencies and suitability to Turkish culture. After the committee agreed that both English and Turkish versions of the MHISS were equivalent, the last stage of the cross-cultural adaptation process was performed. The comprehensibility of the MHISS-T was tested on 20 patients with SSc and 20 healthy individuals. Participants reported they could understand all questions well and the final version of the MHISS-T was created.

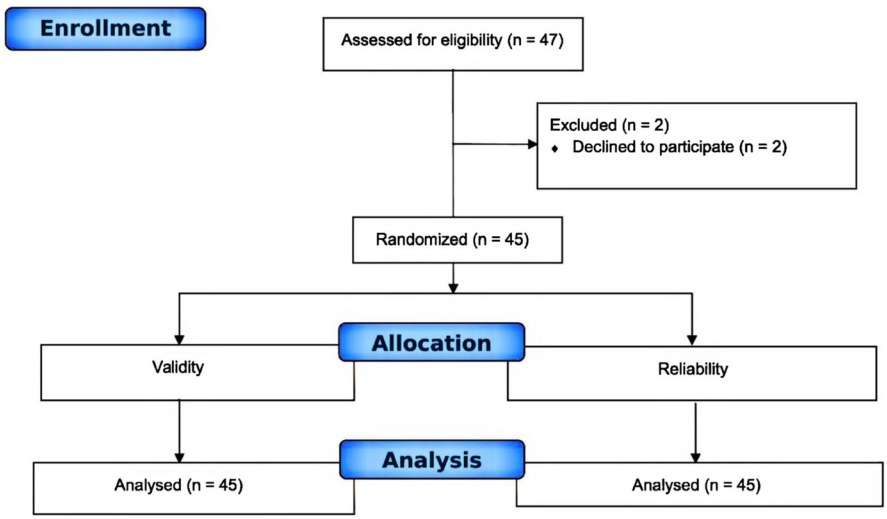


FIGURE 1 Flow diagram of the patients

2.2 | Patients

The study included 45 patients (44 female, one male; mean age 46.06 ± 12.06 years; range 20-65) with SSc disease (Figure 1). Patients were referred to the physiotherapy and rehabilitation outpatient department. The inclusion criteria were: (a) being diagnosed with SSc; (b) being between 18-65 years old; and (c) receiving no treatment between test-retest assessments. The exclusion criteria was being illiterate in Turkish. All participants read and signed the written informed consent form. Demographic characteristics of participants were recorded. All participants filled in the following questionnaires: Turkish version of the Health Assessment Questionnaire (HAQ) and Disabilities of Arm, Shoulder and Hand (DASH) Questionnaire. They also completed the MHISS-T questionnaire for a second time with a 1 week interval with the aim of determining the test-retest reliability of the questionnaire.

2.3 | The DASH

The DASH was developed as an outcomes measurement for use in patients with upper extremity complaints. The DASH is a generic questionnaire to assess upper extremity disorders. The DASH comprises of 37 questions which evaluate upper extremity functions from patients' perceptions. The DASH produces scores between 0 and 100. High DASH score is a demonstration of severe disability.[4] The Turkish version and cross-cultural adaptation of DASH were performed by Duger et al.[5]

2.4 | The HAQ-DI

The HAQ contains 20 questions assessing physical disabilities over the past 1 week in 8 categories of daily living activities: dressing and grooming, rising, eating, walking, hygiene, reach, grip, and activities. Each question is scored on a 4-point rating scale which ranges from 0 (without any difficulty) to 3 (unable to do). Moreover, the HAQ consist of four sections which are about use of devices, aids and needing help from another person when performing daily living activities in any of the eight categories. The total disability HAQ score (HAQ-DI) can be calculated by determining the highest score in each category. Then the average of the category scores are taken. Consequently, scores of the HAQ-DI can take values between 0 and 3. Higher HAQ-DI values reflect more disability.[6] The Turkish version and cross-cultural adaptation of the HAQ-DI were done by Kucukdeveci et al.[7]

TABLE 1 Factor analysis of the Turkish version of the mouth handicap in systemic sclerosis

	Reduced mouth opening	Sicca syndrome	Esthetic concerns
Item 1	**0.848***	0.154	0.113
Item 2	0.087	**0.918***	0.160
Item 3	**0.882***	0.064	0.093
Item 4	**0.835***	0.014	−0.051
Item 5	**0.829***	0.120	0.198
Item 6	**0.891***	0.187	0.296
Item 7	0.160	**0.853***	0.013
Item 8	0.138	**0.840***	0.113
Item 9	0.078	**0.843***	0.009
Item 10	0.025	**0.754***	−0.123
Item 11	0.118	0.080	**0.903***
Item 12	0.219	−0.018*	**0.881***

Both bold and * incicates items loaded highly.

2.5 | The MHISS

The MHISS is composed of 12 questions. All questions inquire about the frequency of the complaints and symptoms. The scores range from 0 (never) to 4 (always). MHISS includes three domains: mouth opening (questions 1, 3, 4-6), mouth dryness (questions 2, 7-10) and esthetic concerns (questions 11, 12). Total MHISS score ranges from 0 to 48. Higher scores reflect more limitations about mouth functions.[2]

Apart from the questionnaires, maximal mouth opening was assessed by using a tape measure. For this assessment, the inter-incisor distance was measured and noted in mm.

2.6 | Statistical analysis

Statistical analyses were executed using the Statistical Package for the Social Sciences (SPSS) 22.0 software. Statistical data were expressed as mean ± standard deviations (±SD), or as interquartile ranges or medians, in accordance with distributions of data. Test-retest and internal consistency analyses were conducted to determine the reliability of the MHISS-T questionnaire. Test-retest reliability was analyzed by using Spearman's ρ correlation coefficients. The internal consistency of MHISS-T was assessed by using Cronbach's α coefficient. The construct validity of MHISS-T was assessed by correlating total scores with total scores of DASH and HAQ-DI questionnaires, maximal mouth opening distance by using Spearman's ρ correlation coefficients. Spearman's ρ correlation coefficients ranging between 0.81 and 1.00 were considered excellent, while 0.61 and 0.80; 0.41 and 0.60; 0.21 and 0.40; and 0 and 0.20

TABLE 2 Internal consistency analysis of the Turkish version of the Mouth Handicap in Systemic Sclerosis, Cronbach's α coefficients

	Item	Cronbach's α value
Reduced mouth opening	5	0.920
Sicca syndrome	5	0.905
Aesthetic concerns	2	0.782
Total score	12	0.863

TABLE 3 Test-retest reliability of the Turkish version of the Mouth Handicap in Systemic Sclerosis and its subscales

		Reduced mouth opening (Second)	Sicca syndrome (Second)	Esthetic concerns (Second)
Reduced mouth opening (First)	Spearman correlation	**0.696****	0.150	0.248
	Sig. (2-tailed) (**)	0.000	0.324	0.101
Sicca syndrome (First)	Spearman correlation	0.234	**0.914****	0.086
	Sig. (2-tailed) (**)	0.121	0.000	0.577
Esthetic concerns (First)	Spearman correlation	0.130	0.147	**0.823****
	Sig. (2-tailed) (**)	0.393	0.334	0.000

Both bold and ** incicates $p < .01$.

were accepted as very good, good, weak, and bad, respectively.[8] Factor analysis was also done to test construct validity. Kaiser–Meyer–Olkin KMO) and Bartlett tests were used for factor analysis. Statistical significance was accepted as $P < .05$.

3 | RESULTS

Forty-four of the 45 patients were female. The mean age for all patients was 46.06 ± 12.06 years. First, KMO test was used to analyze the adequacy of the sample. The value of KMO test was 0.757, which shows the adequacy of the sample size. The significance of the square test statistic acquired as a result of Bartlett sphericity value is a demonstration that the data come from a highly variable normal distribution. The Bartlett sphericity value was significant (Chi-square = 375.338, $P < .001$). MHISS-T constantly showed three different dimensions (Table 1). The total Cronbach's α value for the MHISS-T was 0.863. This value demonstrated that MHISS-T had excellent internal consistency. The Cronbach's α values were 0.920 for reduced mouth opening, 0.905 for sicca syndrome and 0.782 for esthetic concerns subscales (Table 2). The test-retest reliability for the MHISS-T was excellent (rho = 0.888 $P < .001$). The test-retest scores of the MHISS-T subscales were found as 0.696 for reduced mouth opening, 0.914 for sicca syndrome and 0.823 for the aesthetic concerns (Table 3). The Spearman's correlations between the total scores of the MHISS-T scale and inter-incisor distance were negatively and statistically significant ($r = -.739$, $P < .001$). The correlations between the total scores of the MHISS-T scale and the total scores of HAQ-T were very good and statistically significant ($r = .664$, $P < .001$). The correlations between the total scores of the MHISS-T scale and the total scores of DASH-T were good and statistically significant ($r = .570$, $P < .001$) (Table 4).

TABLE 4 Correlations between the Turkish version of the Mouth Handicap in Systemic Sclerosis (MHISS-T) and other outcome measures

	MHISS-T Spearman correlation (N = 40)	
	r	*P*
Inter-incisor distance	−.739	<.001
HAQ-T	.664	<.001
DASH-T	.570	<.001

Abbreviations: DASH-T, Turkish version of the Disabilities of Arm, Shoulder and Hand Questionnaire; HAQ-T, Turkish version of the Health Assessment Questionnaire.

4 | DISCUSSION

The purpose of the study was to translate, validate and adapt the MHISS into the Turkish language. Turkish translation and cultural adaptation of the MHISS questionnaire was performed following a systematic standardized approach. Our results demonstrated that the MHISS-T questionnaire is a valid and reliable instrument to evaluate disability involving the mouth in patients with SSc. As far as we know, MHISS is the first outcome measure which was designed for SSc patients to assess the handicap and the disorder of oral health-related quality of life.

In this study, the mean MHISS-T total score was 22.4 ± 10.72, higher than the scores of the other versions of MHISS. The total scores for original, Dutch and Italian versions of MHISS were 18.8 ± 10.2, 20.3 ± 9.7, 17.65 ± 5.20, respectively.[2,9,10] Our results indicated that Turkish patients with SSc have more mouth disability than French, Dutch and Italian people with SSc.

In the original version, Mouthon et al assessed construct validity of MHISS and their study showed that MHISS has weak correlation with mouth opening, Cochin Hand Function Scale and HAQ (Spearman's ρ = 0.34, 0.37 and 0.33, respectively).[2] In the Dutch version, Schouffoer et al also assessed the construct validity of MHISS and they reported there were moderate correlations between MHISS and HAQ and maximal mouth opening (Spearman's ρ = 0.599, −0.518, respectively).[9] Lastly, in the Italian version by Bongi et al evaluated the construct validity of MHISS and their study demonstrated there was a weak correlation between MHISS and mouth opening (Spearman's ρ = −0.386) and they stated that MHISS was not significantly related to HAQ.[10] In our study, MHISS-T showed very good correlation with HAQ-T and inter-incisor distance (Spearman's ρ = 0.664 and −0.739, respectively) and good correlation with DASH-T (Spearman's ρ = 0.570). Since they are specific to different locations, the moderate correlation between MHIS-T and DASH-T is not surprising. In MHISS, some questions directly inquire about mouth opening. Therefore, very good correlation between inter-incisor distance and MHISS-T score is also not surprising. HAQ

includes 20 questions about daily living activities in 8 different categories. Considering subtypes of SSc, when compared to the other studies, most of the patients in our study had diffuse subtype of SSc (97.7%). Thus, not only their mouths and distal parts of extremities but also their proximal parts of extremities and internal organs were involved. It might be a reason for the very good correlation between MHISS-T and HAQ-T.

In the original version, Mouthon et al reported three factors for MHISS questionnaire and they explained 62.44% of the variance. The first factor (items 1, 3, 4, 5 and 6) indicates handicap induced by reduced mouth opening; the second factor, (items 2, 7, 8, 9 and 10) indicates handicap induced by sicca syndrome and the third factor (items, 11 and 12) indicates esthetic concerns.[2] In the Dutch and Italian versions, Schouffoer et al and Bongi et al reported the same factors.[9,10] In our study, we also found the same factors after we had done the factor analysis and they explained 77.37% of the variance.

The reliability of MHISS-T was assessed with test-retest reliability analysis and Cronbach's α coefficient. In the original version, test-retest reliability analysis demonstrated excellent reliability and it gave an intraclass correlation coefficient (ICC) of 0.96.[2] In the Dutch version, the ICC was 0.94, demonstrating excellent reliability.[9] In the Italian version, MHISS also had an excellent reliability: the ICC was 0.93.[10] In our study, test-retest reliability was evaluated by using Spearman's ρ correlation coefficient. The test-retest reliability of MHISS-T was excellent with a Spearman's ρ correlation coefficient of 0.888. The high correlation coefficient indicates the stability of the measurement obtained from the questionnaire.

The internal consistency was assessed using Cronbach's α coefficient value. In the Dutch version, Cronbach's α was 0.88 for the total MHISS. It was 0.86 for the subscale which is about mouth opening and 0.79 for the subscale that is about mouth dryness.[9] In the Italian version, Bongi et al reported that Cronbach's α was 0.99 and MHISS showed excellent reliability.[10] In the original version, Mouthon et al did not report any Cronbach's α coefficient value.[2] In this study, the Cronbach's α coefficient was 0.863 for the questionnaire. It was 0.92 for the first subscale which is about mouth opening, 0.905 for the second subscale that is about sicca syndrome and 0.782 for the third subscale which is about esthetic concerns. These results indicate that the answers to the questions are consistent. When Cronbach's α coefficient is between 0.70 and 0.95, the internal consistency is considered to be significant.[11]

A limitation of this study was that responsiveness, one of the important psychometric considerations for outcome measurements, was not checked. Responsiveness of the MHISS-T can be analyzed in a future study.

In conclusion, validation and adaptation of the questionnaires in different languages play an important role in standardizing assessment and follow-up of patients over different countries. MHISS is a patient-reported outcome measurement which is especially developed to assess mouth handicap in SSc. It is short and easy to be filled in. Our results indicated that the Turkish version of the MHISS questionnaire is a valid and reliable instrument for assessing mouth handicap in Turkish SSc patients.

AUTHOR CONTRIBUTIONS

Nurten Gizem Tore: design of the study, interpretation of the results and writing the manuscript. Fulden Sari, Hamit Kucuk: data collection. Zeynep Tuna: data analysis. Deran Oskay, Seminur Haznedaroglu: interpretation of the results and reviewing the manuscript.

ORCID

Nurten Gizem Tore https://orcid.org/0000-0002-9935-3564
Zeynep Tunà https://orcid.org/0000-0001-5139-2401

REFERENCES

1. Servettaz A, Agard C, Tamby MC, et al. Systemic sclerosis: pathophysiology of a multifaceted disease. *Presse Med*. 2006;35(12):1903-1915.
2. Mouthon L, Rannou F, Bérezné A, et al. Development and validation of a scale for mouth handicap in systemic sclerosis: the Mouth Handicap in Systemic Sclerosis scale. *Ann Rheum Dis*. 2007;66(12):1651-1655.
3. Beaton DE, Bombardier C, Guillemin F, et al. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000;25(24):3186-3191.
4. Hudak PL, Amadio PC, Bombardier C, et al. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder, and head). *Am J Ind Med*. 1996;29(6):602-608.
5. Duger T, Yakut E, Oksuz C, et al. Reliability and validity of the Turkish version of the Disabilities of the Arm, Shoulder and Hand (DASH) Questionnaire. *Fizyoterapi Rehabil*. 2006;17(3):99.
6. Bruce B, Fries JF. The health assessment questionnaire (HAQ). *Clin Exp Rheumatol*. 2005;23(5):14.
7. Kucukdeveci AA, Sahin H, Ataman S, et al. Issues in cross-cultural validity: Example from the adaptation, reliability, and validity testing of a Turkish version of the Stanford Health Assessment Questionnaire. *Arthritis Care Res (Hoboken)*. 2004;51(1):14-19.
8. Feise RJ, Menke JM. Functional rating index: a new valid and reliable instrument to measure the magnitude of clinical change in spinal conditions. *Spine*. 2001;26(1):78-87.
9. Schouffoer AA, Strijbos E, Schuerwegh AJM, et al. Translation, cross-cultural adaptation, and validation of the Mouth Handicap in Systemic Sclerosis questionnaire (MHISS) into the Dutch language. *Clin Rheumatol*. 2013;32(11):1649-1655.
10. Bongi SM, Del Rosso A, Miniati I, et al. The Italian version of the Mouth Handicap in Systemic Sclerosis scale (MHISS) is valid, reliable and useful in assessing oral health-related quality of life (OHRQoL) in systemic sclerosis (SSc) patients. *Rheumatol Int*. 2012;32(9):2785-2790.
11. Zinbarg RE, Revelle W, Yovel I, et al. Cronbach's α, Revelle's β, and McDonald's ω H: their relations with each other and two alternative conceptualizations of reliability. *Psychometrika*. 2005;70(1):123-133.

How to cite this article: Tore NG, Sarì F, Tunà Z, Kucuk H, Haznedaroglu S, Oskay D. Translation, validation and cross-cultural adaptation of the mouth handicap in systemic sclerosis questionnaire into the Turkish language. *Int J Rheum Dis*. 2020;00:1–5. https://doi.org/10.1111/1756-185X.13812