

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/burns](http://www.elsevier.com/locate/burns)

# Cultural adaptation and validation of Patient and Observer Scar Assessment Scale for Turkish use



Mine Seyyah<sup>a,\*</sup>, Saadet Ufuk Yurdalan<sup>b</sup>

<sup>a</sup> University of Health Sciences Kartal Dr. Lütfi Kırdar Education and Research Hospital, Burn and Wound Treatment Department, Cevizli District, Şemsi Denizler Street, E-5 Karayolu Cevizli Mevkii, 34890 Kartal, Istanbul, Turkey

<sup>b</sup> Marmara University, Faculty of Health Sciences, Physiotherapy and Rehabilitation Department, Başbüyük District, Maltepe Başbüyük Yolu Street, 9/4/1 Maltepe, Istanbul, Turkey

## ARTICLE INFO

### Article history:

Accepted 22 February 2018

### Keywords:

Patient and Observer Scar Assessment Scale  
Hypertrophic scar  
Physiotherapy  
Validity  
Reliability

## ABSTRACT

**Background:** This study aimed to evaluate cross-cultural adaptation, validation, and reliability of Patient and Observer Scar Assessment Scale (POSAS) for its Turkish use.

**Method:** This study included 50 burn patients with hypertrophic scars who were aged 18–65 years (mean,  $37.5 \pm 1.4$  years) and were admitted to Wound and Burn Treatment Center from February 2014 to April 2014. With regard to the cultural adaptation of POSAS from English to Turkish, the scale was translated by two people who worked in different health fields. POSAS was administered to the patients with a 1-week interval to evaluate the validity and reliability of the scale. Internal consistency of the scale was tested using the Cronbach alpha method. **Results:** The Cronbach alpha value for the observer measurements was found to be 0.93 (excellent), and that for patient measurements was found to be 0.77 (good). Accordingly, the internal consistency of the scale was established.

**Conclusion:** The Turkish version of POSAS is a valid, reliable and culturally appropriate survey for evaluating hypertrophic scars. We believe that the Turkish version of POSAS will be an important clinical/scientific tool in the field of burn physiotherapy in Turkey, which will lead to new researches in this field.

© 2018 Elsevier Ltd and ISBI. All rights reserved.

## 1. Introduction

Clinical evaluation is an important phase of general patient follow-up. Besides physical examination and other complementary imaging modalities, scales that patients themselves interpret are becoming increasingly popular [1,2]. In addition to assessing treatment efficacy, these scales are beneficial to clinicians because they provide data that can help in treatment planning on the basis of the degree of impairment of the patient's functioning [3]. Cultural adaptation of scales is an important issue. If a scale is to be used by people in a different

part of the world, it should be translated to their local language, culturally adapted, and proven valid [4].

There are no scales for evaluating burn scars in Turkey. The first verified and a widely used scoring scale was the Vancouver Score Scale (VSS) [5]. The first burn scar evaluation scale based on physical parameters was developed by Sullivan et al. in 1990 to provide an objective assessment of burn scars. The researchers recognized the need for a reliable, objective, and universal scar evaluation method to compare treatment outcomes and burn scarring. VSS independently evaluates the pigmentation, vascularity, flexibility (pliability), and scar height (thickness). Pigmentation is scored as normal, hypopigmented,

\* Corresponding author.

E-mail address: [mine-fzt@hotmail.com](mailto:mine-fzt@hotmail.com) (M. Seyyah).

<https://doi.org/10.1016/j.burns.2018.02.026>

0305-4179/© 2018 Elsevier Ltd and ISBI. All rights reserved.

hyperpigmented and vascularity is scored as normal, pink, red, and purple. Constraints on VSS: pigmentation and vascularity, and the distinction between contraction and pliability. VSS has some deficiencies which are lacks patient perception, pigmentation subscale less applicable to large, heterogeneous scars, operator-dependent errors, excludes pain and pruritus [6]. The VSS is focused on the severity of the wound from a health professional's point of view, but it is also known that the inclusion of a patient-based assessment is also essential. Several scoring scales were developed in the later years. Symptomatic evaluation of the scar was suggested, however, the patient's opinion of scar appearance was not considered in previous scales [7-9].

Finally, in 2004, a reliable and feasible scale, known as the Patient and Observer Scar Assessment Scale (POSAS), was developed to subjectively assess scar formation [7,8]. Previous limitations were recognized in the development of the Patient and Observer Scar Assessment Scale (POSAS), which consisted of two multi-item numerical rating scales, an observer scale, and a patient scale [9].

Compared with VSS, POSAS has been found to be a more consistent and reliable assessment of burn scarring [10]. However, some scales other than POSAS cannot be implemented in terms of time management and profession in clinics where the single healthcare worker follows the patient. Thus, POSAS has been developed as a system that can be divided into two scales, patient and observation scale, and can be easily used in the clinical setting. Another strength of POSAS is that compared with other evaluation scales, it emphasizes on the opinions of the patients. The patient scale version 2.0 English (<http://www.POSAS.org>) consists of seven questions, six of which ask the patient to rate specific characteristics of their scar (pain, itch, color, stiffness, thickness, and regularity) and the seventh question rates the overall opinion of the scar site. The observer scale included six parameters, namely vascularity, pigmentation, thickness, relief, pliability and surface area [10-12]. Both the scales are scored using a 10-point system. One point represents "normal skin," whereas 10 points represent "the worst scar imaginable" [12,13]. The scores from each parameter are added, and higher the score, worse the scar quality. In 2005, Van de Kar et al. added the scar surface area (expansion, contraction, and mix) to the observer scale for a more detailed evaluation [12].

Despite the widespread use of POSAS worldwide, no tool has been used in Turkey for scar evaluation, and clinical evaluations in burn units are performed by photo follow-ups and observation. Hence, we aimed to create a guide for burn evaluation and treatment, which met international standards and to introduce POSAS in the field of burn physiotherapy by conducting its Turkish validity and reliability study. In this context, we are at the forefront of our research.

## 2. Material and methods

### 2.1. Participants

This study included 50 burn patients with hypertrophic scars who were aged 18-65 years (mean age,  $37.5 \pm 1.4$  years) and who

were admitted to University of Health Sciences Kartal Dr. Lütfi Kırdar Education and Research Hospital-Wound and Burn Treatment Center from February 2014 to April 2014.

The study was permitted by the clinical practitioner of the Burn and Wound Center, where the study was conducted and was approved by the ethics committee of University of Health Sciences Kartal Dr. Lütfi Kırdar Education and Research Hospital Scientific Research Evaluation Board on May 20, 2014 (Number: 514/43/4). The informed consent form, which described the purpose and content of the study in detail, was explained and provided to each participant, who signed the voluntary consent form and agreed to participate in the study.

#### Inclusion criteria

- Patients admitted at University Of Health Sciences Kartal Dr. Lütfi Kırdar Education and Research Hospital-Wound and Burn Treatment Center for treatment and in whom wound healing was completed.
- Those aged 18-65 years.
- Those with sufficient cognitive competence to understand the scale and know how to read and write.
- Those who voluntarily participated in the study.

#### Exclusion criteria

- Patients with acute burns who were admitted to University of Health Sciences Kartal Dr. Lütfi Kırdar Education and Research Hospital-Wound and Burn Treatment Center.
- Those aged <18 years.

### 2.2. Method

For cultural adaptation of the English version of POSAS for its Turkish use, POSAS was translated from English to Turkish by two people working in different health fields. A single Turkish translation was created from these translations. The resultant Turkish questionnaire was translated into English by two people who spoke Turkish very well and was then compared with the original English version. After this, the questionnaire was tested among 20 pilot patients, it was checked whether the questionnaire had unexplained questions, the use was deemed ready for the next phase of the study. A week after the initial evaluations among pilot patients, the questionnaire was tested again to measure its retest reliability.

We evaluated the reliability (internal consistency and test and retest reliability) and validity (superficial and content related) of POSAS. Reliability is defined as obtaining the same result when the scale or questionnaire is tested with dependent groups at two different time points [14,15].

### 2.3. Statistical analysis

The SPSS version 11.5 was used to analyze the data of the study. At 95% confidence interval of the statistical program, p-value of <0.05 was considered significant. The one-sample Kolmogorov-Smirnov test and histogram scoring were used to determine the normal distribution suitability of the data. While test-retest and internal consistency analysis were used for reliability, exploratory factor analysis (EFA) was used for validity [16].

Test-retest: The intraclass correlation coefficient (ICC) value was used to evaluate the test-retest reliability. The ICC values can range from 0.00 to 1.00, with those between 0.60 and 0.80 indicating good reliability and those >0.80 indicating excellent reliability.

Validity is the degree to which a measurement instrument or test can accurately assess parameters that are intended to be assessed. The validity of an outcome measure is the ability to measure the actual functional status of the patient. Criterion validity describes the association between the questionnaire and measurement. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett tests of Sphericity were used as prerequisites for EFA.

We calculated the ICC value for the test-retest reliability and used paired t-test to compare the test-retest averages, Cronbach alpha value to assess internal consistency, and Pearson correlation analysis to determine the validity. The probability of error was found to be  $p < 0.05$ .

### 3. Results

Fifty participants were included in the study. 20 patients in the pilot group were not included in this group. The mean age of the patients was  $37.5 \pm 1.4$  years. The analyses revealed that all correlations were positive, strong, and statistically significant ( $p = 0.001$ ).

Internal consistency of the scale was assessed using the Cronbach alpha method. The reliability analysis revealed a Cronbach alpha value was 0.93 of the observer scale. This value should be greater than 0.70 [16,17]. Therefore, there is internal consistency in our scale and no negative effect is detected. The reliability analysis of the patient measurements revealed a Cronbach alpha value was 0.77, further establishing the internal consistency of the scale.

The appropriateness of POSAS for the structural validity analysis was assessed by the KMO test and Bartlett's test. Explanatory factor analysis was used to determine the validity

Scree Plot

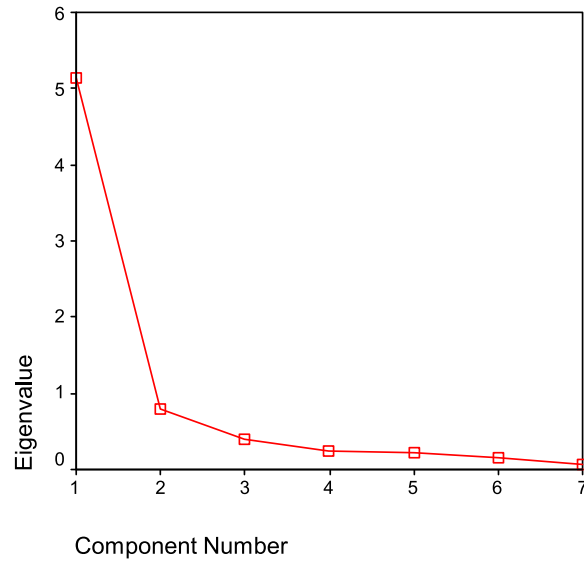


Fig. 1 – Scree plot for observer measurements.

of the observer metric scores. According to the analysis, the sampling adequacy value was 0.89 by the KMO test. Thus, the size of the sample was determined to be very good [16]. The results of Bartlett's test were statistically significant ( $p = 0.001$ ), indicating that the items were suitable for factor analysis (Table 1). The factor analysis revealed a one-factor structure and explained 73.44% of the total variance for observer measurements (Table 2, Fig. 1).

In addition, the explanatory factor analysis of patient measurement values revealed a Bartlett test value was 0.74; thus, the sample size was determined to be good (Table 3). The factor analysis revealed a two-factor structure, but considering the first factor as a one-factor structure was appropriate in

Table 1 – Kaiser-Meyer-Olkin (KMO) and Bartlett's test results for observer measurements.

KMO sampling adequacy value		0,885
Bartlett's test of sphericity	Approx. chi-square	315,144
	df	21
	p	0,001

Table 3 – Kaiser-Meyer-Olkin (KMO) and Bartlett's test results for patient measurements.

KMO sampling adequacy value		0,739
Bartlett's test of sphericity	Approx. chi-square	199,83
	df	21
	p	0,001

Table 2 – Explanation of total variance for observer measurements.

Component	Initial Eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1. Vascularity	5,141	73,437	73,437	5,141	73,437	73,437
2. Pigmentation	0,802	11,456	84,893			
3. Thickness	0,391	5,589	90,482			
4. Relief	0,233	3,324	93,806			
5. Pliability	0,211	3,018	96,824			
6. Surface area	0,146	2,08	98,904			
7. Overall opinion	0,077	1,096	100			

**Table 4 – Explanation of total variance for patient measurements.**

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1. Pain	3,938	56,253	56,253	3,938	56,253	56,253	3,3	47,145	47,145
2. Itching	1,187	16,951	73,204	1,187	16,951	73,204	1,824	26,059	73,204
3. Color	0,707	10,099	83,302						
4. Stiffness	0,571	8,157	91,46						
5. Thickness	0,292	4,165	95,625						
6. Irregularity	0,168	2,394	98,019						
7. Overall opinion	0,139	1,981	100						

terms of the purpose of investigating the cause of explaining >30% of the total variance [16]. The items explained 73.20% of the total variance (Table 4, Fig. 2).

#### 4. Discussion

It is known that scales and questionnaires provide a comparison between the clinical severity of a disease and the results of an applied treatment approach. For the subjective evaluation of hypertrophic scars, VSS and POSAS are the most frequently used questionnaires [18].

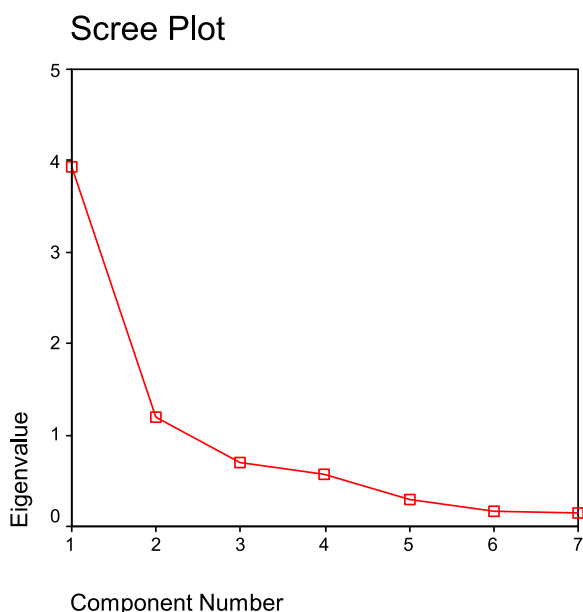
We have found that POSAS has validity and reliability studies in different languages as observer/patient separately and together [19,20], but has not been performed in Turkish. Thus, we assessed the adaptation of POSAS for its Turkish use, which included cultural adaptation and establishing its validity and reliability for objective and effective treatment in clinical settings.

We observed that the Turkish version of POSAS, which was culturally adapted in this study, had high validity and

reliability. After obtaining expert opinions, the validity study of the scale was conducted, and the data collection was performed. We observed a high correlation between the source language (English) and the target language (Turkish) using the multilingual pattern method.

Similarly, reliability analysis revealed that the Cronbach alpha value of the observer measurement of POSAS was 0.93 and that of the patient measurement was 0.77. Hence, POSAS was found to be a highly reliable scale [17]. Explanatory factor analysis determined the validity of the observer metrics scores. According to the KMO test, the sample adequacy value was 0.89. Therefore, the sample size was considered to be very good. Moreover, because the Bartlett's test result was statistically significant, we determined that the questionnaire was suitable for factor analysis [16].

The results of the explanatory factor analysis of the patient measurement values showed that the KMO test value was 0.74, revealing that the sample size was good [16]. On the basis of the data analysis, we concluded that the validity and reliability of the Turkish version of POSAS for evaluating hypertrophic scars was good.

**Fig. 2 – Scree plot for patient measurements.**

#### 5. Conclusion

In this study, the Turkish version of POSAS was proved to be a valid and reliable tool for evaluating hypertrophic scars. The reliability of the Turkish version was found to be high, thereby achieving the goal of the questionnaire. We believe that the Turkish version of POSAS will be an important clinical and scientific tool in the field of burn physiotherapy in Turkey, which will lead to new research in this field.

#### Acknowledgment

The authors acknowledge and want to thank Assos. Prof. Emre İşçi for his help about statistical analysis.

#### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

---

## Conflict of interest

The authors have no conflicts of interest to declare.

---

## REFERENCES

- [1] Pynsent PB. Choosing an outcome measure. *J Bone Joint Surg Br* 2001;83:792-4.
- [2] Gross DP, Battie MC, Asante AK. The Patient-Specific Functional Scale: validity in workers' compensation claimants. *Arch Phys Med Rehabil* 2008;89:1294-9.
- [3] Guccione AA, Mielenz TJ, DeVellis RF, Goldstein MS, Freburger JK, Pietrobon R, et al. Development and testing of a self-report instrument to measure actions: outpatient physical therapy improvement in movement assessment log (OPTIMAL). *Phys Ther* 2005;85:515-30.
- [4] Streiner DL, Norman GR, Cairney J. Health measurement scales: a practical guide to their development and use. New York: Oxford University Press; 2014. p. 31-7 [chapter 4].
- [5] Powers PS, Sarkar S, Goldgof DB, Cruise CW, Tsap LV. Scar assessment: current problems and future solutions. *J Burn Care Rehabil* 1999;20:54-9.
- [6] Fearmonti R, Bond J, Erdmann D, Levinson H. A review of scar scales and scar measuring devices. *Eplasty* 2010; 10:354-63.
- [7] Draaijers LJ, Templeman FR, Botman YA, Tuinebreijer WE, Middelkoop E, Kreis RW, et al. The patient and observer scar assessment scale: a reliable and feasible tool for scar evaluation. *Plast Reconstr Surg* 2004;113:1960-5.
- [8] Mustoe TA. The patient and observer scar assessment scale: a reliable and feasible tool for scar evaluation. *Plast Reconstr Surg* 2004;113:1966-7.
- [9] Durani P, McGrouther DA, Ferguson MWJ. Current scales for assessing human scarring: a review. *J Plast Reconstr Aesthet Surg* 2009;62:713-20.
- [10] Crowe JM, Simpson K, Johnson W, Allen J. Reliability of photographic analysis in determining change in scar appearance. *J Burn Care Rehabil* 1998;19:183-6.
- [11] Nedelec B, Shankowsky HA, Tredget EE. Rating there solving hypertrophic scar: comparison of the Vancouver scar scale and scar volume. *J Burn Care Rehabil* 2000;21:205-12.
- [12] Van de Kar AL, Corion LU, Smeulders MJ, Draaijers LJ, van der Horst CM, van Zuijlen PP. Reliable and feasible evaluation of linear scars by the Patient and Observer Scar Assessment Scale. *Plast Reconstr Surg* 2005;116:514-22.
- [13] DeJong HM, Phillips M, Edgar DW, Wood FM. Patient opinion of scarring is multidimensional: an investigation of the POSAS with confirmatory factor analysis. *Burns* 2017;43:58-68.
- [14] Scott DL, Garrood T. Quality of life measures: use and abuse. *Best Pract Res Clin Rheumatol* 2000;14:663-87.
- [15] Shrout PE, Fleiss JL. Intraclass correlations: uses in assessing rater reliability. *Psychol Bull* 1979;86:420-8.
- [16] Büyüköztürk Ş. Sosyal bilimler için veri analizi el kitabı. Pegem Atf İndeksi 2017;1-213.
- [17] Şencan H. Sosyal ve davranışsal ölçümlerde güvenilirlik ve geçerlilik. Seçkin Yayıncılık 2005;415-68.
- [18] Garratt A, Schmidt L, Mackintosh A, Fitzpatrick R. Quality of life measurement: bibliographic study of patient assessed health outcome measures. *BMJ* 2002;324:1417.
- [19] Deslauriers V, Rouleau DM, Alami G, MacDermid JC. Translation of the Patient Scar Assessment Scale (POSAS) to French with cross-cultural adaptation, reliability evaluation and validation. *Can J Surg* 2009;52:E259-63.
- [20] Van der Wal MB, Tuinebreijer WE, Bloemen MC, Verhaegen PD, Middelkoop E, Van Zuijlen PP. Rasch analysis of the Patient and Observer Scar Assessment Scale (POSAS) in burn scars. *Quality Life Res* 2012;21:13-23.