RESEARCH ARTICLE

Translation, Validation, and Cross-Cultural Adaptation of the Patient and Observer Scar Assessment Scale (POSAS) into Persian

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Abstract

Objectives: This study aimed to translate, culturally adapt, and validate the Patient and Observer Scar Assessment Scale (POSAS) for Persian-speaking populations, ensuring its applicability and reliability in both clinical and research settings in Iran.

Methods: The cross-cultural adaptation process involved forward and backward translations, expert panel reviews, and pre-testing. A total of 60 post-surgical patients participated in the study. Psychometric evaluations included content validity, internal consistency, and test-retest reliability. Content Validity Ratios (CVRs) and Content Validity Indices (CVIs) were calculated, with thresholds set at 0.51 and 0.79, respectively. Reliability was assessed using Cronbach's alpha coefficients (≥0.7) and test-retest stability over a two-week interval.

Results: The Persian POSAS demonstrated robust psychometric properties. All items exceeded the CVI threshold, achieving strong expert consensus (CVR ≥0.51). Cronbach's alpha coefficients were 0.88 and 0.81 for the Observer Scar Assessment Scale (OSAS) and Patient Scar Assessment Scale (PSAS), respectively, indicating high internal consistency. Test-retest reliability confirmed stability over time. These results were consistent with previous adaptations in other languages, including Arabic and Italian.

Conclusion: The Persian adaptation of POSAS is a valid and reliable tool for scar assessment, filling a critical gap in patient-centered care for Persian-speaking populations. This tool enables standardized evaluation of scars and supports clinical research. Future studies should explore its responsiveness to therapeutic interventions and its applicability across diverse patient demographics.

Level of evidence: III

Keywords: Cross-cultural research, Cultural adaptation, Persian validation, Psychometric validation, Scar assessment

Introduction

Each year, millions of individuals worldwide develop post-surgical scars, a common consequence of the rising number of surgeries.[1-4] Scars represent the final stage of tissue repair, to restore both the skin's protective function and its appearance. However, they often result in significant cosmetic, psychological, and financial concerns, which can severely impact patients' quality of life.[5,6]

Various tools are available for assessing surgical scars, including the Vancouver Scar Scale (VSS), the Modified Vancouver Scar Scale (MVSS), and the Manchester Scar Scale (MSS).[7-9] Among these, the Patient and Observer Scar Assessment Scale (POSAS) is considered one of the most comprehensive instruments,[10] which evaluates multiple parameters, such as scar texture, pigmentation, pain, itchiness, and overall appearance, from both the patient's and observer's perspectives. Initially developed in 2004 for assessing burn scars, POSAS has since been adapted for use in evaluating other types of scars, including surgical scars.[11,12]

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The POSAS consists of two sections: one for patients and one for observers, both utilizing numerical scoring systems to assess aspects such as pain, flexibility, and vascularization.[12-15] The objective of this study is to translate and culturally adapt the POSAS into Persian, ensuring its relevance and effectiveness for clinical application in Iranian populations.

Materials and Methods

Study Design

This research involved translating and culturally adapting the Patient and Observer Scar Assessment Scale (POSAS) into Persian, followed by validation and reliability testing. The process was conducted in several phases: translation, cultural adaptation, content validation, reliability analysis, and statistical evaluation.[16]

Study Population

The study recruited 60 post-surgical patients from the orthopedic department, all of whom had undergone surgery for Carpal Tunnel Syndrome (CTS). Participants were selected based on the guideline of 5–10 patients per scale item, a commonly accepted recommendation for determining sample size in psychometric research.[11,17,18] This approach ensures a sufficient sample size for robust analysis while maintaining the validity and reliability of the measurement tools used. The inclusion criteria were defined as patients over 18 years of age who had undergone CTS surgery within the last 3 months and had no confounding conditions, such as surgical site infections, keloid or hypertrophic scarring, or other medical conditions that could affect healing or recovery. Exclusion criteria included participants with prior upper limb surgeries or conditions such as cognitive impairments, which could affect their ability to participate in the study. The sample size also aligned with psychometric recommendations, enhancing the statistical power of the research and ensuring the results would be meaningful and applicable to the broader patient population undergoing CTS surgery.[11,17,18]

Permission and Acquisition

Authorization was obtained from the POSAS organization, and the original English version (Version 2) of the scale was secured for translation and adaptation.[19]

Translation

Two independent bilingual experts with expertise in orthopedics translated the scale into Persian. A committee consisting of translators, orthopedic specialists, and a statistician reviewed the translations and consolidated them into a single draft.[20]

Back-Translation

To ensure accuracy, the Persian version was back-translated into English by an independent bilingual expert who was unfamiliar with the study's objectives. Any discrepancies between the back-translated and original versions were addressed to refine the Persian adaptation.[11]

Expert Review and Finalization

A panel consisting of three orthopedic specialists, one statistician, and one translator conducted a thorough review to finalize the Persian POSAS [Figure 1, 2].

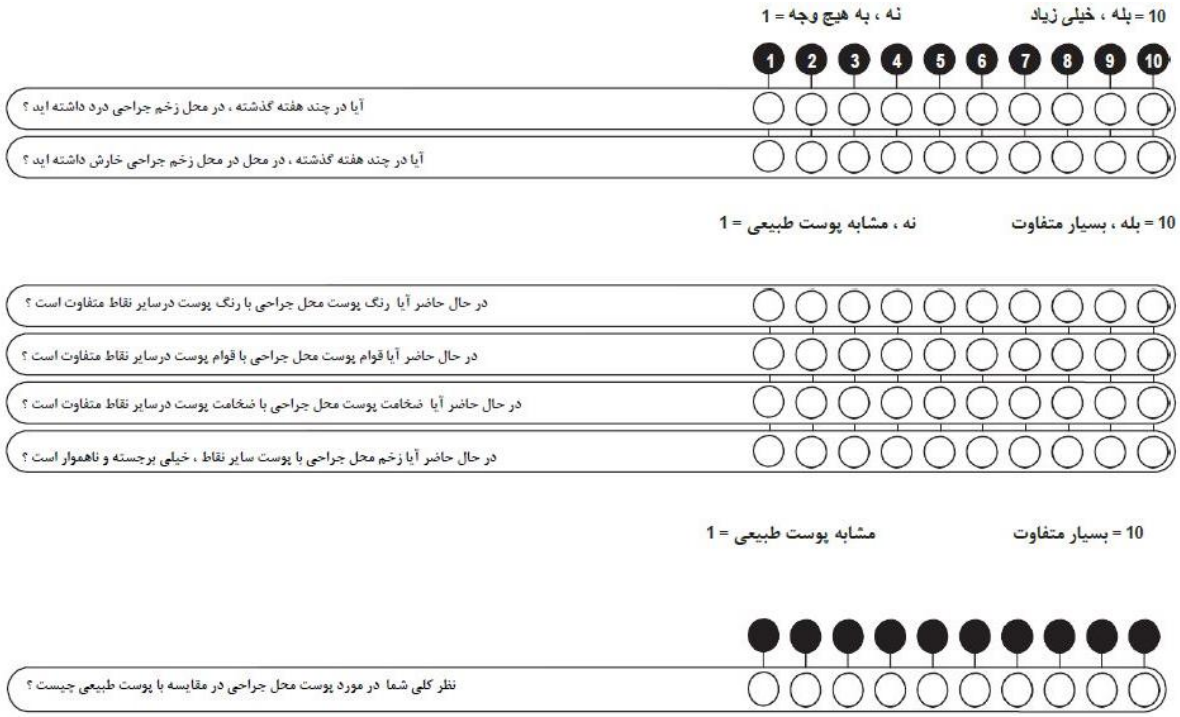

Figure 1. Persian version of the POSAS 2.0 Patient Scale

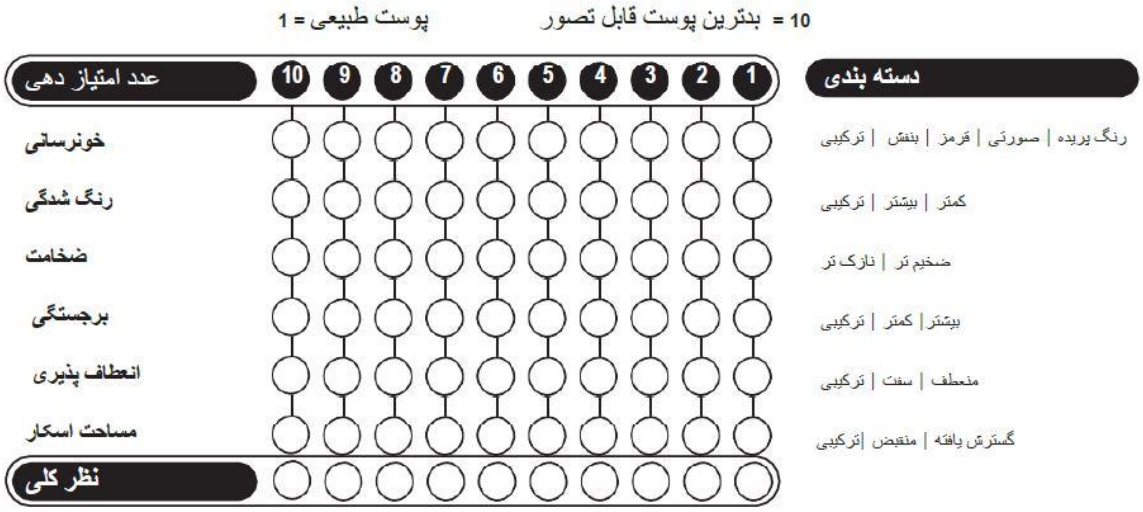

Figure 2. Persian version of POSAS 2.0 Observer Scale

Outcome Measures

The Patient and Observer Scar Assessment Scale (POSAS) was used to assess scar outcomes in this study.[11] The scale consists of two subscales: the Observer Scar Assessment Scale (OSAS) and the Patient Scar Assessment Scale (PSAS).[11] OSAS evaluates vascularity, pigmentation, thickness, relief, pliability, and surface area, while PSAS evaluates scar-related pain, pruritus, color, stiffness, thickness, and irregularity.[11] Each item on both subscales is rated on a 10-point scale, with 1 representing normal skin (no symptoms) and 10 reflecting the worst imaginable scar or sensation. The total score for each subscale ranges from 6 to 60 points.[10] To enhance the reliability of the measurements, detailed instructions were provided to the observer on how to score and administer the scale.[11]

Data analysis

Validation

Content Validity: Due to the lack of a validated Persian scale for evaluating wound quality, the Content Validity Ratio (CVR) and Content Validity Index (CVI) methods were used to assess content validity.[14,15] A total of 14 experts rated the necessity of each item using Lawshe's method, with a CVR threshold of 0.51. Additionally, items were rated for relevance on a four-point scale, with the CVI threshold set at 0.79.[14, 15]

Reliability Testing

Test-Retest Reliability: The finalized Persian POSAS was administered twice to 60 participants over a two-week interval to measure stability.[5] For reliability assessment, the OSAS scale was administered by two independent raters, both of whom were orthopedic residents. To evaluate reliability, test–retest reliability for the PSAS and inter-observer reliability for the OSAS were calculated using the Intraclass Correlation Coefficient (ICC) with a two-way random effects model and consistency type, accompanied by 95% confidence intervals.[11,20] ICC values ranging from 0.70 to 0.85 were considered indicative of good reliability, while values greater than 0.85 were deemed excellent.[11, 20]

Test-retest reliability was evaluated over a two-week interval. This timeframe was chosen based on previous validation studies of POSAS in different languages, such as Italian and Arabic, which used similar periods to assess measurement stability.[12,13] However, it is acknowledged that scar characteristics may evolve during this interval, particularly in the early post-surgical phase.[12,13] s, such that potential variations in scar appearance over two weeks could introduce minor fluctuations in both patient-reported and observer-assessed scores.[12,13]

Internal Consistency: Internal consistency, which refers to the extent to which items on a scale measure the same underlying concept, was assessed using Cronbach's alpha (α) and item-to-total correlations.[12,21] These analyses were conducted on aggregate data from both admission and discharge. Cronbach's alpha values greater than 0.90 are considered excellent, indicating strong one-dimensionality of the instrument, though values above 0.95 may suggest redundancy among items.[12,22-24] Values ranging from 0.80 to 0.89 are regarded as good, while values between 0.70 and 0.79 are considered acceptable.[12,22-24]

Additionally, item-to-total correlations were calculated to assess how well each item correlated with the total scale score, excluding the item being tested from the total. A minimum item-to-total correlation of 0.40 was set as the satisfactory threshold, indicating that each item contributed adequately to the overall measurement of the construct.[12, 25]

Results

The study included 60 participants aged 23 to 80 years (mean = 51.92; SD = 12.13). The majority of participants

(84.4%) were female, reflecting the predominance of women undergoing elective surgeries in this population [Table 1].

The time elapsed since surgery ranged from 30 to 70 days, with a mean duration of 41.67 days (SD = 11.24).

Participants exhibited diverse educational backgrounds: 13.3% (n = 8) had completed primary school, 38.3% (n = 23) held a high school diploma, and 48.4% (n = 29) had a university degree or higher. Regarding comorbidities, 31.7% (n = 19) had hypertension, 23.3% (n = 14) were diagnosed with diabetes mellitus, 26.7% (n = 16) had hypothyroidism, and 10.0% (n = 6) had rheumatoid disease [Table 1].

Table 1. Patients' demographic information

Characteristic	n (%)
Age in years, (mean ±SD)	51.92 ± 12.13
Age in years, range	23 - 80
Gender:	
Male	9 (15.6%)
Female	51 (84.4%)
Time since surgery in days, (mean±SD)	41.67 ± 11.24
Time since surgery, range	30 - 70
Weight in kg, (mean±SD)	76.3± 12.3
Height in cm, (mean±SD)	159 B± 9.3
Educational level:	
Primary school	8 (13.3%)
High school	23 (38.3%)
University degree	29 (48.4%)
Comorbidities:	
Hypertension	19 (31.7%)
Diabetes mellitus	14 (23.3%)
Hypothyroidism	16 (26.7%)
Rheumatoid disease	6 (10.0%)

OSAS Reliability

Internal Consistency:

The OSAS subscale presented excellent internal consistency, with a Cronbach's alpha of 0.88. Corrected item-total correlations ranged from 0.45 (surface irregularities) to 0.67 (surface area), indicating acceptable correlations across items.

Inter-Observer Reliability:

ICC values for inter-observer reliability ranged from 0.71 (vascularity) to 0.89 (pigmentation), with most items demonstrating good to excellent reliability. Notably, surface irregularities (ICC = 0.85, 95% CI: 0.69–0.92) and pigmentation (ICC = 0.89, 95% CI: 0.78–0.94) exhibited excellent reliability [Table 2].

PSAS Reliability

Internal Consistency:

The PSAS subscale demonstrated good internal consistency, with a Cronbach's alpha of 0.81. Corrected item-total correlations varied between 0.40 (colour) and 0.67 (stiffness) [Table 2].

Test–Retest Reliability:

The ICC values for test–retest reliability ranged from 0.72 (color) to 0.89 (irregularity), suggesting consistent reliability across repeated assessments.

OSAS Content Validity

All items in the OSAS subscale demonstrated high content validity, with CVI values ranging from 0.85 (pliability and pigmentation) to 1.00 (thickness).[10,14,26] Similarly, CVR values ranged from 0.57 (pliability and pigmentation) to 0.85 (thickness and surface area) [Table 3].[10,14,26]

PSAS Content Validity

The PSAS subscale also demonstrated high content validity, with Content Validity Index (CVI) values ranging from 0.85 (for stiffness and thickness) to 1.00 (for pain). The Content Validity Ratio (CVR) values ranged from 0.57 (for stiffness) to 0.85 (for pain and irregularity) [Table 3].[10,14,26]

Table 2. Reliability Analysis of OSAS and PSAS Subscales (Cronbach's Alpha Values and Item-Deleted Analysis), Test–retest and Inter-observer ICC

Subscale	Cronbach's alpha	Item	Corrected item-total correlation	Cronbach's alpha if the deleted item	ICC Inter-observer (95%CI)	ICC Test–retest (95%CI)
OSAS	0.88	*Vascularity*	0.56	0.84	0.71 (0.40 – 0.85)	
		Pigmentation	0.61	0.83	0.89 (0.78 -0.94)	
		Thickness	0.60	0.80	0.73 (0.43 – 0.86)	
		Surface Irregularities	0.45	0.84	0.85 (0.69 -0.92)	
		Pliability	0.58	0.84	0.75 (0.50 – 0.87)	
		Surface Area	0.67	0.83	0.77 (0.59 – 0.88)	
PSAS	0.81	*Pain*	0.42	0.78		0.76 (0.52 – 0.88)
		Pruritus	0.48	0.78		0.75 (0.49 – 0.87)
		Colour	0.40	0.79		0.72 (0.51 – 0.85)
		Stiffness	0.67	0.76		0.73 (0.46 – 0.86)
		Thickness	0.57	0.77		0.77 (0.53 – 0.88)
		Irregularity	0.51	0.78		0.89 (0.78-0.94)

Table 3. Content Validity Analysis of OSAS-I and PSAS Subscales (Content Validity Index and Content Validity Ratio)

Subscale	Item	CVI	CVR
OSAS	*Vascularity*	0.92	0.71
	Pigmentation	0.85	0.57
	Thickness	1.00	0.85
	Surface Irregularities	0.92	0.71
	Pliability	0.85	0.57
	Surface Area	0.92	0.85
PSAS	*Pain*	1.00	0.85
	Pruritus	0.92	0.71
	Colour	0.92	0.71
	Stiffness	0.85	0.57
	Thickness	0.85	0.71
	Irregularity	0.92	0.85

Discussion

The Persian adaptation of the POSAS represents a significant advancement in scar assessment tools for Iranian patients. In accordance with established international guidelines, the study ensured both linguistic accuracy and cultural relevance, similar to adaptations in other languages, such as Arabic and Italian.[12,19]

The Persian POSAS demonstrated robust psychometric properties, comparable to adaptations in other languages. For instance, Cronbach's alpha values were consistent with those reported for the Arabic (0.89) and Italian (0.72–0.80) versions.[8,12] Additionally, test-retest reliability mirrored findings from other adaptations, reinforcing the tool's stability.[17,22]

In this study, a homogeneous sample of patients who had undergone carpal tunnel release surgery was deliberately selected. This approach was selected to minimize variability in scar characteristics and ensure a more controlled validation of the Persian POSAS. Similar methodologies have been employed in previous validation studies, where patient selection was restricted to specific surgical procedures.[13] Such homogeneity enhances the reliability of psychometric assessments by reducing confounding factors related to different scar types, healing processes, and anatomical locations.

Although the findings provide strong evidence for the

reliability and validity of the Persian POSAS in CTS patients, the generalizability of the results to other types of scars, such as burn or traumatic scars, may be limited. However, similar validation studies have been conducted with specific patient groups, and this approach has been deemed appropriate for scale validation.[11-13]

One of the key considerations in this study is the potential for changes in scars during the two-week interval between test and retest assessments. Although previous validation studies have demonstrated the feasibility of such a timeframe, scars, particularly in the early healing phase, may undergo modifications in pigmentation, pliability, or surface irregularities.[12,13] These changes could lead to slight variations in the POSAS scores over time, potentially affecting test-retest reliability.[12,13] Future studies should explore shorter or multiple assessment intervals to more accurately capture the dynamic nature of scar evolution.

During the translation and cultural adaptation of the Persian POSAS, specific terms presented challenges due to differences in linguistic and conceptual interpretations. Specifically, 'pigmentation' required adaptation to a term that more accurately reflected variations in skin tone as perceived by Persian-speaking patients. The term 'relief' was modified to better convey the concept of surface irregularities, as the direct translation did not fully capture its intended meaning. Similarly, 'pliability' was reworded to ensure it aligned with the clinical perception of skin flexibility in Persian medical terminology.

Limitations and Recommendations

A key limitation of this study was the absence of an existing Persian scar assessment tool for construct validation. Future studies should aim to develop complementary tools for cross-validation. Additionally, the predominance of female participants may limit the generalizability of the findings to male populations. Further research should investigate longitudinal responsiveness to clinical interventions.

Conclusion

Based on the findings, the Persian version of the POSAS is a reliable and valid tool for scar assessment in Iranian patients. This adaptation enhances clinical care and facilitates cross-cultural research, addressing a critical gap in patient-centered evaluations within the region.

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Declaration of Informed Consent: The authors declare that there is no information that can be used to identify patients.

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