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Validation of the Persian version of the Burn Specific Health Scale – Brief

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ABSTRACT

Background: The Burns Specific Health Scale-Brief (BSHS-B) is easy to apply, can be self-administered, and is considered a suitable instrument to measure general health and the physical, mental, and social aspects of burn victims' life.

Aim: The purpose of this study was to translate and culturally adapt the BSHS-B into the Persian language and to investigate its psychometric properties.

Methods: The BSHS-B was translated and adapted for Iranian patients. 200 patients (94.34%) filled out the questionnaire. The psychometric properties of the scale, including its internal consistency, test–retest reliability, and construct validity through the known-groups technique were evaluated.

Results: The Cronbach's alpha coefficient of total scores of the questionnaire was 0.94, demonstrating reasonable internal consistency of the instrument. The test–retest coefficients were reported to be between 0.81 and 0.96. The scale's construct validity was statistically significant. Principal components' factor analysis was used to derive an instrument called the Burn Specific Health Scale-Brief in eight domains. The domains described patients' functions in terms of "Heat sensitivity", "Affect", "Hand function & simple abilities", "Treatment regimens", "Work", "Sexuality", "Interpersonal relationships", and "Body image".

Conclusions: The reliability and validity of the adapted version of the BSHS-Brief was shown to be satisfactory. Thus, it can be used to investigate quality of life of Iranian patients suffering from burn.

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1. Introduction

The increased survival of burn patients has required clinicians and researchers to look beyond mortality statistics and to consider how burn affects the patients' long-term adjustment and quality of life (QoL) [1]. Some patients with full thickness burns experience a profound impairment in their QoL [2]. Burns affect not only the skin but also all aspects of human

life, leaving survivors with numerous physical and psychosocial handicaps. Therefore, rehabilitation and measuring health status of burn victims have attracted attention in healthcare professionals [3,4]. The lived-experience of people who have sustained burn should be recognized and evaluated by medical team in all phases of burn care [5].

Currently, the Burn Specific Health Scale-Brief (BSHS-B) in some form has become the most commonly used instrument to investigate the QoL of burn survivors. Clarity regarding the

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components and use of the versions of the BSHS-B will strengthen burn QoL research. The BSHS-B has undergone extensive psychometric testing and revision over the last 25 years. It has been widely used to measure short and long-term outcomes in burn patients. The BSHS, in its different versions has been used to measure different concepts such as the health status and health-related QoL in several countries such as Finland [6], Sweden [7], Holland [8], Australia [9], Spain [10], United States [11], Canada [12], Norway [13], Turkey [14], China [15], and Egypt [16], but the same phenomenon has not occurred in Iran. Therefore, the purpose of this study was to translate and culturally adapt the BSHS-B into the Persian language and to investigate its psychometric properties.

2. Material and methods

2.1. Participants and settings

The study was conducted in two teaching hospitals in Tehran, Iran from September 2008 to September 2009. 213 adult patients with full thickness burns were recruited using the convenience sampling method. All patients met the following inclusion criteria to be included in this study: aged ≥ 18 years and suffering from severe burns with 10% or greater Total Body Surface Area (TBSA). Patients with a previous diagnosis of vision and hearing disorders, mental retardation and severe psychiatric disorders such as schizophrenia, depression and dementia were excluded from the study. It is noted that the patients' files were checked in order to find the patients with the above mentioned criteria.

2.2. Ethical considerations

Permission to translate the scale was obtained from the scale owner. The study was approved by the research council affiliated with Shahed University, which corroborated its ethical considerations (ID = M-P/M105). Also, official permission was granted by the teaching hospitals before entering the research zones. The other ethical considerations addressed in this study were the participants' autonomy, confidentiality, and anonymity throughout the study process. The participants were informed that study participation involved no harm or discomfort, that participants would receive no direct benefit from their participation, and that the data they provided would be used in the evaluation and improvement of the instrument. Lastly, from those patients who showed a willingness to participate in this study, informed consent was obtained.

2.3. Data gathering

The patients either filled in the answer sheet themselves or responded the questions orally depended on their illiteracy condition.

2.4. Questionnaire

Burn-Specific Health Scale-Brief version (BSHS-B) was designed and developed by Kildal et al. [7]. It is the only

condition-specific health status instrument, which is employed in patients suffering from burn. This questionnaire was designed to assess the level of functioning and health related QoL in adult burn survivors. The BSHS-B had 40 items covering nine well-defined domains including simple abilities (questions from 1 to 3); hand function (questions from 4 to 8), affect (questions from 9 to 15), body image (questions from 16 to 19), interpersonal relationship (questions from 20 to 23), sexuality (questions from 24 to 26), heat sensitivity (questions from 27 to 31), treatment regimen (questions from 32 to 36), and work (questions from 37 to 40).

Responses were rated on a 5-point scale from 0 (extremely) to 4 (none/not at all) for each of the 40 items and patients were asked to select the best answer. Mean scores were calculated for each of the domains. This final score reflected an alteration of the QoL. A higher mean score indicated a more positive evaluation of function and a higher QoL [7].

The translation process was performed according to the TCA (translation and cultural adaptation) group [17]. The original English version was translated (forward translation) into Persian separately by two physicians, two nurse instructors and professors from psychiatric nursing (bilingual linguistics). Then, other experts (physicians and nurse instructors) reviewed the translations in terms of their inconsistencies with the original one. Minor revisions were suggested in some areas and, finally one Persian version of the scale was created. Subsequently, it was translated back from Persian to English by two professional English lecturers (bilingual language experts). The back translated version and the original one were compared and found to be highly similar in terms of the structure and meaning. The nurse lecturers and two physicians compared the original version with the back-translated version (harmonization). An expert panel consisted of 10 healthcare professionals consisted of clinical nurse, sociologist, health manager, psychologist, and physicians were asked to assess the questionnaire's conceptual equivalence (cognitive debriefing) and to rate each item of the Persian version in terms of relevance, clarity, and simplicity as 1 (not relevant), 2 (somewhat relevant), 3 (relevant), or 4 (very relevant). Finally, according to their recommendations, minor changes were made and pilot testing were performed with the help of seven patients regarding face validity and comprehension.

It should be noted that the sexual aspect of the questionnaire was modified in order to get a prompt answer without any embarrassment to the patients, especially females and a final BSHS-P version was reached (final report). A content validity index (CVI) was computed using the proportion of experts who were in agreement about items' relevance. The scale content validity/average (S-CVI/Ave) was 0.95 in the final version indicating adequate content validity $CVI > 0.80$ [18].

2.5. Reliability

Test-retest reliability was evaluated by 53 patients. Each patient twice completed an identical questionnaire at an interval of 15 days, and the gathered data was compared. Additionally, the internal reliability was evaluated for the total sample in each of the domains.

2.6. Construct validity

Construct validity was assessed using the known-groups method and exploratory factor analysis. The variables consisted of presence of face and head burns, presence of hand burns, and the length of hospitalization.

2.7. Statistical analysis

Descriptive analysis was used for all variables. Internal consistency was computed using Cronbach's alpha for each domain and the total scale's score. Test-retest reliability was measured through an estimation of the intraclass correlation co-efficient in each domain using SPSS v.16. A principal components analysis with Varimax rotation was used to report the factorial structure of the BSHS-P items by extracting factors with eigenvalues greater than 1 [19], Bartlett's Test of Sphericity, Kaiser-Meyer-Olkin (KMO), Scree plots, loadings of over 0.40 [20].

3. Results

At first, 213 patients with burn participated in this study. Only 13 participants did not provide answers to all items, and missing values were found in three domains of the BSHS-B Persian version. The patient's clinical characteristics are shown in Table 1. Most of patients were female (62% vs 38%) and single (74%). 85.4% of them completed primary and secondary schools. 36% were housewives, 16% jobless, and 16% student. Their ages ranged from 18 to 51 years

Table 1 – The clinical features of patients.

Parameters of burn	No.	%	Total
Time since injury			
<10 year	62	31.00	
10-20 years	83	41.50	
>20 year	55	27.50	200
Etiology of burn			
Thermal	140	70.00	
Scald	41	20.50	
Chemical	11	5.50	
Electrical	8	4.00	200
Site of burn			
Head and neck	132	76.00	
Upper arms	150	75.00	
Trunk	48	56.50	
breast	65	36.36	
Lower limbs	57	28.50	200 [†]
Place of management			
Fatima Hospital	158	79.00	
Shahid Motahari	42	21.00	200
Length of hospital stay (month)			
<1	89	44.10	
>1	111	55.50	200
Need for rehabilitation after burn			
Yes	172	86.00	
No	28	14.00	200

[†] Some burn patients had burns in the different parts of the body, which were reported separately in Table 1.

Table 2 – Internal reliability of BSHS-B Persian version.

BSHS-B Persian version	Items	Cronbach's alpha
Total score	40	0.946
Hand function and simple activity	8	0.943
Affect	7	0.920
Treatment regimen	5	0.926
Heat sensitivity	5	0.879
Work	4	0.914
Body image	4	0.83
Interpersonal relationships	4	0.78
Sexuality	3	0.66

(Mean = 25 y, SD = 6.8 y). The number of patients requiring an operation was 10 (0.5%). Also 195 patients (95%) required a skin graft. The mean of the TBSA was 34.91% (SD = 1.99%). 28.4% of the samples had typical third-degree burns, while 71.6% of them had mixed second and third degree burns. The mean total score for our study was 135.80 (SD = 33.64), ranging from 55 to 159. The mean length of time for completing the questionnaire was 19.05 ± 5 min.

3.1. Reliability

3.1.1. Internal reliability

As shown in Table 2, the coefficients obtained in each of the health domains varied from 0.66 to 0.94. The overall value of the test was 0.94. The majority of Cronbach's alpha values was greater than 0.8, demonstrating that the internal consistency of the translated instrument was in an acceptable level.

3.1.2. Test-retest reliability

Table 3 shows the test-retest reliability for the BSHS-B Persian version. The intraclass correlation ranged from 0.81 to 0.96. The total score was 0.93.

Pearson correlations among the domains of the BSHS-B Persian version are shown in Table 4. The only non-statistically significant correlation was reported for body image and simple functional abilities. Most of the correlations were of moderate strength.

Table 3 – Test-retest reliability of the BSHS-B Persian version.

BSHS-B Persian version	Intraclass correlation coefficient (ICC)	95% confidence interval		p
		Lower bound	Upper bound	
Total score	0.93	0.87	0.97	0.002
Hand function and simple activity	0.96	0.93	0.97	0.001
Affect	0.94	0.88	0.98	0.001
Treatment regimen	0.92	0.85	0.96	0.005
Heat sensitivity	0.87	0.76	0.93	0.002
Work	0.89	0.80	0.94	0.003
Body image	0.90	0.82	0.95	0.001
Interpersonal relationships	0.89	0.80	0.94	0.002
Sexuality	0.81	0.72	0.91	0.002

Table 4 – Pearson correlations in the domains of the BSHS-B Persian version.

	Simple activity	Affect	Interpersonal relationships	Sexuality	Body image	Treatment regimen	Heat sensitivity	Work
Simple activity	1	0.225	0.207	0.302	0.131	0.302	0.227	0.412
Affect		1	0.544	0.410	0.531	0.423	0.475	0.432
Interpersonal relationships			1	0.436	0.521	0.522	0.371	0.446
Sexuality				1	0.478	0.532	0.411	0.468
Body image					1	0.497	0.490	0.532
Treatment regimen						1	0.557	0.550
Heat sensitivity							1	0.557
Work								1

Table 5 – Construct validity of the BSHS-B Persian version.

	Length of hospitalization (d) ≤1 month (n = 89) mean ± SD	Length of hospitalization (d) >1 month (n = 111) mean ± SD	p	Without face-head burns (n = 68) mean ± SD	With face-head burns (n = 132) mean ± SD	p	Without upper arms burns (n = 50) mean ± SD	Without upper arms burns (n = 150) mean ± SD	p
Total score	111.49 ± 27.49	94.60 ± 27.02	0.0001	110.30 ± 328.09	97.90 ± 27.79	0.004	106.98 ± 31.05	100.50 ± 27.43	0.164
Hand function and simple activity	28.11 ± 6.22	23.51 ± 8.50	0.0001	26.48 ± 7.78	25.08 ± 7.93	0.231	28.16 ± 6.56	24.69 ± 8.12	0.007
Affect	17.53 ± 7.38	15.17 ± 6.95	0.021	17.08 ± 7.33	15.78 ± 7.15	0.226	16.74 ± 7.75	16.05 ± 7.06	0.581
Treatment regimen	14.80 ± 5.15	12.53 ± 5.81	0.004	15.11 ± 5.29	12.73 ± 5.65	0.004	14.10 ± 5.21	13.36 ± 5.77	0.423
Heat sensitivity	13.38 ± 5.70	11.70 ± 5.30	0.046	14.30 ± 5.31	11.56 ± 5.50	0.001	12.56 ± 6.16	12.47 ± 5.39	0.925
Work	9.33 ± 4.74	7.29 ± 4.09	0.004	9.42 ± 4.65	7.57 ± 4.30	0.007	8.76 ± 4.83	8.02 ± 4.38	0.315
Body image	7.67 ± 4.11	6.88 ± 3.63	0.151	8.02 ± 4.03	6.82 ± 3.72	0.037	7.20 ± 4.04	7.24 ± 3.81	0.941
Interpersonal relationships	13.56 ± 3.41	11.06 ± 4.33	0.0001	12.66 ± 4.10	11.92 ± 4.13	0.233	12.44 ± 4.49	12.08 ± 4.01	0.623
Sexuality	7.07 ± 2.34	6.36 ± 2.16	0.026	7.19 ± 1.94	6.41 ± 2.38	0.020	7.02 ± 2.22	6.56 ± 2.28	0.219

3.1.3. Construct validity

To analyze construct validity through the known-groups technique, the total length of hospitalization, face and head injury, upper arms, lower limbs, and breast burns were measured, which were statistically significant (Table 5).

Additionally, construct validity was also assessed using the exploratory factor analysis. The Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO) (coefficient and Bartlett’s test of sphericity) were 0.843 and 0.780, respectively. Accordingly, the sample size was appropriate for a factor analysis.

Table 6 shows the coefficients of each item in each of the eight factors using varimax rotation. Domains were ordered by their contribution to the component. Coefficients greater or equal to 0.4 for items that did not belong to the domain were not shown here. Overall, the principal components analysis applied to our sample seemed to confirm the eight domains of the BSHS-B Persian version. The domains described patients’ functions in terms of heat sensitivity, affect, hand function and simple abilities, treatment regimens, work, sexuality, interpersonal relationships, and body image.

4. Discussion

This study showed that the BSHS-B Persian version was an easy, reliable, and valid questionnaire for investigating the health status of QoL in Iranian patients suffering from burns. The mean length of time for completing the BSHS-B Persian version was similar to the BSHS-Turkish version [14]. However, completing the BSHS-B Persian version took less

time when the respondents completed it for the second time. The original BSHS was developed from a 369-item test version into a 114-item final entity. To decrease the time spent for filling out the questionnaire, a brief version of the BSHS with 40 items was developed [7]. The version of the BSHS-B culturally adapted to Persian language, which showed a high level of internal consistency for the total score ($\alpha = 0.94$) as well as for all domains (varying from 0.66 to 0.94). This figure is consistent with previous studies [4,10]. To determine test-retest reliability, each patient completed the BSHS-B Persian version twice. In this study, we found an intraclass correlation coefficient of 0.93 (ranging from 0.81 to 0.96). To attain acceptable agreement between the two tests, an intraclass correlation coefficient of more than 0.70 is required [21]. To analyze construct validity, face and head injury, upper arms injury, and the length of hospitalization were assessed. The results showed that patients having a face and head injury had significantly lower total scores than did persons with other types of burns. In addition, the patients hospitalized longer than one month reported lower total scores in comparison with the patients hospitalized shorter than one month. These findings are consistent with those of other studies [10,13].

Through a principal components analysis, eight domains were created from the original scale. Although only 200 samples were available, this was an adequate sample size to carry out the principal components analysis as advised by Sapnas and Zeller [22]. Furthermore, it was confirmed that the translated questionnaire preserved the correlational structure. In this study, the sample included a heterogeneous group

Table 6 – Rotated component matrix resultant from the principal components after varimax.

		Factor1	Factor 2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
Domains	Eigen value	6.050	4.738	3.970	3.771	3.306	2.676	2.594	1.997
	% total scale variance	15.126	11.845	9.925	9.427	8.264	6.691	6.484	4.992
Hand function and simple activity	Items								
	1	0.875							
	2	0.908							
	3	0.723							
	4	0.737							
	5	0.840							
	6	0.880							
	7	0.827							
Affect	8	0.886							
	10		0.718						
	11		0.555						
	12		0.788						
	13		0.809						
	14		0.516						
	15		0.833						
	16		0.831						
Treatment regimens	33			0.827				0.456	
	34			0.843					
	35			0.828					
	36			0.853					
Heat sensitivity	37			0.503					
	28				0.832				
	29				0.805				
	30				0.733				
	31				0.684				
Work	32				0.529				
	38					0.771			
	39					0.715			
	40					0.767			
Body image	9					0.796			
	24		0.401				0.450		
	25						0.591		
	26						0.668		
Interpersonal relationships	27						0.703		
	17							0.677	
	18							0.664	
	19							0.780	
Sexuality	20							0.567	
	21								0.763
	22								0.637
	23								0.536

Factor loads with module less than 0.40 were omitted from the table.

of burn patients varying from TBSA of 0.10–75%. The large variability of TBSA assures that the sample was appropriate to validate the BSHS-B Persian version. Since TBSA is associated with the impact of the burn in the person's health status.

In this study, the correlations between the various domains were in the expected direction and magnitude. Most linear correlations were of moderate magnitude, but Blalock et al. reported even lower correlations [23]. The only non-statistically significant correlation was between body image and simple functional abilities. A reasonable result is that to be healthy in one of those domains does not guarantee to be healthy in the others. These results were similar to findings reported by Kildal et al. [24].

5. Conclusion

The BSHS-B originally developed for the English language was culturally adapted to the Persian language, and tested in a group of Iranian patients suffering from burn. The translation and cultural adaptation of this questionnaire were conducted according to the currently accepted methodology. The adapted version of the BSHS-B Persian version fulfills the validity and reliability criteria required from a standard instrument for the assessment of health status in burn victims, while maintaining the properties of the original version of the instrument.

Conflict of interest statement

The authors declare no conflict of interest.

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