

# Validity and Reliability of Turkish Version of the Burn-Specific Pain Anxiety Scale

Sevgi Deniz Doğan, MSc\* and Sevban Arslan, PhD†

This study was conducted to adapt the Burn-Specific Pain Anxiety Scale (BSPAS) into Turkish, and to test its validity and reliability. The study was conducted between April 2016 and July 2017 in a university and a training/research hospital using the methodological research model. The population of the study consisted of patients hospitalized in burn units during the above-mentioned dates. The study was conducted with a total of 50 burn patients, who met the inclusion criteria, and who volunteered to participate in the study. Validity and reliability analyses were performed using language, content and construct validities, and a reliability analysis. The language validity of the BSPAS was tested using back translation method, and the content validity was tested using expert opinions. The results of exploratory factor analysis (0.727–0.910) demonstrated a single factor structure, and the factor loads were adequate. Confirmatory factor analysis indicated that the fit indexes were appropriate. To measure internal consistency of the scale, item total correlation was used, and the correlations were found to be adequate (0.59–0.96). The Cronbach's  $\alpha$  coefficient of the scale was 0.95. It was determined that the Turkish version of the BSPAS is a valid and a reliable assessment tool.

Burn injuries, despite the advances in science and technology, are still an important health problem.<sup>1,2</sup> The prevalence of burn patients in Turkey is 200,000 cases annually, and 15,000 of these are treated admitted to the hospital, where a significant number of the patients lose their lives.<sup>3</sup>

Treatments aimed at improving the quality of the burn patients' care cause an increase in the severity of the patient's pain, whereas the recurrence of the treatments, as well as the awareness of this cycle, all result in anxiety.<sup>4-6</sup>

Since the recovery of the patients is negatively affected when pain and anxiety of the burn patients cannot be controlled, providing for an optimal pain control, and decreasing the anxiety levels of the patients, is recommended.<sup>2,7</sup> In this context, assessing pain and anxiety accurately has an important value. A study where the relationship between pain, anxiety, and depression levels of burn patients were investigated found that being unable to control the prolonged pain levels increased the anxiety levels of the patients.<sup>8</sup> A similar study by Karateke concluded that the burn patients who experienced severe pain should be assessed in terms of anxiety as well.<sup>2</sup>

There are currently different valid and reliable tools for assessing pain and anxiety levels of burn patients.<sup>9,10</sup> Nevertheless, a valid and a reliable instrument for simultaneously assessing pain

and anxiety of burn patients does not exist in Turkey. Therefore, the Burn-Specific Pain Anxiety Scale (BSPAS), developed by Taal and Faber, was translated to Turkish and reliability and validity tests were conducted to use the scale in Turkey.<sup>11</sup>

## METHODS

### Design

Methodological research model was used in this study, which was conducted between April 2016 and July 2017 with burn patients admitted to the burn units of a university and a training/research hospital.

### Participants

The population of this study consisted of patients who received treatment in burn units in aforementioned hospitals between May 2016 and January 2017. The literature states that the ideal sample for a reliability and validity study is 5 to 10 times the number of the items.<sup>11</sup> Since the BSPAS that is adapted contains nine items in total, the sample size needs to consist of minimum 45 people. The sample of this study consisted of 50 burn patients that met the inclusion criteria and who agreed to participate in the study.

### Data Collection

The data were collected immediately before dressing the wound with face to face interviews in 8 to 10 minutes, using a personal information form, the BSPAS, the Visual Analogue Scale (VAS), and the State Anxiety Scale (SAI).

### Data Collection Tools

*Personal Information Form.* The form, created by the researcher in light of the literature, consists of 11 questions including sociodemographic characteristics (age, gender, and

From the \*Health Services Department, Isparta Uygulamalı Bilimler University, Uluborlu Selahattin Karasoy Vocational School, Isparta, Turkey; †Surgical Nursing Department, Cukurova University, Faculty of Health Sciences, Adana, Turkey

*Conflict of interest statement.* This research was presented at the congress of "5th International and 16th National Nursing Congress" held in Ankara, Turkey between 5 and 8 November 2017. This study was conducted under the supervision of the second author as a Master of Science thesis in the Nursing Department of Health Sciences Institute of Cukurova University.

*Address correspondence to Sevban Arslan, PhD, Cukurova University, Faculty of Health Sciences, Surgical Nursing Department, Adana, Turkey. Email: sevbanadana@hotmail.com*

© American Burn Association 2019. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com.

doi:10.1093/jbcr/irz091

marital status) and qualities related to the burn (type of burn, reason, area, percentage, etc.) of the patients.

**Visual Analogue Scale.** Patients mark their own experiences of pain on a 10 cm long line where “no pain at all” is located on one end, and “the worst pain imaginable” is located on the other end of the line. The distance from “no pain at all” to where the patient has marked indicates the severity of the pain of the patient. The VAS is the most commonly used scale for assessing pain of burn patients.<sup>2</sup>

**State Anxiety Inventory.** The State Anxiety Inventory was developed by Spielberg et al in 1970 and adapted to Turkish by Öner and Le Compte in 1977. The SAI consists of 20 items in total. Every item has four options to choose from (not at all, somewhat, moderately so, and very much so), and the total score varies from 20 to 80. Higher total scores obtained from the scale correlate with higher anxiety levels of the patient.<sup>10,12</sup>

**Burn-Specific Pain Anxiety Scale.** BSPAS was developed by Taal and Faber in 1997 for assessing pain of burn patients. The scale, which consists of nine items in its original language, contains a visual analogue line from 0 to 10, with two reference points. The reference points are identified by the expressions “not at all” (0) and “the worst imaginable way” (10), using the numbers indicated. The total score of the scale is calculated by adding up the scores of all items, minimum score being 0 and the maximum being 90.<sup>11</sup> Higher total scores correlate with greater pain and anxiety levels regarding painful treatments during their hospital admissions.

### Statistical Analysis

The demographic data derived from the personal information form were analyzed using numbers and percentage. The validity of the questionnaire was tested by consulting experts, and by performing the Barlett test, the Kaiser–Meyer–Olkin (KMO) Index, an exploratory factor analysis, and a confirmatory factor analysis. As a part of the reliability analysis, the Cronbach’s  $\alpha$  coefficient and Pearson’s product–moment correlation coefficient were used to determine internal consistency and homogeneity.

### Ethical Considerations

Since the developer of the scale, L. A. Taal, could not be reached, permission for adapting the BSPAS to Turkish was asked from Tahereh Najafi Ghezjeljeh, who conducted the psychometric analysis of the original scale.

To conduct this study, an approval from Non-Interventional Clinical Research Ethics Committee of Faculty of Medicine of Cukurova University (Decision No: 52, Date: 04.01.2016) and written permissions from Balcali Hospital of Medical Faculty of Cukurova University, and from Adana Provincial Health Directorate, were obtained. In addition, verbal consents from the burn patients were obtained, agreeing to participate in the study.

## FINDINGS

Findings regarding the demographic characteristics of the patients are shown in Table 1.

**Table 1.** Characteristics of the sample ( $n = 50$ )

Characteristics	Min	Max	<i>M</i>	<i>SD</i>
Age	16.00	73.00	38.54	17.53
	<i>N</i>		%	
Sex				
Male	30		60.0	
Female	20		40.0	
Marital status				
Married	29		58.0	
Single	21		42.0	
Working status				
Yes	27		54.0	
No	23		46.0	
Educational level				
Illiterate	3		6.0	
Literate	4		8.0	
Elementary	16		32.0	
High school	19		38.0	
Diploma	8		16.0	
Burn factor				
Hot water–oil–steam	21		42.0	
Contact	2		4.0	
Flame	13		26.0	
Chemical	4		8.0	
Electricity	10		20.0	
Burn depth				
2°	11		22.0	
3°	39		78.0	
Burn locations*				
Hand-arms	36		72.0	
Foot-legs	20		40.0	
Torso	14		28.0	
Face	12		24.0	
Neck	4		8.0	
Analgesics*				
Non-Steroid Anti-Inflamatur	37		74.0	
Parasetamol	35		70.0	
Ketamin	27		54.0	
	Min	Max	<i>M</i>	<i>SD</i>
Total body surface area	2.00	36.00	10.54	7.96

\*More than one response.

### Findings on the Validity of the BSPAS

**Language Validity.** The BSPAS was translated from English to Turkish by four different translators. After examining the translated items by the researcher, a single version of the scale was created. Later, the scales translated to Turkish were translated back to English by three different translators. The original and the translated versions of the scale were compared, and it was determined that the meaning of the items of the scale did not differ.

**Content Validity.** By referring to the expert opinions for each item of the scale, the content validity index was calculated. The scores obtained differed between 0.8 and 1.0, and the average index was 0.96.

**Table 2.** Items and factor loads of the scale

	Itens da BSPAS	Factor loads
1	Actually, I am constantly thinking of my pain	0.909
2	I find it is impossible to relax during care (wound cleansing, baths, dressings and physiotherapy)	0.727
3	Due to the pain, I feel nervous and restless	0.859
4	The pain is often so strong that I have to stop all of my activities	0.906
5	I feel my muscles contracting when care (wound cleansing, baths, dressings, and physiotherapy) actually starts	0.787
6	I am afraid of the pain during and right after care (wound cleansing, baths, dressings, and physiotherapy)	0.895
7	Each time I have to go through a (care) procedure, I am worried about the pain I may feel	0.901
8	The pain can be so strong that I am afraid of losing control of myself	0.910

**Table 3.** Results of confirmatory factor analysis of the scale

Index	Normal value	Acceptable value	Values found
$\chi^2/SD$	1.191	<2	<5
RMSEA	0.062	<0.05	<0.08
CFI	0.994	>0.95	>0.90
SRMR	0.036	<0.05	<0.08
GFI	0.916	>0.95	>0.90
AGFI	0.812	>0.95	>0.90

**Factor Analysis.** The KMO index of the items of the scale was 0.814, and the value obtained from the Bartlett's test was  $\chi^2 = 488.186$ ,  $P = .000$ .

**Exploratory Factor Analysis.** Table 2 shows that the factor load of the BSPAS items varied between 0.727 and 0.910. The BSPAS, which has a unidimensional construct in its original language, maintained its construct in its Turkish adaptation as well.

After conducting the exploratory factor analysis, the total percentage of the variation of the Turkish form of the BSPAS was 74.639%.

**Confirmatory Factor Analysis.** To investigate the nine-item model fit of the scale, different fit indexes were used. These values were  $\chi^2/SD = 2.188$ , RMSEA = 0.156, CFI = 0.946, SRMR = 0.058, GFI = 0.658, and AGFI = 0.436. After inspecting the relevant fit index values, the first item, which had the lowest factor load, was removed from the scale for not being acceptable in this version of the model. Confirmatory factor analysis was conducted once more for the scale with eight items. The results of the confirmatory factor analysis of the BSPAS with eight items are shown in Table 3.

As seen in Figure 1, the factor loads of every item on the scale were found to vary between 0.59 and 0.96 after the confirmatory factor analysis.

### Findings on the Reliability of the BSPAS

**Stability/Parallel Forms Reliability.** The correlation of the BSPAS with the VAS was  $r = .494$ , and with the SAI  $r = .745$ . These results indicate that the scale had a moderate positive linear relationship with the VAS and a very strong positive linear relationship with the SAI.

**Internal Consistency.** The Cronbach's  $\alpha$  of the scale was 0.950, and the total score correlation coefficient varied between 0.658 and 0.875 (Table 4).

## DISCUSSION

In this section, the findings of the reliability and validity analyses of the Turkish version of the BSPAS are discussed.

### Discussing the Findings of Construct Validity

Sample size is important for the reliability of the correlation. Conducting the KMO test assesses the adequacy of the data obtained from the sample.<sup>13,14</sup> Tavşancıl reports that the value gets more perfect closer it is to 1, and a value below 0.50 is unacceptable. The KMO value was 0.81 in our study, and the values between 0.80 and 0.89 are regarded as very good. This finding suggests that the sample size is adequate for a factor analysis.<sup>15</sup>

Bartlett's test analyzes whether the data are multivariate normally distributed.<sup>15</sup> The result of the Bartlett's test was found to be  $\chi^2 = 488.186$ ,  $P = .000$ . These findings suggest that the data are normally distributed, the results of the analysis are not affected by the sample size, and that it is suitable for a factor analysis.

Literature suggests that the factor load needs to be over 0.30. In this study, each item had factor loads of 0.70 and above, and differed between 0.727 and 0.910 (Table 2). The BSPAS, which has a unidimensional construct in its original language, maintained its unidimensional construct in its Turkish form as well<sup>11</sup> (Table 2).

The explained variance was 74.639% in this study (Table 3). Literature suggests that variation between 40% and 60% is adequate.<sup>15</sup> According to the findings of the confirmatory factor analysis, the item factor loads and the explained variance were relatively high.

After the exploratory factor analysis, the items of the scale were assessed by performing a confirmatory factor analysis to investigate the adequacy of the data set in terms of the theoretical structure.<sup>13</sup>

Since an adequate fit index was not obtained in the first model, the first item, which had the lowest factor load, was decided to be removed from the scale. Confirmatory factor analysis was conducted once more for the eight-item version of the scale. Since the fit index values were suitable for the acceptable values, the model can be used in this form (Table 3).<sup>13</sup>

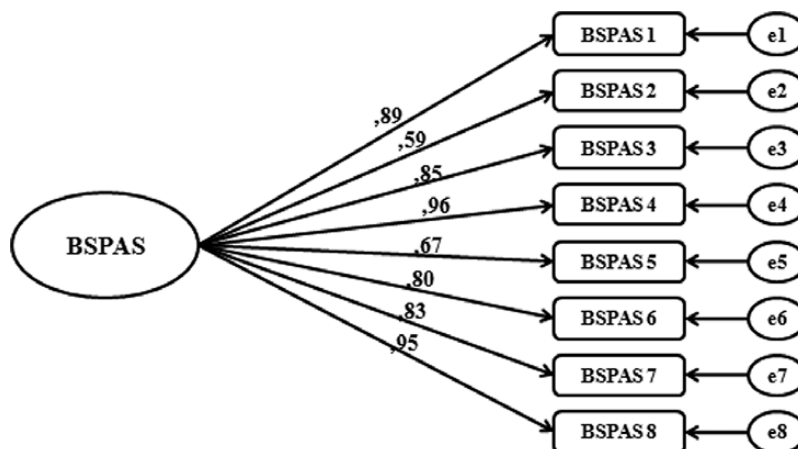


Figure 1. PATH diagram of factor structure of the scale.

Table 4. Items of the scale, mean values, item total correlations, and Cronbach's  $\alpha$  values if the item is removed

BSPAS's items	<i>n</i>	<i>M</i>	<i>SD</i>	Total item correlation	Cronbach's $\alpha$ value when the item is deleted
1	50	3.94	3.119	0.875	0.940
2	50	5.98	2.737	0.658	0.953
3	50	3.94	3.184	0.808	0.944
4	50	3.14	2.726	0.869	0.941
5	50	6.20	2.611	0.733	0.949
6	50	5.34	3.317	0.861	0.941
7	50	4.52	3.418	0.868	0.940
8	50	3.28	2.942	0.873	0.940
				Cronbach's $\alpha$	0.950

Literature states that the factor load should be below 0.30 in confirmatory factor analysis.<sup>13,16</sup> In this study, the factor loads of confirmatory factor analysis varied between 0.59 and 0.96. In the light of the literature, these findings of fit indexes and factor loads of confirmatory factor analysis were adequate.

In conclusion, the unifactorial structure of the eight-item BSPAS is appropriate for the model, and construct validity is obtained.

#### Discussing the Findings of Stability/Parallel Test Reliability

The findings suggest that the BSPAS has a moderate positive linear relationship with the VAS ( $r = .494$ ), and a very strong positive linear relationship with the SAI ( $r = .745$ ). Findings obtained from the analyses to test the reliability of the scale indicate that the BSPAS demonstrates high reliability.<sup>17,18</sup>

#### Discussion of the Findings of Internal Consistency

To measure the internal consistency and the homogeneity in the reliability studies of the BSPAS, item analysis method was used, and the Cronbach's  $\alpha$  coefficient was calculated.<sup>19,20</sup>

Taal and Faber found a high Cronbach's  $\alpha$  ( $\alpha = 0.94$ ) in their study, indicating that all the items are measuring the same construct.<sup>11</sup> The total Cronbach's  $\alpha$  coefficient was found to be 0.95 in this study (Table 4). The Cronbach's  $\alpha$

coefficient was very close to 1 in this study, indicating that the scale is reliable.

Another internal consistency measurement used in this study was item total correlation. The item total correlations in this study differed between 0.658 and 0.875, and all the item total correlations of the items were in a good level (Table 4).

## CONCLUSIONS

The aim of this study was to adapt the BSPAS to Turkish and to test the validity and the reliability of the scale. The BSPAS was assessed in terms of language validity, content validity, construct validity, and internal consistency, and it was determined that it is a valid and a reliable instrument to use in the Turkish population.

## REFERENCES

1. Yavuz M. Internal and Surgical Care. Adana: Academician Medicine Publishing; 2014. p. 109.
2. Karateke Y. Examination of the Relationships Between Burn Pain, Anxiety and Depression in Burn Patients. Istanbul University, Institute of Health Science, Istanbul: Department of Surgical Nursing, Master Programme; 2010.
3. Aksoy N. Management of nursing care in burn patient. Selcuk Med J 2015;31:47-51.
4. Yılmaz Şahin S, Dal Ü, Vural G. Burn patient expectations from nurses. TAF PrevMedBull 2014;13:37-46.

5. Mohammadi Fakhar F, Rafii F, Jamshidi Orak R. The effect of jaw relaxation on pain anxiety during burn dressings: randomised clinical trial. *Burns* 2013;39:61–7.
6. Tengvall O, Wickman M, Wengström Y. Memories of pain after burn injury—the patient’s experience. *J Burn Care Res* 2010;31:319–27.
7. Najafi Ghezalje T, Mohades Ardebili F, Rafii F, Hagani H. Translation and psychometric valuation of persian versions of burn specific pain anxiety scale and impact of event scale. *Burns* 2013;39:1297–303.
8. Loncar Z, Bras M, Micković V. The relationships between burn pain, anxiety and depression. *Coll Antropol* 2006;30:319–25.
9. Eti Aslan F. *Pain Nature and Control*. 2nd ed. Adana: Academician Publishing; 2014. p. 9–16.
10. Öner N, Compte A. *State-Trait Anxiety Inventory Manual*. 2nd ed. İstanbul:Bogazici University Publications; 1995.
11. Taal LA, Faber AW. The burn specific pain anxiety scale: introduction of a reliable and valid measure. *Burns* 1997;23:147–50.
12. Biçersoy G. *The Preoperative Anxiety Levels Of Day Surgery Patient*. Malatya, Turkey: İnönü University, Institute of Health Science, Department of Surgical Nursing. Master Programme Malatya; 2015.
13. Çapık C. Use of confirmatory factor analysis in validity and reliability studies. *J Natolia Nurs Heal Sci* 2014;17:196–205.
14. Karakoç FY, Dönmez L. *Basic principles of scale development*. TED 2014;40.
15. Tavşancıl E. *Attitude Measurement and Data Analysis whit SPSS*. Ankara: Nobel Publishing; 2014. p. 53–7.
16. Harrington D. *Confirmatory Factor Analysis*, 1st ed. New York: Oxford University Press; 2009. p. 22–30.
17. Boluda MP, Asencio JM, Vela AC, Mayor SG, Campos AL, Leiva IL, Kaknani-Uttumchandani S. The dynamic experience of pain in burn patients: a phenomenological study. *Burns* 2016;45:1097–104.
18. Alpar R. *Uygulamalı İstatistik ve Geçerlik-Güvenirlik [Applied Statistics and Validity Reliability]*. Ankara: Detay Publishing; 2016. p. 502–588.
19. Adam M, Leblebici B, Tarım MA, et al. Validation of a Turkish version of the burn-specific health scale. *J Burn Care Res* 2009;30:288–91; discussion 292.
20. Esin NM. *Veri Toplama Yöntem ve Araçları & Veri Toplama Araçlarının Güvenirlik ve Geçerliliği*. 1st ed. İstanbul: NobelTıp Publishing. 2014;193–233.