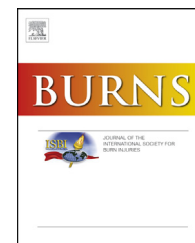


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## Validation of the Italian version of the Burn Specific Health Scale-Brief



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### ABSTRACT

**Introduction:** A growing awareness of psychological and functional impairment due to burns have led to the development of specific instruments to evaluate Quality of Life in this population, such as the Burn Specific Health Scale – Brief (BSHS-B), whose psychometric properties have been consistently verified. The aim of this study was to translate the BSHS-B into Italian and to investigate its reliability and validity.

**Methods:** Translation procedures were carried out according to accepted standards. Internal reliability was assessed using Cronbach's alpha coefficient. Concurrent validity was evaluated through correlations between the BSHS-B and the Short-Form 36 Health Survey (SF-36), the Self-report Clinical Inventory (SCL-90), and the Body Uneasiness Test (BUT).

**Results:** The overall Cronbach's alpha value for the scale was 0.887. Significant correlations were found between the Italian BSHS-B domains, the SF-36 subscales (Spearman's rho: 0.184–0.414), and several SCL-90 subscales (Spearman's rho: –0.173 to –0.477). Furthermore, the affect and relationship domain and the skin domain of the BSHS-B negatively correlated with the compulsive self-monitoring and depersonalization subscales of the BUT.

**Conclusion:** The Italian translation of BSHS-B has shown satisfactory internal consistency, criterion validity, and convergent validity, supporting its application in routine clinical practice as well as in international studies.

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## 1. Introduction

As the advances of medical and surgical techniques have increased survival rates after burns, there has been an increased focus on the psychological *sequelae* of burn trauma, in order to improve the psychological and functional adjustment of this clinical population. It is well known that both psychological and physical consequences of burns (including pain, scars, contractures, and amputations) account for mild

to severe impairment and disability and significantly affect Health Related Quality of Life (HRQoL). Comparison with population controls and clinical groups demonstrated that burn patients perceived a lower overall life satisfaction and HRQoL that is influenced by specific physical and psychological factors such as heat sensitivity, impaired self-care, body image dissatisfaction, and changes in their social and working role [1]. Burn survivors show relevant and persisting problems in home and social integration, experience family difficulties and a lack of social support [2–4]. Furthermore, systematic

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reviews claim that nearly 28–33% of burn patients have not returned to any form of employment after 3 years post-burn [5,6]. Psychiatric complications are a major issue in victims of burn trauma: according to the literature, up to 65% of inpatients burn units experience a variety of psychiatric symptoms including drowsiness, confusion, sleep disturbances, depression, and anxiety [7,8]. Hyper-arousal, avoidance, and re-experiencing of the traumatic events are common symptoms, which often raise the clinical threshold for Acute and Post-Traumatic Stress Disorder (11–25% in the first month post-burn) [1]. Moderate to severe depressive symptoms – such as grief, shame, and social withdrawal – are experienced by 17–33% of in-patients and prevalence of Major Depressive Disorder ranges from 4% during the hospitalization to 10% in the year following discharge [9].

In light of these findings, post-burn HRQoL assessment contributes to improving out-patient aftercare service by recognizing individuals at a higher risk for developing psychological and psychiatric problems and by identifying physical, emotional, and social issues that may benefit from multi-disciplinary rehabilitation programs [10,11]. In response to the lack of a specific tool to evaluate HRQoL in burn survivors, Blades et al. (1979) developed the original Burn Specific Health Scale consisting of 114 items, from which an abbreviated (BSHS-A) [12], a revised (BSHS-R) [13], and a brief version (BSHS-B) [14] were derived. Easiness to administration, sensitivity to burn-related issues, and excellent psychometric properties have made the BSHS the most widely used instrument in clinical practice and research in burn trauma [15,16]. BSHS-B has been translated into several languages including Korean, Chinese, and Persian [17–19], but not Italian. The aim of this study was to translate the BSHS-B into Italian and to investigate its reliability and validity.

## 2. Methods

The study project was approved by the clinical team of the Operative Unit of Plastic Surgery and Burn Therapy of the Civico and Benfratelli Hospital of Palermo (Italy). Possible participants were approached by psychologists and medical residents within 6 months from their admission. All the participants were informed about the study's aims and procedures and then provided their written informed consent. Participants' anonymity was maintained throughout data collection and data analysis. Psychologists and medical residents distributed the self-report questionnaires to the patients and, when needed, assisted them in providing written answer to the questions.

### 2.1. Participants and settings

Study participants were adult burn patients (18–65 years) consecutively recruited from the Operative Unit of Plastic Surgery and Burn Therapy of the Civico and Benfratelli Hospital of Palermo (Italy) from 2010 to 2012. Patients were excluded if they were not fluent in Italian, presented either severe perceptual disabilities or mental retardation, or referred any diagnosis or treatment for major psychiatric or neurological disorders.

## 2.2. Measures

### 2.2.1. The Burn Specific Health Scale-Brief (BSHS-B)

The Burn Specific Health Scale-Brief (BSHS-B) is a widely used instrument to assess quality of life in burn patients [14]. The scale consists of 40 items encompassing nine subscales: simple abilities (3 items), hand function (5 items), work (4 items), body image (4 items), heat sensitivity (5 items), treatment regimens (5 items), affect (7 items), interpersonal relationships (4 items), and sexuality (3 items). Each item describes a particular task or experience that subjects are asked to evaluate on a scale from 0 (extreme) to 4 (not at all). A recent factor analysis [11,20] showed that, with the exception of work, all the above subscales can be grouped into three domains: the function domain (simple abilities and hand function), the skin sensitivity domain (body image, heat sensitivity, and treatment regimen), and the affect and relationship domain (affect, interpersonal relationship, and sexuality). Mean scores were calculated for each of the nine subscales and for the three domains. Consistently with other HRQoL scales, lower scores of the BSHS correspond to a worse quality of life.

Translation procedures were carried out according to accepted standards [21,22]. The original English version was forward-translated by two independent translators, an English translator and a psychiatric nurse fluent in English, who agreed on a final Italian translation. This first Italian version was independently back-translated in English by another translator and by a psychologist fluent in English with experience in HRQoL research, who, in turn, agreed on a final English back-translation. The Italian translation and the English back-translation were then reviewed by a multi-disciplinary committee composed by a professor of Psychiatry, a psychologist with experience in burn care unit, a physician, and a psychologist. The English back-translation was compared to the original version in order to detect any misinterpretation and ambiguity; the two versions were found to be reasonably similar. Furthermore, the Italian translation was compared to the original one to ensure conceptual equivalence and improve understandability. Minor amendments were made to the sexuality subscale: to render the question less embarrassing for patients, the item 21 was worded as “I feel frustrated because I cannot be sexually active (original: aroused) as I used to”; the item 23 was changed into “I no longer hug, hold the hand (original: hold), or kiss” as there is no real difference in the Italian language between hugging and holding. In addition, “tying shoelaces, bows...” in item 6 was modified in “tying shoelaces, necktie...” to provide another example of the same hand function. Eventually, a pilot study was conducted with 10 out-patients, using the probe method. Patients were asked whether they considered any of the items challenging, annoying, or irrelevant and were asked to put one item for each subscale in their own words. The Italian translation of BSHS-B showed adequate face validity.

### 2.2.2. The Short-Form 36 Health Survey (SF-36)

The SF-36 [23,24] was included in the study protocol to evaluate criterion validity. SF-36 is the most widely used

self-report questionnaire in the evaluation of the impact of a variety of diseases and treatments on HRQoL. The 36 items encompass eight subscales: (1) limitations in physical activities because of health problems (10 items); (2) limitations in usual role activities because of physical health problems (4 items); (3) limitations in usual role activities because of emotional problems (4 items); (4) bodily pain (2 items); (5) general mental health (psychological distress and well-being) (5 items); (6) limitations in social activities because of physical or emotional problems (2 items); (7) vitality (energy and fatigue) (4 items); and (8) general health perceptions (5 items). Subscale scores are transformed into a 0–100 scale, where lower scores refer to worse HRQoL.

### 2.2.3. The Self-Report Clinical Inventory (SCL-90)

The SCL-90 [25,26] was administered to evaluate convergent validity. SCL-90 is a 90-items questionnaire which is used to assess presence and severity of psychopathological symptoms in general medicine settings. Questions refer to symptoms that occurred during the previous week and are grouped into nine subscales: obsessivity–compulsivity (10 items), interpersonal sensitivity (9 items), depression (13 items), anxiety (10 items), rage–hostility (6 items), somatization (12 items), phobic anxiety (7 items), paranoid ideation (6 items), and psychoticism (10 items). All items are scored on a 0 (not at all) to 4 (severely) scale and averaged to get subscales scores. Higher scores correspond to severe or highly frequent symptoms.

### 2.2.4. The Body Uneasiness Test (BUT)

The BUT [27,28] was also administered to evaluate convergent validity. The BUT is a self-report questionnaire that is used to evaluate body image dissatisfaction in the general population. The 34 items cover five subscales: weight phobia (8 items), body image concerns (9 items), avoidance (6 items), compulsive self-monitoring (6 items), and depersonalization (5 items). For the purpose of this study, the first subscale (weight phobia) was not computed. Items are scored on a 0 (never) to 4 (always) scale and higher scores correspond to higher dissatisfaction.

### 2.2.5. Demographic

In addition to the above, socio-demographic and clinical information was collected for every patient.

## 2.3. Psychometric documentation

### 2.3.1. Reliability

The internal consistency of the Italian BSBS-B was assessed for each sub-scale and domain, as well as for the overall scale.

### 2.3.2. Validity

Concurrent validity was evaluated as criterion validity and convergent validity. For criterion validity, SF-36 was chosen as the gold standard measure for HRQoL and correlations with the Italian BSBS-B domains were analyzed. Since it is recognized that a poor HRQoL after-burn is associated with psychopathological symptoms (particularly, anxiety and depression) and body image dissatisfaction, correlations between SCL-90, BUT, and the Italian BSBS-B domains were analyzed to evaluate convergent validity.

## 2.4. Data analyses

Analyses were carried out by using SPSS ver. 18. Cronbach's alpha was calculated for each subscale, domain, and for the overall scale, to assess internal consistency. Spearman's correlation coefficient was used to evaluate convergent validity between the Italian BSBS-B domains and the SF-36, the SCL-90, and the BUT subscales. There was a limited amount of missing items in the Italian BSBS-B as well as in the questionnaires used for concurrent validity (less than 10% of missing values in each instrument). To calculate the Cronbach's alpha values, these items were excluded listwise. The same procedure was used to calculate the mean subscale scores of the BSBS-B and the other questionnaires.

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## 3. Results

### 3.1. Sample description

Of 141 potential participants, 10 (7.1%) were excluded from the study because of self-reported pre-burn psychiatric diseases. There were no differences between participants and non-participants in terms of gender, age, level of education, occupational status, total burn surface area (TBSA), presence of full-thickness burns, and presence of hand or face burns. The final sample consisted of 32 (24.4%) in-patients and 99 (75.6%) out-patients. Sixty-nine (52.7%) of the participants were male, 73 (55.7%) had 8 years of education, 90 (68.7%) were employed at the time of the injury, 35 (26.7%) were unemployed, 6 (4.6%) were students or retired. The mean age was 40.21 years (SD = 12.33). 26 (19.8%) subjects were victim of a job accident while 78 (59.5%) were burnt at home, 12 (9.2%) in the street, and 15 (11.5%) in other places, such as in the countryside. The majority of burns were thermal injuries, 64 (49.0%), 56 (42.7%) were scalds while only 11 (8.3%) were caused by chemicals. The mean TBSA was 16.80 (SD = 12.20), 81 (61.8%) patients had either hand or face burns, and 17 (13.0%) had full thickness burns.

### 3.2. Reliability

Cronbach's alpha coefficients for the Italian BSBS-B subscales ranged from 0.656 for sexuality to 0.905 for work. Coefficients for all three domains were higher than 0.8. The overall alpha value for the scale was 0.887 (Table 1).

### 3.3. Criterion validity

Several significant correlations were found between the Italian BSBS-B domains, the work subscale, and the SF-36 subscales with Spearman's coefficients ranging from 0.184 to 0.414. Particularly, the skin involvement domain and the affect and relationship domains of the Italian BSBS-B were significantly associated with the bodily pain, mental health, social functioning, and general health of the SF-36. By contrast, the function domain correlated with the physical functioning and the physical role limitations subscales of the SF-36 (Table 2).

**Table 1 – Internal consistency reliability for the Italian BSHS-B.**

Italian BSHS-B	N	Items	Cronbach's alpha
Total score	121	40	0.887
Function domain	129	8	0.801
Simple abilities	130	3	0.713
Hand function	130	5	0.888
Skin involvement domain	126	14	0.837
Body image	130	4	0.739
Heat sensitivity	128	5	0.900
Treatment regimens	130	5	0.825
Affect and relationship domain	131	14	0.886
Affect	131	7	0.867
Interpersonal relationships	131	4	0.810
Sexuality	131	3	0.656
Work	128	4	0.905

### 3.4. Convergent validity

The Italian BSHS-B overall score showed mild to moderate negative correlations with all the SCL-90 subscales but paranoid ideation, suggesting that the lower the QoL is, the higher the frequency and severity of psychopathological symptoms are. The lowest Spearman's rho coefficient was for obsessivity-compulsivity ( $\rho = -0.173, p = 0.048$ ) while the highest was for depression ( $\rho = -0.477, p < 0.001$ ). The SCL-90 subscale had multiple correlations with the skin involvement and the affect and interpersonal relationship domain, while no correlation was found with the function domain.

Significant negative correlations were found between the BUT subscales and the skin involvement domain and the affect and relationship domain of the Italian BSHS-B, confirming the role played by body image dissatisfaction in

**Table 2 – Criterion validity for the Italian BSHS-B: correlation with the SF-36 subscales (Spearman's rho coefficient).**

SF-36	Italian BSHS-B			
	Function domain	Skin involvement domain	Affect and relationship domain	Work subscale
Physical functioning	0.404**	0.107	0.209 <sup>†</sup>	0.202*
Physical role limitations	0.278**	0.108	0.165	0.414**
Emotional role limitations	0.028	0.046	0.097	-0.054
Bodily pain	0.146	0.376**	0.212 <sup>†</sup>	0.217*
Mental health	0.121	0.274**	0.238**	0.206*
Social functioning	0.040	0.213 <sup>†</sup>	0.184 <sup>†</sup>	0.128
Vitality	0.101	0.159	0.208*	0.285**
General health	0.065	0.204 <sup>†</sup>	0.252**	0.102

<sup>†</sup> p value <0.05.  
<sup>\*\*</sup> p value <0.01.

**Table 3 – Convergent validity for the Italian BSHS-B: correlation with the SCL-90 and the BUT subscales (Spearman's rho coefficient).**

SCL-90	Italian BSHS-B			
	Function domain	Skin involvement domain	Affect and relationship domain	Work subscale
Obsessivity-compulsivity	-0.126	-0.226**	-0.173 <sup>†</sup>	-0.067
Interpersonal sensitivity	-0.096	-0.224*	-0.298**	-0.046
Depression	-0.156	-0.343**	-0.477**	-0.190*
Anxiety	-0.105	-0.282**	-0.272**	-0.105
Rage-hostility	-0.165	-0.201 <sup>†</sup>	-0.234**	-0.011
Somatization	-0.140	-0.200 <sup>†</sup>	-0.092	-0.105
Phobic anxiety	-0.151	-0.154	-0.198*	-0.142
Paranoid ideation	-0.037	-0.130	-0.234**	0.013
Psychoticism	-0.100	-0.121	-0.350**	-0.047
<b>BUT</b>				
Body image concerns	-0.154	-0.131	-0.226**	-0.052
Avoidance	-0.116	-0.074	-0.067	0.074
Compulsive self-monitoring	-0.085	-0.236**	-0.280**	-0.016
Depersonalization	-0.151	-0.239**	-0.240**	-0.089

<sup>†</sup> p value <0.05.  
<sup>\*\*</sup> p value <0.01.

modulating post-burn quality of life. Specifically, both domains were related with the compulsive self-monitoring and depersonalization subscales, while the affect and relationship domain additionally correlated with the body concerns subscales (Table 3).

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#### 4. Discussion

The Italian BSHS-B showed good internal consistency, with Cronbach's alpha coefficients above 0.9 for the total score and above 0.8 for the three domains. Particularly, the overall scale coefficient of 0.89 demonstrated a good homogeneity of our translation that is slightly lower than the Chinese (0.97) and the Persian (0.95) translations [18,19]. In addition, all subscales but sexuality, presented Cronbach's alpha coefficients between 0.71 and 0.91. These results are consistent with the original paper [14] as well as with other translations of the BSHS-B [18,19], which found that sexuality had a lower alpha value than the other subscales. Notably, both in the Persian and the Chinese adaptation sexuality alpha values were lower than 0.7. However, it cannot be excluded that the lower alpha value was an effect of the amendments made to the translation of this subscale.

The correlations between the Italian BSHS-B and the criterion measure, the SF-36, were in the expected direction and, largely, in the expected distribution: as indicated by Willebrand and Kildal [20], the function domain was significantly associated with the physical aspects of quality of life (i.e. physical functioning and physical role limitations subscales of SF-36), while the skin involvement and the affect and relationship domains correlated with the bodily pain and the mental aspects of HRQoL (social functioning, mental health, and vitality). This suggests that the Italian BSHS-B describes a construct of HRQoL that reasonably overlaps with that assessed by the SF-36.

On the other hand, these correlations were less strong than those expected from the previous study [20] evaluating the relationship between the BSHS-B domains and the SF-36 at 6 months post-burn (0.4–0.5). Similarly, another study [29] found moderate to strong correlations (0.4–0.6) between the overall BSHS-B score and the SF-36 subscales in a sample of mainly ambulatory patients assessed at the same time interval. The discrepancies between our and their results should be better investigated by further studies. It might be influenced by different characteristics of the samples or might reflect a lack of power due to inadequate sample size.

By examining the relationships between the Italian BSHS-B and the symptoms subscales of the SCL-90, we observed that lower scores in the skin involvement and the affect and relationship domains were associated with more severe and frequent symptoms of depression, anxiety, interpersonal sensitivity, and hostility, and – to a minor extent – to severe symptoms of delusional ideation or hallucinations. By contrast, such a relationship was not found with the function domain and the work subscale. Associations between poor HRQoL at BSHS and anxiety and depression symptoms are well documented by the literature, both in the early and late course of burns. In the above mentioned paper by Willebrand and Kildal [20] the anxiety and depression score of the Hospital Anxiety and Depression Scale negatively correlated with the skin involvement and the affect and relationship domains

and, less strongly, with the function domain and the work subscales. Furthermore, in a Korean sample of hospitalized burn patients assessed two months after the burn trauma, the Center for Epidemiologic Studies Depression Scale (CES-D) correlated with all BSHS-B subscales, particularly with affect, body image, treatment regimens and heat sensitivity [30]. Similarly, in another sample of Brazilian out-patients assessed within 1 year from injury, the Beck's Depression Inventory (BDI) showed strong correlations with the affect and body image domain and the interpersonal relationship domain of BSHS-R [31]. In both studies, simple abilities and work had the lowest correlations with depression. Compared to these three studies, we found similar negative correlations between depression, anxiety, and the BSHS subscales related to interpersonal relationship, affect, and body image. However, the magnitude of these relationships was lower than that observed by them. As per before, the different results might be influenced by different characteristics of the samples or insufficient power. Furthermore, it might be speculated that the weaker correlation between health-related quality of life, anxiety, and depression is due to the use of SCL-90, a generic instrument for assessing psychiatric symptoms, rather than the more specific HADS, CES-D, and BDI scales. Indeed, looking at the correlations between the SF-36 subscales and the anxiety and depression score of SCL-90 we found a similar effect size (ranging from –0.191 to –0.424).

With regards to body image dissatisfaction, we found that the skin involvement and the affect and relationship domains negatively correlated with the body concerns, compulsive self-monitoring, and depersonalization subscales of the BUT, indicating that a poor HRQoL is associated with persistent worries, feelings of shame and embarrassment, and perception of self-estrangement or self-detachment. Previous studies showed that clinically significant body image dissatisfaction was associated with lower scores in both the mental and the physical subscales of SF-36 [32] and predicted psycho-social functioning at 12 months post-discharge, mediating the effect of gender, TBSA, and pre-burn quality of life [33].

In summary, the Italian translation of BSHS-B has shown satisfactory internal consistency, and acceptable criterion and convergent validity, supporting its application in routine clinical practice as well as in international studies. Nevertheless, the study presents several limitations such as the limited sample size and the heterogeneity of the sample, which is comprised of both in-patients and out-patients with various severities of burns. In addition, the short interval between the time of injury and the assessment might have artificially reduced the impact of burn on quality of life. Therefore, further studies are needed to confirm the psychometric properties of the Italian BSHS-B.

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None.

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#### Contributors

LS and DLB designed the study. ADP coordinated the data collection. AB, AP, AB, and CRC administered and scored the

questionnaires. LS undertook the statistical analyses and wrote the first draft of the paper. DLB methodologically revised the paper. All the authors contributed to and approved the final paper.

### Conflict of interest

None.

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