

Assessment of health-related quality of life in the first year after burn*

Avaliação da qualidade de vida relacionada à saúde no primeiro ano após a queimadura
Evaluación de calidad de vida relacionada con la salud en el primer año después de la quemadura

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ABSTRACT

Objective: To compare the perception of quality of life for burn victims between the 4th and 6th and between the 9th and 12th months after hospital discharge, according to gender, body surface burned and visibility of scars. **Methods:** A longitudinal study. The study participants were adults admitted to a burn unit. A socio-demographic data form and the Medical Outcomes Study 36-Item Short-Form Survey were applied. **Results:** There was an improvement in the perception of quality of life, highlighting the domains: *Role physical* and *Role emotional*. Men showed better results in the domain Bodily pain; and also those who classified their scars as not visible in the domains: *General Health*, *Vitality*, *Social Functioning* and *Role emotional*, between the 9th and 12th month. **Conclusion:** Patients reported worse quality of life at an early phase and improvement in a late phase, mainly in the domains of *Role physical* and *Role emotional*, among men. The visible scars represented negative rating in the late phase.

Keywords: Burns; Adult; Quality of Life; Rehabilitation.

RESUMO

Objetivo: Comparar a percepção de qualidade de vida de vítimas de queimaduras entre o 4^o e 6^o mês e entre o 9^o e 12^o mês após a alta hospitalar, de acordo com o sexo, superfície corporal queimada e visibilidade das cicatrizes. **Métodos:** Estudo longitudinal. Participaram adultos internados em uma unidade de queimados. Foram aplicados formulário de dados sociodemográficos e o *Medical Outcomes Study 36-Item Short-Form Survey*. **Resultados:** Houve melhora na percepção da qualidade de vida, destacando-se os domínios *Aspecto físico e emocionais*. Os homens apresentaram melhores resultados no domínio *Dor*; e aqueles que classificaram suas cicatrizes como não visíveis nos domínios *Estado geral de saúde*, *Vitalidade*, *Aspecto social e Emocional* entre o 9^o e 12^o mês. **Conclusão:** Pacientes relataram pior qualidade de vida em fase precoce e melhora em fase tardia, principalmente no domínio *Aspecto físico e emocional* entre os homens. As cicatrizes visíveis representaram avaliação negativa na fase tardia.

Palavras-chave: Queimaduras; Adultos; Qualidade de Vida; Reabilitação.

RESUMEN

Objetivo: Comparar la percepción de calidad de vida de víctimas de quemaduras entre el 4^o e 6^o y entre el 9^o y 12^o mes después del alta, y sus diferencias según sexo, superficie corporal quemada y visibilidad de la cicatriz. **Métodos:** Estudio longitudinal. Participaron adultos internados en una Unidad de Quemados. Aplicado formulario de datos sociodemográficos y el *Medical Outcomes Study 36-Item Short-Form-Survey*. **Resultados:** Huvo mejora de la percepción de calidad de vida, destacándose Aspectos físicos y Emocionales. Los hombres presentaron mejores resultados en el dominio Dolor; y los que clasificaron sus cicatrizes como no visibles en los dominios Estado general de salud, Vitalidad, Aspecto social y Emocional entre el 9^o e 12^o mes. **Conclusión:** Pacientes relataron peor calidad de vida en la fase precoz y mejor en la fase tardía, principalmente en los dominios Aspecto físico e emocional, entre los hombres. Las cicatrizes visibles representan evaluación negativa en la fase tardía.

Palabras clave: Quemaduras; Adultos; Calidad de Vida; Rehabilitación.

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INTRODUCTION

The number of cases of burns has aroused the interest of many health professionals concerned about the prevention of this type of trauma and the reduction sequelae¹.

The effectiveness of acute treatment of burned individuals reflects in the increase of people who survive these accidents, higher rates of sequels and reconstructive surgeries. Specialized services serving the burned person play an important role in the social reintegration process^{2,3}.

After hospital discharge, most victims report changes in social roles and interpersonal relationships, especially in the first year. These changes are evidenced by the absence from work and perception of change of the behavior of people close due to scars and bodily changes caused by the burn⁴.

The physical, psychological and psychosocial manifestations may compromise the quality of life of burned patients⁵. Emotional problems and the severity of the burn are important factors that can impair the quality of life over time⁶.

The concept of quality of life has been the subject of extensive discussions and referred to as quality of life - QL (encompassing a more generic concept), health-related quality of life - HRQOL (covering concepts related to health, illness and health care) or health status (relating to the physical condition which reflects the exact state of the patient)^{7,8}. In general, the concept of QL encompasses a wide and multidimensional assessment of areas related to physical, psychological and social aspects^{7,8}. For this reason, during evaluation, in addition to the concept, the chosen instrument contributes to the contextualization of the theme under study⁹, that is, it must accompany the concept used.

In burned patients, authors^{5,6,10-12} define HRQOL as the health status related to responsiveness and adaptation to changes resulting from trauma, considering the individual, family and social aspects.

The early identification of possible complicating factors of care and rehabilitation process has contributed to the interest in the proposal. The use of tools such as scale or generic questionnaires to assess burn victims of HRQOL aids in the information reliability for clinical practice, having as an advantage the comparison to other populations⁸.

When evaluating the HRQOL of burn victims for 18 months after hospital discharge, authors¹⁰ have identified improvement in all the domains of the quality of life scale, as well as the basic and usual activities, such as self-care and mobility between the first and third month after hospital discharge. However, 18 months after discharge, patients still reported pain and discomfort as their main problems. A comparison of individuals who have suffered burns and the assessment of China's general population, burn victims over two years of the trauma showed lower values for the domains *physical functioning* and *role limitations* due to physical problems and pain. In addition, emotional changes contributed negatively to the evaluation of social aspects and performance of social roles among the victims of burns¹¹.

Characteristics such as gender, burned surface area (TBSA) and pain are involved with physical or emotional health problems, and make the HRQOL assessment complex and individual^{5,6,11-13}.

Regarding the assessment of changes in health status, authors report that the main complaints of the victims described in the literature are related to skin sensitivity to heat, body image and work. These are the main reasons for the negative evaluations. In addition, aspects which occurred before the burn and identified during the first year after the fact would impact on the health of burned patients after several years¹⁴. The pre-existence of mood disorders such as depression and post-traumatic stress, are presented as long-term health predictors in patients with burns. The significant improvement in health after a burn can be expected after two years¹⁴.

In a recent study on the health status of Brazilian burn victims, the authors reported that during the six months following hospital discharge they were in good health. However, depression, anxiety, post-traumatic stress disorder and clinical variables such as length of hospital stay, number of surgeries and TBSA were negatively associated with the perceived health status¹⁵.

It is noteworthy that the evaluation of responsiveness and adaptation to changes after the accident with burns, in this case HRQOL, allows the obtainment of greater insight into these changes. Early detection of the difficulties faced by people who have suffered burns during the rehabilitation process would allow the healthcare team, especially nurses, to plan targeted care to obtain better results. Thus, essentially subjective manifestations can be turned into objective data which, in turn, lead to concrete actions and effective care.

In Brazil, few studies have been done addressing HRQOL or health status of the burn victims. All of these studies were cross-sectional design studies, using a generic scale to assess HRQOL^{16,17} and a specific scale¹⁸ to assess the health status of the burn victims.

For these reasons, the aims of this study were to explore the association of the variables gender, TBSA and visibility of scars with the perception of HRQOL evaluated over time and compare two HRQOL perception measures of the burn victims, obtained between the 4th and 6th month (M1) and between 9th and 12th months (M2) after hospital discharge.

METHODS

This is a quantitative approach study, of the longitudinal type, performed in the ambulatory of the Burn Unit of the Hospital das Clínicas, Ribeirão Preto Medical School, University of São Paulo (UQ-FMRP-USP), after obtaining the approval of the Ethics and Research Committee's of the Hospital where the study was conducted (reference: 11571/2003).

The proposal for a longitudinal study to measure HRQOL, allows comparisons between the results obtained on more than one occasion, that is, identify the variation in more than one measure and over time¹⁹.

The study included subjects older than 18 years, of both sexes, who were hospitalized at the UQ-FMRP-USP, were in the first two weeks after the occurrence of the burn and who presented conditions for participating according to time, space and people guidelines.

Patients who had evident cognitive difficulty to understand the applied instruments or who were in acute conditions of mood state changes or psychiatric diagnoses did not participate in the study, as well as those who had been hospitalized after the second week of the burn event, since they would have gone through the "acute rehabilitation phase" in which the most painful procedures such as bathing, dressings and skin grafting are carried out.

Data were collected through the application of a form for sociodemographic data collection and clinical developed for this study. It included the identification of data subjects (date of birth/age, sex and education) and on the burn (burn day, admission date, etiologic agent, the accident site, TBSA and affected body regions) and the perception of a visible scar. We also used the generic, multidimensional questionnaire Medical Outcomes Study 36 - Item Short-Form Health Survey (SF-36) - Brazilian version²⁰ to assess the HRQOL, consisting of 36 items, which are divided into eight domains: *Physical functioning*, *Role-physical*, *Bodily pain*, *General health*, *Vitality*, *Social function*, *Role emotional* and *Mental health*. The values for each domain range from zero to one hundred (zero: the worst health status and a hundred: the best of health status)²⁰. Each item is answered based on Likert scale. The standardized score for each domain can range from zero to 100, where zero represents the worst state of health of the individual and 100, the best state of health.

This questionnaire has been used (English version) to evaluate the health related quality of life and physical functioning of burn victims²¹. The Brazilian version features good reliability when used for measuring HRQL in critically ill patients prior to admission in the intensive care unit (> 0.70)²².

The subjects interviewed individually were 91 adult patients treated at UQ-FMRP-USP from June 2005 to March 2009, who agreed to participate in the study, met the inclusion criteria, and signed the informed consent form (IC). In the case of participants who had some difficulty in completing the questionnaires (such as visual impairment or motor of the hand, or to learn to read and/or write), one of the researchers helped in completing the instruments. For this, the researcher performed the reading of the question and its response options for three times; afterwards he would record the option chosen by the patient in the corresponding Likert scale questionnaire.

The patients were informed about and included in the study during the first days of hospitalization for treatment for burns. Immediately after hospital discharge, in addition to routine appointments at the outpatient unit, meetings were scheduled for follow-up corresponding to the period between the 4th and 6th month (M1) and between 9th and 12th months (M2) after hospital discharge. In situations where a patient did not attend the service,

he was contacted by telephone and via had another meeting scheduled. After three attempts with no return, it was considered participant's loss.

Of the 91 participants interviewed during the first measurement (M1), 18 did not complete the second measurement due to change of address, telephone or city; death and no show after three interview attempts.

Data were analyzed using the Statistical Package for the Social Sciences SPSS version 18.0 for Windows (IBM Corporation, Armonk, NY, 2011), with descriptive analyzes for all variables. Due to the fact that the various subscales and scores of the domains of SF-36 significantly differ from a normal distribution, we proceeded to the non-parametric analysis of both measures (M1 and M2) using the Wilcoxon test, in which the average values were classified as: negative (decrease in scores between M1 and M2), positive (increase in scores between M1 and M2) and draw (amounts held in M1 and M2). To explore whether the HRQOL variable differed according to sex, TBSA and burn visibility the Mann Whitney test was carried out. For all situations, the significance level was 0.05.

In order to supplement information on the change of the scores obtained for the two measures (4th and 6th month and 9 and 12 months after hospital discharge) during the first year after burning, the effect size with the following classifications was evaluated: small ($r = 0.10$), medium ($r = 0.30$) and large ($r = 0.50$)²³ and the correlation coefficients obtained (M1 and M2) were classified as follows: values < 0.30 , weak correlations; between 0.30 and 0.50, moderate correlations and > 0.50 , strong correlations²⁴.

Covariance analysis (MANCOVA) were performed to examine differences in the HRQOL controlling the influence of the variables *sex*, *scar visibility* and *TBSA* (covariables), in the domains SF-36 in M1 and M2. These analyzes were performed as, in the analysis of residues, data distribution was normal.

RESULTS

Study participants were 73 individuals (18 women and 55 men) who completed both measures (between the 4th and 6th months and between the 9th and 12th months).

The subjects had a mean age of 35.2 years (SD: 12.9) and were receiving outpatient treatment. According to the level of education, it is emphasized that 35 (45.2%) had completed high school (over 10 years of education) and 24 (32.9%) had incomplete first degree (less than seven years of schooling). The average TBSA was 17% (SD: 12.44), and 75% of subjects had less than 20% TBSA (Table 1).

Among the etiologic agents, alcohol and flammable products appeared in 46 cases (63.7%), burns by electricity in 12 (16.4%) and the overheated liquid in nine (12.3%). Most of the accidents occurred at home ($n = 40$; 58.4%). The most affected body areas were upper limbs ($n = 62$; 84.9%) and torso ($n = 49$; 67.1%), but many of the participants had more than one area of the body burnt (Table 1).

Table 1. Sociodemographic characteristics and related trauma burn (n = 73), Ribeirão Preto, 2009

Variable/Measures	n (%)	Mean (SD)	Median (variation)
Sex			
Female	18 (24.7)		
Male	55 (75.3)		
Age (years)		35.2 (12.9)	33.0 (16-70)
Education level			
≤ primary school	37 (50.7)		
≥ high school diploma	30 (41.1)		
higher grade	6 (8.2)		
Accident location			
Home	40 (54.8)		
Work	26 (35.6)		
Recreation/out of home	7 (9.6)		
Burn etiology			
Alcohol/flammable	46 (63.0)		
Electrical	12 (16.4)		
Scalds	9 (12.3)		
Hot surfaces	3 (4.1)		
Chemical	1 (1.4)		
TBSA (%)		17.0 (12.4)	14.0 (1-60)
≤ 20	52 (71.2)		
> 20	21 (28.8)		
Body burn area			
Head/face/neck	42 (57.5)		
Front/back chest	49 (67.1)		
Upper limbs	62 (84.9)		
Lower members	35 (47.9)		
Buttocks/genitals	12 (16.4)		

Regarding the perceived HRQOL, there was no statistically significant difference for all the domains of the SF-36, and there was an improvement in the evaluations carried out between 9th and 12th months (M2) compared to those between the 4th and the 6th month (M1). This distinction was evidenced by the greater number of positive changes in M2 (Table 2). The size of the effect in the change of scores between M1 and M2 ranged from 0.21 to 0.79. A large effect size was identified for the domains *Physical functioning* ($r = 0.55$), *Role physical* ($r = 0.60$), *Bodily pain* ($r = 0.59$) and *Role emotional* ($r = 0.79$) and average effect for *general health status* ($r = 0.32$), *Vitality* ($r = 0.24$), *Social functioning* ($r = 0.28$) and *Mental health* ($r = 0.21$) (Table 2).

There were positive and statistically significant changes (higher values) for the domains *Physical functioning* ($n = 26$; $p < 0.00$), *Role physical* ($n = 19$; $p < 0.01$), *Bodily pain* ($n = 31$;

$p < 0.00$), *General health* ($n = 26$; $p < 0.03$), *Social functioning* ($n = 6$; $p < 0.04$) and *Role emotional* ($n = 28$; $p < 0.00$) among the patients who showed TBSA lower than 20% and *Physical functioning* ($n = 13$; $p < 0.01$), *Role physical* ($n = 13$; $p < 0.00$), *Bodily pain* ($n = 14$; $p < 0.00$) *Vitality* ($n = 13$; $p < 0.01$) and *Role emotional* ($n = 13$; $p < 0.00$) in patients with TBSA greater than 20% (Table 3).

Individuals who reported their scars as visible presented significant statistical changes for the domains *Physical functioning* ($n = 27$; $p = 0.00$), *Role physical* ($n = 21$; $p = 0.00$) and *Bodily pain* ($n = 26$; $p = 0.00$) in the two measurements (M1 and M2). Among the subjects who reported their scars as not visible, only the domain *Mental health* was not statistically significant ($n = 16$; $p = 0.45$). Finally, for positive changes to the variable gender, the values of the eight domains were statistically significant for women (Table 3).

Table 2. Mean values, dispersion and changes in HRQOL when compared the values of the SF-36 applied between 4th to 6th (M1) and between 9th and 12th (M2) months after the occurrence of the burn (n = 73), Ribeirão Preto, 2009

Values Domains	Mean Rank	SD	Median	Min-Max	Changes in scores *	n	z	p*	Effect size **
Physical function_M1	73.8	26.2	80.0	0-100	Negative	12	-4.55	0.00	0.55
Physical function_M2	87.1	16.2	90.0	10-100	Positive	39			
					Ties	22			
Role physical_M1	35.3	42.5	0.0	0-100	Negative	10	-3.98	0.00	0.60
Role physical_M2	61.6	44.9	100.0	0-100	Positive	32			
					Ties	31			
Bodily pain_M1	60.8	27.1	62.0	0-100	Negative	11	-4.51	0.00	0.59
Bodily pain_M2	76.3	26.2	84.0	10-100	Positive	45			
					Ties	17			
General health_M1	75.5	17.8	72.0	32-100	Negative	15	-2.93	0.00	0.32
General health_M2	81.4	18.9	87.0	5-100	Positive	39			
					Ties	19			
Vitality_M1	73.0	20.3	75.0	15-100	Negative	18	-2.46	0.01	0.24
Vitality_M2	77.6	19.0	85.0	15-100	Positive	40			
					Ties	15			
Social functioning_M1	72.4	24.7	75.0	0-100	Negative	14	-2.43	0.01	0.28
Social functioning_M2	79.5	25.8	87.5	0-100	Positive	36			
					Ties	23			
Role emotional_M1	46.6	44.7	33.3	0-100	Negative	5	-4.92	0.02	0.79
Role emotional_M2	78.5	35.7	100.0	0-100	Positive	34			
					Ties	34			
Mental health_M1	71.4	22.3	72.0	8-100	Negative	22	-2.41	0.02	0.21
Mental health_M2	76.1	22.3	80.0	8-100	Positive	43			
					Ties	8			

* Changes in HRQOL (SF-36) when compared both measures (M1 and M2); ** Effect size between M1 and M2 † $p < 0.05$.

In the analysis of the relationship between M1, M2 and the percentage of TBSA assessed on admission, there was a positive and statistically significant correlation between the domains of M1 *Physical functioning*, *Bodily pain*, *Vitality*, *Social functioning* and *Role emotional* to most areas of M2, not having significant relationship between the domains of the SF-36 and the TBSA (Table 4).

The HRQOL measures were analyzed using multivariate effect (MANCOVA) and are controlled to the study of random influence of the variables sex, TBSA and visibility of scars reported by patients.

Comparing the values of M1 and M2 of the domains of the SF-36, with the covariates sex and visibility of the scar reported by the patient, the domains were presented as positive coefficients with each other, that is, in our sample, the values shown in M1 (4th to 6th months) positively affected the amounts reported in the areas of M2 (9th to 12th months) (Table 5).

Regarding the covariables, sex had positive and statistically significant coefficients in the change of the *Bodily pain* domain values ($p < 0.03$), suggesting that during the first year after burn men showed a significant decrease in pain, compared with women. As for the *visibility of the scar*, the coefficients were negative for the domains *General health* ($p < 0.02$) and *Vitality* ($p < 0.02$), suggesting that patients who reported their visible scars on the M1 would present deterioration in the perception of the same M2. On the other hand, the TBSA covariate was found negative for the domains *Bodily pain* and *Social functioning*, that is, the higher the TBSA, the greater the pain (Table 5).

DISCUSSION

The present study sought to understand the perception of health status of burn victims who were in outpatient care between the 4th and 6th months and between the 9th and 12th months after

Table 3. Difference between the SF-36 mean values when applied between 4th to 6th (M1) and 9th between 12th (M2) according total burn surface area (TBSA) and scars considered visible for patients (n = 73), Ribeirão Preto, 2009

Measures Domains	Changes in scores*	TBSA		Visible scars		Sex	
		< 20 (n = 52)	> 20 (n = 21)	Yes (n = 48)	No (n = 25)	Female (n = 18)	Male (n = 55)
Physical function _M1	Negative	10	2	10	2	6	6
Physical function _M2	Positive	26	13	27	12	6	36
	Ties	16	6	11	11	6	16
<i>z</i>		-3.66	-2.70	-3.45	-3.02	-0.83	-4.53
<i>p</i>		0.00	0.01	0.00	0.00	0.41	0.00
Role physical _M1	Negative	8	2	8	2	4	6
Role physical _M2	Positive	19	13	21	11	5	27
	Ties	25	6	19	12	9	22
<i>z</i>		-2.66	-3.15	-2.95	-2.92	-0.72	-3.88
<i>p</i>		0.01	0.00	0.00	0.00	0.47	0.00
Bodily pain _M1	Negative	7	4	9	2	5	6
Bodily pain _M2	Positive	31	14	26	19	9	36
	Ties	14	3	13	4	4	13
<i>z</i>		-3.62	-2.72	-3.02	-3.45	-1.01	-4.62
<i>p</i>		0.00	0.01	0.00	0.00	0.32	0.00
General health _M1	Negative	9	6	14	1	3	12
General health _M2	Positive	26	13	20	19	10	29
	Ties	17	2	14	5	5	14
<i>z</i>		-2.19	-1.89	-0.85	-3.33	-0.88	-2.84
<i>p</i>		0.03	0.06	0.40	0.00	0.38	0.00
Vitality _M1	Negative	17	1	15	3	7	11
Vitality _M2	Positive	27	13	23	17	8	32
	Ties	8	7	10	5	3	12
<i>z</i>		-1.25	-2.74	-0.85	-3.05	-0.23	-2.83
<i>p</i>		0.21	0.01	0.39	0.00	0.82	0.01
Social functioning _M1	Negative	10	4	12	2	3	11
Social functioning _M2	Positive	26	10	21	15	10	26
	Ties	16	7	15	8	5	18
<i>z</i>		-2.06	-1.32	-1.02	-2.70	-0.88	-2.19
<i>p</i>		0.04	0.18	0.31	0.01	0.38	0.03
Role emotional _M1	Negative	3	2	3	2	3	2
Role emotional _M2	Positive	21	13	24	10	7	27
	Ties	28	6	21	13	8	26
<i>z</i>		-3.9	-2.89	-4.22	-2.56	-1.79	-4.41
<i>p</i>		0.00	0.00	0.12	0.05	0.07	0.00

Continued Table 3.

Measures Domains	Changes in scores*	TBSA		Visible scars		Sex	
		< 20 (n = 52)	> 20 (n = 21)	Yes (n = 48)	No (n = 25)	Female (n = 18)	Male (n = 55)
Mental health_M1	Negative	16	6	15	7	6	17
Mental health_M2	Positive	30	13	27	16	11	32
	Ties	6	2	6	2	2	6
<i>z</i>		-1.84	-1.53	-1.54	-2.00	-1.17	-2.12
<i>p</i>		0.06	0.12	0.12	0.45	0.24	0.03

p < 0.05; * Changes in HRQOL (SF-36) when compared both measures M1 (4th - 6th month) and M2 (9th - 12th month).

Table 4. Correlations between mean values of the SF-36 applied between 4 to 6 (M1), on 9 and 12 (M2) and total burn surface area (TBSA) (n = 73), Ribeirão Preto, 2009

9-12 month 4-6 month	Physical function	Role physical	Bodily pain	General health	Vitality	Social functioning	Role emotional	Mental health
Physical function	0.55**	0.29**	0.29*	0.09	0.17	0.20	0.24*	0.09
Role physical	0.29*	0.38**	0.31**	0.29*	0.25*	0.29*	0.23	0.07
Bodily pain	0.35*	0.28*	0.49*	0.18	0.23	0.26*	0.16	0.01
General health	0.18	0.07	0.27*	0.35**	0.28*	0.35**	0.26*	0.22
Vitality	0.28*	0.09	0.33*	0.24*	0.51**	0.26*	0.30*	0.34**
Social functioning	0.18	0.05	0.27*	0.20	0.27*	0.47**	0.36**	0.36**
Role emotional	0.30*	0.12	0.37*	0.08	0.78*	0.14	0.34**	0.17
Mental health	0.28	0.16	0.37**	0.30*	0.45**	0.26*	0.31**	0.44**
TBSA	-0.14	-0.23	0.29	0.75	0.29	0.44	-0.09	0.03

* *p* < 0.05; ** *p* < 0.01.

Table 5. Covariance analysis between the mean values of the SF-36 applied in the 9th to 12th (M2), according the values of the SF-36 applied in the 4th and 6th (M2), sex, visibility scar and total burn surface area (TBSA) (n = 73), Ribeirão Preto, 2009

Domains SF-36 (M2)	Covariables (M1)	Adjusted means	SD	CI 95%		g _L	f	<i>p</i> -value
				Below	Higher			
Physical function	Physical function							0.00
	Sex							0.39
	Male	87.49	2.18	83.13	91.86	1	0.74	
	Female	84.17	3.53	77.12	91.22			
	Visible scars							0.16
	Yes	83.20	2.34	78.58	87.93	1	2.05	
	No	88.41	3.29	81.84	94.98			
	TBSA (%)							0.15
	< 20	88.64	2.19	84.27	93.01	1	2.12	
	> 20	83.02	3.54	75.96	90.07			

Continued Table 5.

Domains SF-36 (M2)	Covariables (M1)	Adjusted means	SD	CI 95%		gL	f	p-value
				Below	Higher			
Role physical	Role physical							0.01
	Sex							0.33
	Male	67.89	6.73	54.45	81.33			
	Female	56.15	10.77	34.67	77.64	1	0.98	
	Visible scars							0.12
	Yes	53.41	7.16	39.12	67.70	1	2.45	
	No	70.63	10.02	50.64	90.63			
	TBSA (%)							0.81
	< 20	60.52	6.83	46.89	74.15	1	0.06	
> 20	63.52	10.94	41.70	85.34				
Bodily pain	Bodily pain							0.00
	Sex							0.03
	Male	81.16	3.34	74.50	87.83			
	Female	67.70	5.41	56.90	78.50	1	5.27	
	Visible scars							0.97
	Yes	69.77	3.59	62.62	76.93	1	2.85	
	No	79.09	5.06	69.00	89.17			
	TBSA (%)							0.97
	< 20	74.32	3.31	67.73	80.92	1	0.00	
> 20	74.54	5.42	63.72	85.36				
General health	General health							0.00
	Sex							0.54
	Male	85.38	2.76	79.87	90.88	1	0.38	
	Female	82.38	4.45	73.50	91.25			
	Visible scars							0.02
	Yes	78.22	3.00	72.24	84.19	1	5.87	
	No	89.53	4.18	81.19	97.88			
	TBSA (%)							0.17
	< 20	80.55	2.71	75.14	85.95	1	1.96	
> 20	87.21	4.42	78.39	96.03				
Vitality	Vitality							0.00
	Sex							0.07
	Male	82.80	2.49	77.83	87.77	1		
	Female	74.67	4.05	66.59	82.75		3.45	
	Visible scars							0.02
	Yes	73.73	2.67	68.40	79.06	1	5.87	
	No	83.74	3.80	76.16	91.32			
	TBSA (%)							0.09
	< 20	74.94	2.46	70.03	79.84	1		
> 20	82.53	4.09	74.37	90.69		2.96		

Continued Table 5.

Domains SF-36 (M2)	Covariables (M1)	Adjusted means	SD	CI 95%		gL	f	p-value
				Below	Higher			
Social functioning	Social functioning							0.01
	Sex							0.93
	Male	81.81	3.78	74.27	89.35			
	Female	81.18	6.13	68.95	93.42	1	0.01	
	Visible scars							0.05
	Yes	75.35	4.07	67.23	83.46			
	No	87.65	5.72	76.24	99.00	1	3.87	
	TBSA (%)							0.85
	< 20	80.87	3.74	73.41	88.34	1	0.04	
> 20	82.12	6.11	69.93	94.31				
Role emotional	Role emotional							0.01
	Sex							0.72
	Male	79.57	5.24	69.12	90.02			
	Female	76.18	8.47	59.28	93.09	1	0.13	
	Visible scars							0.05
	Yes	74.29	5.66	63.00	85.58			
	No	81.47	7.92	65.65	97.28	1	0.67	
	TBSA (%)							0.64
	< 20	80.08	5.29	69.52	90.65	1	0.22	
> 20	75.68	8.50	58.72	92.64				
Mental health	Mental health							0.00
	Sex							0.20
	Male	76.83	3.15	70.55	83.11			
	Female	69.55	5.15	59.27	79.82	1	1.70	
	Visible scars							0.87
	Yes	72.75	3.40	65.96	79.55			
	No	73.62	4.78	64.10	83.15	1	0.03	
	TBSA (%)							0.31
	< 20	76.04	3.12	69.83	82.26	1	1.07	
> 20	70.34	5.13	60.10	80.58				

p < 0.05.

discharge, and the influence of the variables *sex*, *total burn surface area* and *visibility of scars reported by the patient*.

From the results presented, it was possible to observe an improvement in HRQOL during the first year. However, patients still reported worse perception of HRQOL in the component *Role physical* in the 12th month after hospital discharge.

Similar data were described in a study conducted in China¹¹, with 20 participants who had the occurrence of burn for over two years and patients who underwent hemodialysis. Extensive burn survivors had significantly lower values in the areas *Physical*

functioning, *Role physical*, *Bodily pain* and *Social and Role emotional*. Compared to patients who underwent hemodialysis, patients with burns showed significantly higher values in the assessment of *General health and Vitality*, and worse for *Role emotional*¹¹.

Data from this study allowed the observation of positive changes in HRQOL when compared both measures (M1 and M2), but in the effect size analysis for these changes, the highlights were the domains *Role emotional* (0.79) *Role physical* (0.60), *Bodily pain* (0.59) and *Physical functioning* (0.55) due to the

effect size considered large (Table 2). However, in most domains (*Physical functioning, General health, Vitality, Social functioning* and *mental health*) patients have a worse perception of physical conditions over one year.

The change in the domains *Physical functioning* and *Role physical* (Table 2) may be related to the fact that patients tend to show a decrease of mobility-related problems over time⁶ with improvement in movement and in carrying out daily activities²⁵. That is, the best post-burn recovery, better evaluation of HRQOL. Regarding the severity indicators, authors²⁶⁻²⁸ reported that the highest percentage of TBSA and the depth of the burns may show negative changes, especially for the physical, mental, social and general health. Likewise, the presence of burning on the hands and psychological aspects changes would be directly related to the perception of HRQOL^{27,29}. However, other authors^{5,30} state they have not found relationship between evaluation of HRQOL from health measures, and variables such as age, sex, TBSA, injury time and hospital stay during recovery.

In analyzing the results of this study, we observe statistically significant differences between the values of the domains of SF-36. Burn patients with TBSA lower than 20% showed increased values over time for the domains *Physical functioning, Role physical, Bodily pain, General health, Social function* and *Role emotional*; and *Physical functioning, Role physical, Bodily pain, Vitality* and *Role emotional* for those who had TBSA greater than 30% (Table 3). We also identified influences of the covariable sex (in both measures, men showed significant and positive changes compared to women) only in the domain *Bodily pain*, and negative influences of the covariate *visibility of scars* in the domains *Role emotional, General health, Social functioning* and *Vitality*. Besides that, TBSA > 20% was found negative for the domain *Bodily pain* and *Social functioning*.

Such data should be interpreted with caution, since the number of male participants was higher in relation to women. However, the results in relation to women, which could suggest greater difficulties in the recovery of health-related aspects in the first year after hospital discharge draw attention. Regarding TBSA in both groups (TBSA up to 20% and > 20%), there was better evaluation of HRQOL from the health status assessment, between the 9th and 12th month (M2) when compared to those concerning the 4th and 6th month (M1).

In order to identify the specific clinical and functional indices which provide a good quality of life after major burns, in a sample of 47 survivors of accidents, authors²⁷ found significantly lower scores in the perception of the domains *Role physical* (69.1 vs. 82.1; $p = 0.006$) and *General health* (67.2 vs. 77.0; $p = 0.0001$) when compared to the Canadian population norms. They concluded that, in general, individuals who suffered injuries from burns did not present significant changes in most domains of the SF-36 and that aspects such as the extent of the burn, depth, age and burn on the hands were related to the perception of poor quality of life related to the health²⁷.

In order to study the relationship between the presence of contractures and HRQOL, researchers²⁹ applied the SF-36 in a sample of 22 adults receiving outpatient treatment for at least six months after they have been discharged. The authors found that the domains *Vitality* and *Role emotional* were the most affected due to the percentage of TBSA. However, when considering the presence of contractures, the domains *Physical functioning, Role physical, Bodily pain* and *Vitality* were the most affected. The authors²⁸ found no relationship between TBSA and *Physical functioning* but with *Role emotional* and *Social functioning*. In this perspective, when analyzing the results of this research, it is emphasized that most of the participants presented total TBSA $\leq 20\%$, and only did not show statistically significant and positive differences (higher values) in the domains *Vitality* and *Mental health* (Table 3).

Aspects related to the change in functionality are mainly mentioned in situations where burns involve the hands or body regions considered important by the individual²⁷. In the sample of this study, 42 patients had burns to the head, face or neck, 62 in the upper limbs, including hands (Table 1), and 48 of the 73 participants (Table 3) reported their scars as visible. However, during the first year of rehabilitation these burns were not mentioned as important (visible) for these patients. Individuals who suffered accidents with burns often do not understand burns as great complicating factors and apparently it is understood as a problem only by health professionals and not necessarily by the patients themselves³⁰.

When assessing HRQOL on 100 surviving individuals with burns, in the application of burn-Specific Scale-Brief (BSHS-B) authors³¹ concluded that patients who have suffered burns showed negative impacts in most dimensions that compose the health assessment of BSHS-B, mainly in the dimensions related to *affection, body image, skin sensitivity, work* and *psychological aspects*. These aspects were influenced by gender, educational level education, occupation after the burn, TBSA, visibility of scars, especially by the stigma, and functionality. In the analysis of the relationship between the measures of HRQOL (M1 and M2) of the present study statistically significant correlations were identified. In addition, in the extent of the domains *Physical functioning, Bodily pain, Vitality, Social functioning* and *Role emotional* of the M1, there was significant correlation with most areas of M2. On the other hand, in the analysis of covariance (Table 4), significant effects on the variable TBSA were not identified.

We underline the importance of the health team, and especially in relation to the nursing staff, attention should be paid to aspects of HRQOL during the recovery of burned individual, since their evaluation can contribute to the early identification of domains that may have been affected³¹. This would allow the planning and development of care started at an early stage of the rehabilitation process, that is, from the hospital admission, immediately after the occurrence of burns, involving patients and families, and promoting continuity of care after hospital discharge.

When analyzing the results related to the domain *Bodily pain*, six months after hospital discharge, 75% of participants did not present it as the most important area for change in HRQOL. However, there was significant correlation between the domains *Bodily pain* and *Social functioning*, considering the variable gender (Table 3). Expressions of pain during care in the rehabilitation period, can present itself as a major contributor in the development of physical and psychological limitations during the first year after burn³² and consequently the commitment of the assessment of HRQOL.

Results as the ones presented in this study suggest that burn victims have a process of successful adaptation regarding important aspects in the evaluation of HRQOL. Individuals with extensive burns do not always present psychological changes and/or physical and/or social problems, however, these aspects represent important risk for changes or difficulties in the long run. Actions that promote recovery and prevent the onset of complications by the healthcare staff, especially nursing which remains in contact with the patient most of the time during hospitalization, potentiate positive feedback regarding the HRQOL of burn victims.

CONCLUSION

Based on the study results, it is concluded that the domains *Role physical* and *Role emotional* presented the highest involvement in the first six months after hospital treatment for burns. There was better assessment regarding the HRQOL for all dimensions when compared both to temporary measures (M1 and M2), highlighting the effect size, with better values in M2, dimensions: *Role emotional*, *Role physical*, *Bodily pain* and *Physical functioning*. And changes in both measures (M1 and M2) especially for males.

Overall, HRQOL, represented to the extent of the SF-36 domains in the first six months of recovery, would be negatively affected by variables related to TBSA, visibility of scars and sex; and by the presence of scars considered visible and sex in a later stage of recovery.

The sample size can be highlighted as a major limitation, which is also justified as this is a specific population and it may, thus, hamper the inclusion of more participants. For this reason we point out the need for future studies with larger numbers of participants of both sexes, thus allowing the achievement of robust statistical analysis of the influence of the variables studied, as well as the inclusion of variables such as social support, physical limitations and return to conducting activities before the accident.

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* Article extracted from a Doctoral Thesis title in English is "Validation of the Burns Specific Pain Anxiety Scale - BSPAS and the Impact of Event Scale - IES for Brazilians who suffered burns".