





# Pruritus in burn victims: relationship with anxiety, depression, and post-traumatic stress

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## ABSTRACT

**Objective:** To assess the relationship between pruritus intensity and anxiety, depression, post-traumatic stress, and health-related quality of life scores in burn victims. **Methods:** A cross-sectional study, carried out in two outpatient clinics of burn hospitals located in municipalities in the countryside of São Paulo. The sample consisted of 60 patients who answered sociodemographic and clinical characterization instruments: the Visual Numerical Scale, to assess pruritus intensity, the Hospital Anxiety and Depression Scale, the Impact of Events Scale, to assess post-traumatic stress, and the Freiburg Life Quality Assessment Wound Module to Brazilian Portuguese. **Results:** The sample was characterized by a predominance of males (73%). Significant positive correlations were found between pruritus intensity and anxiety ( $r=0.33$ ), depression ( $r=0.53$ ), post-traumatic stress ( $r=0.43$ ), and total Freiburg Life Quality Assessment Wound score ( $r=0.63$ ). **Conclusions:** These findings reinforce the importance of assessing pruritus in comprehensive care for burn victims, aiming to reduce the psychological impact and improve health-related quality of life.

**DESCRIPTORS:** Burns. Pruritus. Anxiety. Depression. Quality of life. Enterostomal Therapy.

## Prurido em vítimas de queimaduras: relação com ansiedade, depressão e estresse pós-traumático

## RESUMO

**Objetivos:** Avaliar a relação entre a intensidade do prurido e os escores de ansiedade, depressão, estresse pós-traumático e a qualidade de vida relacionada à saúde em pacientes vítimas de queimaduras. **Método:** Estudo transversal, realizado em dois ambulatórios de hospitais de queimados localizados em municípios do interior paulista. A amostra foi constituída por 60 pacientes que responderam aos instrumentos de caracterização sociodemográfica e clínica, Escala Visual Numérica para avaliação da intensidade do prurido, Escala Hospitalar de Ansiedade e Depressão, Escala de Impacto de Eventos para avaliação do estresse pós-traumático e a versão brasileira da *Freiburg Life Quality Assessment Wound*. **Resultados:** A amostra caracterizou-se pelo predomínio do sexo masculino (73%). Correlações positivas significativas foram encontradas entre a intensidade de prurido e ansiedade ( $r=0,33$ ), depressão ( $r=0,53$ ), estresse pós-traumático ( $r=0,43$ ) e escore total da *Freiburg Life Quality Assessment Wound* ( $r=0,63$ ). **Conclusão:** Esses achados reforçam a importância da avaliação do prurido na atenção integral à vítima de queimadura visando à redução do impacto psicológico e melhora na qualidade de vida relacionada à saúde.

**DESCRIPTORES:** Queimaduras. Prurido. Ansiedade. Depressão. Qualidade de vida. Estomaterapia.

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# Prurito en víctimas de quemaduras: relación con ansiedad, depresión y estrés postraumático

## RESUMEN

**Objetivo:** Evaluar la relación entre la intensidad del prurito y las puntuaciones de ansiedad, depresión, estrés postraumático y la calidad de vida relacionada a la salud en pacientes víctimas de quemaduras. **Método:** Estudio transversal, realizado en dos ambulatorios de hospitales de quemados ubicados en municipios del interior de São Paulo. La muestra se constituyó por 60 pacientes que respondieron a los instrumentos de caracterización sociodemográfica y clínica, Escala Visual Numérica para evaluación de la intensidad del prurito, Escala Hospitalaria de Ansiedad y Depresión, Escala de Impacto de Eventos para evaluación del estrés postraumático y la versión brasileña de la *Freiburg Life Quality Assessment Wound*. **Resultados:** La muestra se caracterizó por el sexo masculino (el 73%). Correlaciones positivas significativas se encontraron entre la intensidad de prurito y ansiedad ( $r=0,33$ ), depresión ( $r=0,53$ ), estrés postraumático ( $r=0,43$ ) y puntuación total de la *Freiburg Life Quality Assessment Wound* ( $r=0,63$ ). **Conclusión:** Esos hallazgos refuerzan la importancia de la evaluación del prurito en la atención integral a víctimas de quemadura, buscando la reducción del impacto psicológico y la mejora en la calidad de vida relacionada a la salud.

**DESCRIPTORES:** Quemaduras. Prurito. Ansiedad. Depresión. Calidad de vida. Estomaterapia.

## INTRODUCTION

Burns stand out as a trauma that alters the physical and psychological well-being and quality of life of its victims<sup>1</sup>, which points to the need for its approach in the preventive and rehabilitation spheres. The World Health Organization (WHO) estimates that approximately 180,000 burn victims die every year and that the majority occur in low- and middle-income countries<sup>2</sup>.

Non-fatal burns are responsible for long periods of hospitalization and can lead to disabling sequels, which can result in physical, economic and psychosocial impacts. A retrospective observational study using the Brazilian Health System (SUS – *Sistema Único de Saúde*) Hospital Information System (HIS) database showed that, from 2000 to 2014, a total of 412,541 hospitalizations due to burns were recorded in Brazil, with a mean of 27,503 hospitalizations/year<sup>3</sup>.

The trauma experienced by burn patients during initial care, rehabilitation and throughout life is variable. Currently, there is evidence suggesting that burns can be considered a chronic disease given its impacts throughout life, especially with the occurrence of possible secondary morbidity<sup>4,5</sup>.

Various skin-related consequences, scarring and specific symptoms are described such as pain, pruritus, fatigue, sleep disturbances, loss of physical abilities, disfigurement, loss of mobility, scars, depression, anxiety, post-traumatic stress, among others, affecting burn victims and their families<sup>6,7</sup>.

Among the complications, pruritus is common and harmful, occurring after the burn and during the rehabilitation process, with an impact on health-related quality of life (HRQoL) and emotional well-being<sup>8,9</sup>. The relationship between pruritus and psychological factors has psychophysiological foundations. Chronic pruritus is associated with anxiety, stress and mood disorders. On the other hand, stress and anxiety exacerbate pruritus, affecting disease prognosis<sup>10</sup>.

Based on the above, this study aimed to assess the relationship between pruritus intensity and anxiety, depression, post-traumatic stress and HRQoL scores in burn victims undergoing outpatient care.

## METHOD

This is a cross-sectional study, carried out in two outpatient clinics of burn hospitals located in municipalities in the countryside of the state of São Paulo, Brazil.

All patients treated at these outpatient clinics from February 2017 to June 2018 took part in this study.

First-time burn victims, who were assessed between two months and fifteen days to four months after the trauma, the period in which the first return to the outpatient clinic occurred, aged 18 years or over, of both sexes, with preserved cognitive conditions, who required hospitalization, regardless of the burned body surface area (BSA) and depth of the injury, were included. Patients after reconstructive surgery due to new healing and the possibility of influencing pruritus manifestation, those serving sentences in a closed prison regime, with previous psychiatric diagnoses and those with sequelae or neuronal dysfunction in the limb affected by the burn, with impairment of sensitivity, were excluded.

Potential research participants, identified by hospital admission and discharge book or system and/or by the return schedule at the units' outpatient clinics, were invited to participate. Patients who did not return between two months and fifteen days and four months after trauma or who did not attend the return visit were invited to participate in the study by telephone or letter. Only those who signed the Informed Consent Form (ICF) prepared in accordance with the recommendations and ethical principles provided for in research involving human beings participated in the study.

Data were collected through consultation of medical records and interviews with patients. For sociodemographic and clinical characterization, the following variables were used: date of birth, age, sex, marital status, education, origin, day and time of the accident, date of hospitalization and discharge, type of accident, BSA, burn location and causative agent.

The following instruments were applied:

- Visual Numerical Scale (VNS): assesses pruritus intensity and consists of an 11-point verbal numerical assessment scale, with two anchor phrases: 0 – no pruritus, 10 –pruritus pain as bad as it could possibly be<sup>11</sup>.

- Hospital Anxiety and Depression Scale (HADS): the validated HADS version for the Brazilian context was used<sup>12</sup>, composed of 14 multiple-choice items, seven of which are aimed at assessing symptoms of anxiety (HADS-A) and seven aimed at measuring symptoms of depression (HADS-D). Answers are assigned a score from zero to three, and the sum of this score results in the final score for each subscale (HADS-A and HADS-D). The overall score ranges from zero to 21, so the higher the score, the worse the anxiety and depression. The overall score cut-off point is eight and nine for the anxiety and depression symptom subscales, respectively. In the present study, the instrument presented satisfactory internal consistency, with a Cronbach's alpha coefficient of 0.87.

- Event Impact Scale (EIS): for screening post-traumatic stress disorder, the Brazilian version of EIS was applied, validated in patients with burns<sup>13</sup>. It contains 15 items, divided into two subscales: seven items that make up the subscale that assesses intrusive thoughts and eight items that assess avoidance reactions. Each item is answered on a 100 mm visual line accompanied by a numerical sequence and two anchor words: "this does not describe what happens to me" (zero) and "this describes well what happens to me" (10). The total score is obtained by summing the subscale values, which can vary between 0 and 150. The higher the score, the greater the post-traumatic stress or impact of the burn event. In the present study, the Brazilian version proved to be reliable with a Cronbach's alpha coefficient of 0.92.

- Freiburg Life Quality Assessment Wound (FLQA-wk): the Brazilian version of the FLQA-wk<sup>14</sup> was used to assess HRQoL. This scale contains 24 items, divided into six domains: physical symptoms (five items), daily life (five items), social life (three items), psychological well-being (four items), treatment (four items) and satisfaction (three items). Dimensions with five items have a minimum score of five and a maximum of 25; dimensions with four items have a minimum score of four and a maximum of 20; and dimensions of three items have a minimum score of three and a maximum of 15. To calculate the score, it is necessary that at least 75% of items are answered and that at least five of the six scales are complete. Domain scores are calculated by averaging each item, after recoding the satisfaction scale. The total score corresponds to the sum of the mean values for each domain and varies from one (best HRQoL) to five (worst HRQoL). The instrument also consists of three Visual Analogue Scales related to health status, quality of life and wound conditions, graded from

zero (very poor) to ten (very good). However, these do not participate in calculating the total scale score. In the present study, the Brazilian version of FLQA-wk presented a Cronbach's alpha coefficient of 0.79.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) (version 23.0 for Windows). Sociodemographic and clinical data, in addition to pruritus intensity, anxiety, depression, post-traumatic stress and HRQoL, were analyzed using descriptive statistics. Spearman's correlation coefficient was used to test the correlation between pruritus intensity and HADS-A, HADS-D, EIS, FLQA-wk scores. A coefficient  $<0.30$  was considered to be of weak magnitude, between  $0.30$  and  $0.50$ , of moderate magnitude, and  $>0.50$ , of strong magnitude. Significant positive correlations of moderate to strong magnitude were hypothesized between pruritus intensity and HADS-A and HADS-D, EIS and HRQoL measures. To test scale reliability, Cronbach's alpha coefficient was used. Cronbach's alpha coefficient greater than  $0.70$  was considered satisfactory.

The study was approved by the Research Ethics Committee of the *Universidade Estadual de Campinas*, under Opinion 1.822.715.8845.

## RESULTS

Of the 298 patients initially screened, 70 were eligible. Of these, 10 patients refused to participate, with the sample consisting of 60 patients. Among the participants, there was a predominance of males (73.0%), with a mean age of 39 (SD 13.0) years, most of them married (40.0%), with a mean education of 10 (SD 4.5) years of study and a mean family income of R\$ 4,178.37 (US\$835.67) (SD 4.4). Table 1 presents the clinical characterization of the patients studied.

The mean time interval between the burn and the interview was three (SD 0.4) months, and 91.7% reported pruritus. Most accidents occurred in the domestic environment (52.0%), with the main causative agents being alcohol and fire. The most affected areas of the body were the upper limbs (75.0%) followed by the lower limbs (53.0%). The burns were predominantly 2<sup>nd</sup> degree (Table 1).

Table 2 shows pruritus intensity, post-traumatic stress, anxiety, depression and HRQoL scores. It was observed that the sample presented moderate pruritus, with a low level of post-traumatic stress, low levels of anxiety and depression, and satisfactory HRQoL.

Table 3 shows the results of the analyzes that investigated the relationship between pruritus and other variables related to mental health. The use of correlation analysis using Spearman's coefficient showed significant positive correlations of moderate to strong magnitude between pruritus intensity and anxiety ( $r=0.33$ ;  $p\text{-value}=0.002$ ) and depression ( $r=0.53$ ;  $p<0.001$ ) scores assessed by HADS-A and HADS-D and also with post-traumatic stress, estimated by applying EIS ( $r=0.43$ ;  $p=0.001$ ).

It was observed that pruritus intensity also presented a positive correlation of moderate to strong magnitude with most domains and total FLQA-wk score, except for psychological well-being and treatment domains, in which there was a weak correlation and no correlation, respectively. Considering that the higher the FLQA-wk score, the worse the HRQoL, the data show that the greater pruritus intensity after the burn, the worse the HRQoL.

Significant inverse correlations of weak magnitude were also found between pruritus intensity and health status and wound conditions visual scales, and a negative correlation of moderate magnitude with perceived HRQoL. Considering that, in the three visual scales (which do not participate in calculating the final FLQA-wk score), the higher the score, the better the health status, wound conditions and HRQoL, inverse correlations indicate that the greater the intensity of pruritus, the worse the health status, wound conditions and perceived HRQoL.

## DISCUSSION

In the present study, patients with burns presented moderate pruritus, low levels of anxiety, depression and post-traumatic stress, indicating good mental health status and satisfactory HRQoL. A significant positive correlation of moderate to strong magnitude was observed between pruritus intensity and the HADS-A and HADS-D scores as well as the EIS scores, showing that the greater the intensity of the pruritus, the higher the levels of anxiety, depression and post-traumatic

**Table 1.** Clinical characterization of burn victims undergoing outpatient follow-up in two hospitals in municipalities in the countryside of São Paulo (n=60). Campinas and Limeira, SP, 2017–2018

Variables	
Type of accident (% , n)	
Domestic	52.0 (31)
Labor	45.0 (27)
Others	3.0 (2)
Causative agent (% , n)	
Thermal	
Alcohol and fire	34.0 (20)
Fire	18.0 (11)
Hot liquids (water and oil)	17.0 (10)
Explosion	8.0 (5)
Gasoline	3.0 (2)
Electrical	
Electricity	8.0 (5)
Others	12.0 (7)
Burned area (% , n) (n=60)	
Upper limbs	75.0 (45)
Lower limbs	53.0 (32)
Trunk	35.0 (58)
Head/neck	48.0 (29)
Buttocks/genitalia	15.0 (9)
Burn depth (% , n) (n=51)	
1 <sup>st</sup> degree	2.0 (1)
2 <sup>nd</sup> degree	77.0 (46)
3 <sup>rd</sup> degree	7.0 (4)
Burn time (mean, SD) (months)	3.0 (0.4)
Hospitalization time (mean, SD) (days)	24 (18)
Burned body surface (%) (mean, SD) (n=48)	16.7 (9.2)

Note: SD: standard deviation.

stress. Significant positive correlations of moderate to strong magnitude were found between pruritus intensity and the total score and most of the FLQA-wk domains, showing that the greater the pruritus intensity, the worse the HRQoL.

Considering the sample sociodemographic and clinical characterization, the findings of this study support national and international literature regarding the predominance of burns in males of productive and occupational age, due to flame/fire in the home environment, partial thickness and upper limbs injury<sup>15,16</sup>.

It is known that, as a result of the wound healing process, pruritus is an expected symptom in patients with burn wounds, given the processes of revascularization and release of cytokines. It affects 80.0 to 100.0% of patients, with moderate to severe intensity, occurring a few days after the burn and tends to decrease over time, but some cases can persist for years<sup>9</sup>. Our results showed that pruritus was perceived by patients at moderate intensity during the assessment period (two and a half to four months after the accident). It should be noted that the eventual persistence of pruritus during the different phases of wound healing will imply therapeutic interventions for care throughout burn patients' rehabilitation period.

A previous study<sup>17</sup> carried out with the objective of assessing clinical and histopathological characteristics of post-burn patients showed that pruritus intensity, assessed by VNS, was 4.58 (SD 3.24) and that there are histological differences,

**Table 2.** Descriptive analysis of the Visual Numerical Scale, Event Impact Scale, Hospital Anxiety and Depression Scale and Freiburg Life Quality Assessment - Wound Module in burn victims undergoing outpatient follow-up (n=60). Campinas and Limeira, SP, 2017–2018

	MEAN (SD)	MeANna	OBSERVED VARIATION (min-mAx)
VNS	5.0 (2.7)	4.95	0.5–10
EIS	54.0 (39.0)	43.2	0–135
HADS			
AnXIETY (HADS-A)	6.5 (4.5)	6.0	0–18
DepressIOn (HADS-D)	3.9 (3.9)	3.0	0–17
FLAA-wk			
PHYSICAL SYMPTOMS	2.0 (0.8)	1.9	1–4.6
DAILY LIFE	2.2 (1.0)	2.0	1–5
SOCIAL LIFE	2.1 (1.1)	1.8	1–5
PSYCHOLOGICAL WELL-BEING	1.6 (0.7)	1.3	1–4
TREATMENT	2.7 (0.6)	2.9	1–4
SATISFACTION	2.1 (0.9)	2.0	1–5
TOTAL SCORE	2.1 (0.7)	2.1	1.1–4.2
VAS – HEALTH STATUS	8.2 (1.7)	-	0.3–10
VAS – WOUND CONDITIONS	7.7 (2.1)	-	0.5–10
VAS – QUALITY OF LIFE	8.0 (2.0)	-	1–10

Note: VNS: Numerical Visual Scale; EIS: Event Impact Scale; HADS: Hospital Anxiety and Depression Scale; FLQA-wk: Freiburg Life Quality Assessment Wound; SD: Standard deviation; Min: Minimum; Max: Maximum; VAS: Visual Analogue Scale.

**Table 3.** Spearman's correlation coefficient (r) between pruritus intensity and measures of anxiety and depression, intensity of post-traumatic stress and quality of life in burn victims undergoing outpatient follow-up (n=60). Campinas and Limeira, SP, 2017–2018

	Pruritus intensity assessed by VNS	
	(r)	p-value
HADS		
Anxiety (HADS-A)	0.33	0.002*
Depression (HADS -D)	0.53	<0.001*
EIS	0.43	0.001*
FLQA-wk		
Physical symptoms	0.73	<0.001*
Daily life	0.49	<0.001*
Social life	0.47	<0.001*
Psychological well-being	0.28	0.025*
Treatment	0.04	0.780
Satisfaction	0.58	0.001*
Total score	0.63	<0.001*
Health condition	-0.29	0.025*
Wound conditions	-0.33	0.011*
Quality of life	-0.45	<0.001*

VNS: Numerical Visual Scale; HADS: Hospital Anxiety and Depression Scale; FLQA-wk: Freiburg Life Quality Assessment Wound. \*p<0.05 considered statistically significant.

such as prominent deposition of mast cells and thin collagen bundles in patients with pruritus when compared to the group without pruritus.

Although study patients did not present mental health impairment, pruritus intensity showed a significant positive correlation of moderate magnitude with HADS-D and EIS and of weak magnitude with HADS-A. These

findings are consistent with data from the literature, showing that mental health and psychological changes can exacerbate pruritus<sup>10,18</sup>.

Post-traumatic stress symptoms, depression and anxiety can persist after the injury has healed and have psychosocial consequences, affecting social functioning and disability<sup>7</sup>. Van Loey *et al.*<sup>19</sup> observed that higher levels of EIS were associated with the profile of pain and chronic pruritus.

Regarding HRQoL, the total FLQA-wk score was 2.1 points, which corresponds to a good QoL. An important observation in this study is that assessment was carried out on average three months after the burn. HRQoL is worse immediately after the accident and improves over time. In general, significant improvement occurs within six months after the event, with recovery in those with more severe burns and longer hospital stays being less favorable<sup>20</sup>. A multicenter study carried out with 309 adults, which assessed HRQoL during hospitalization at three, six, 12 and 18 months, and the report of pre-injury memories showed worse HRQoL during hospitalization and levels of HRQoL very close to those of pre-injury after 18 months<sup>21</sup>, showing its improvement over time.

When the correlation between pruritus intensity and the FLQA-wk was carried out, it was observed that there was a strong positive relationship for the total HRQoL score and physical symptoms and satisfaction domains. It is understood that the lower the intensity of the pruritus, the better the QoL of patients with burns, supporting literature data<sup>7,22</sup>. Burn patients who reported experiencing pruritus during follow-up had worse physical and mental health compared to patients who did not experience pruritus<sup>22</sup>. In the physical symptoms domain, pain is frequent, starting soon after the burn, continuing during treatment, resulting from the burn itself and the therapies used, which can negatively influence healing and rehabilitation, and consequently impair HRQoL<sup>23</sup>. As it is a subjective, individual characteristic, pain must be properly assessed, diagnosed and treated.

In relation to Visual Analogue Scales, greater impairment was observed on the wound scale. There was an inverse correlation between pruritus intensity and all health status, wound and quality of life visual scales, showing that pruritus contributes to worse QoL.

Some limitations can be pointed out in this study, such as self-report assessment, single assessment of pruritus, although multi-item measures are not available to assess pruritus in Brazilian culture and limited case series. As strengths, we highlighted the use of validated instruments widely used in the literature, the recognized importance of subjective assessment of investigated measures and evidence of satisfactory internal consistency in the instruments used (Cronbach's alpha greater than 0.70). It is important to consider the studied population's vulnerability, whose complexity makes assessment difficult in the initial phases of the treatment and rehabilitation process.

## CONCLUSION

The assessment of 60 burn victims allowed us to conclude that there is a high prevalence of pruritus (91.7%) in these people. There is a correlation between pruritus intensity and HADS-A, HADS-D, EIS and HRQoL. Therefore, the multidisciplinary team must assess the presence and pruritus intensity in patients with burns so that interventions can be proposed to mitigate this condition in comprehensive care for burn victims, thus reducing psychological impact and seeking to improve QoL. It is recommended that future studies be carried out with an extended sample to confirm the relationships between pruritus, anxiety, depression and HRQoL.

**Conflict of interest:** None.

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