Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/burns

Severity of burn and its related factors: A study from the developing country Pakistan

Syed Omair Adil [a,*], Nighat Nisar [a], Ehmer-Al-Ibran [a,b], Kashif Shafique [a], Naila Baig-Ansari [c]

[a] Dow University of Health Sciences, Gulzar-e-Hijri, Ojha Campus,Suparco Road, KDA Scheme-33, Karachi, Pakistan
[b] Burns Centre, Civil Hospital Karachi Baba-e-Urdu Road, Off M.A. Jinnah Road, Karachi, Pakistan
[c] The Indus Hospital Research Center, Landhi Local Road, Karachi, Pakistan

ARTICLE INFO

Article history:
Accepted 3 January 2016

Keywords:
Burns
Risk factors leading to burn
Hospitalized patient
Pakistan

ABSTRACT

Background: Burns are leading cause of fatal injuries and major cause of morbidity and mortality in developing countries. The major obstacle in controlling severity is factors related to burn. This study determines frequency of burns and the factors related to it in Karachi, Pakistan.

Methods: A cross-sectional study was conducted and 384 hospitalized adult patients with burns were consecutively interviewed during August 2013 to February 2014. Information was collected on socio-demographic profile, intent of burn, severity of burn, health hazards, physical and psychological characteristics. TBSA burn of >15% was considered as higher severity of burn.

Results: Higher severity of burns was found in 76.3% patients. Multivariate analysis showed that higher severity of burns were significantly associated with age less than 25 years (OR 2.7, 95% CI 1.5–4.9), never had been to school (OR 3.1, 95% CI 1.7–5.9) and intentional burn (OR 20.6, 95% CI 5.0–84.9).

Conclusion: Majority of patients had higher severity of burn. The intent of injury was intentional, age less than 25 years and no schooling were found significantly associated with higher severity of burns.

1. Introduction

Burns are serious public health problem and a major imposition to the healthcare sector as well as to the society. During the mass casualty events, one of the most common injuries inflicted to the victims are related to burns [1,2]. In the commercial fields especially in the chemical and manufacturing plants, the fire related incidents have caused an up rise in burns particularly those falling in the category of higher severity.

The incidence of burns is significantly higher in the developing countries as compared to the developed ones [3]. This fact is also proven by the WHO report which shows that approximately 90% of worldwide burns occur in underdeveloped countries [4]. Also it is reported that more than 40% burns related deaths takes place in Southeast Asia where a large number of victims are left with lifelong disabilities and disfigurements due to a lack of support system as well as the facilities providing treatment [5].

* *Corresponding author*. Tel.: +92 3322319119.
E-mail address: s.omair.adil@gmail.com (S.O. Adil).
http://dx.doi.org/10.1016/j.burns.2016.01.007

In Pakistan, the incidence of burns does not have a figure attached to it, but the report by WHO shows it to be around 1388/100,000 per annum as compared to the global incidence of burns related injuries which is 110/100,000 per annum [1]. This figure makes our country to be the one with the highest incidence of burn related injuries. A local study conducted in Peshawar reported the frequency of scald burn to be 65.4% followed by flame burn 25.7%, electrical burn 4.6%, chemical burn 1.7% and steam burn 1.6% [1]. A similar study from Karachi reported frequency of fire burn 79%, electrical burn 7.7%, Scald burn 5.2% and chemical burn 3% [2].

Studies showed that the mean total body surface area burn (TBSA) in patients with severe burn was 11% and 24% [6,7] which increased to >55% in some studies most probably due to a more rigid admission criteria. Studies have reported a considerable increase in the mortality rate in patients who suffer a TBSA >20% [8,9].

The severity of the burn depends on two main factors i.e. the degree of heat and secondly, the length of time the victim is in contact with the heat source. Major cause of morbidity and mortality in burn victims is the burn of higher severity which is further compounded by factors like prolonged hospitalization, disfigurement and associated disability. The disfigurement and disability that are a part and parcel of a burn result in stigmatization of the victim and thus rejection by the society [2–4].

An important step toward diminishing the severity in burns is to limit the risk elements associated with them. There is a need to identify the determinants for severity of burns so that appropriate preventive strategies can be undertaken to reduce the burden of disease. Apart from the physical factors related to burn, the social factors are also crucially important to explore as they are responsible for a variable proportion of burn admissions in developing countries.

2. Materials and methods

2.1. Data collection procedure

A cross-sectional study was conducted after gaining an approval from the Institutional Review Board (IRB) of Dow University of Health Sciences (DUHS). The data was prospectively collected from all hospitalized adult burn patients from August 2013 to February 2014. The dependent variable was the percentage of total body surface area (TBSA) burn. >15% TBSA burn was classified as a burn of higher severity and ≤15% TBSA burn was classified as burn with lower severity [10]. Risk factors like age, gender, area of residence, educational status, total monthly household income, family structure, physical disability, difficulty in learning/recalling, use of sleeping pills/tranquilizers, stressful events at home, exposure to physical violence and exposure to psychological violence were also evaluated.

2.2. Statistical analysis

Data was entered, cleaned and analyzed by using SPSS version 21. Cleaning and coding of the data was done prior to the analysis. Shapiro–Wilk's test was used to assess the distribution of variables. Median (IQR-Interquartile Range) were computed for all the quantitative variables like age, total household income, number of rooms, and TBSA% as all the variables were found to be non-normally distributed. Frequency and percentages were computed for all the qualitative variables like age categories, gender, severity of burn, educational status, area of residence and area of injury.

Mann–Whitney *U*-test was applied to check significant difference in median value of all the quantitative variables. Chi-square and Fisher-exact test were applied to assess significant association between various qualitative variables and outcome variable (severity of burn). Univariate binary-logistic regression was also applied to assess significant association between various qualitative variables and outcome variable (severity of burn). *P*-value < 0.05 was considered significant.

All the variables with *P*-value ≤ 0.25 in univariate analysis were selected for multiple logistic regression (LR) to calculate Adjusted Odds Ratio [11]. Backward LR method was applied to develop the final model. *P*-value < 0.05 was considered significant.

3. Results

3.1. Demographics characteristics

A total 384 burn patients who were hospitalized were included in the study. Mean age of patients in the study cohort was 30.6 ± 12.05years (Range: 18–70 years). 204 (53.1%) patients were ≤25 years of age while 180 (46.9%) were of >25years. There was a male preponderance in the study cohort as evident by male to female ratio of 300 (78.2%)/84 (21.9%). The categorization of the patients according to their marital status showed that the majority of them were married i.e. 281 (56.8%) followed by 156 (40.6%) who were single and 10 (2.6%) were divorced. The grouping of the patients depending on the nature of the burn showed that the highest number i.e. 146 (38%) of incidents were due to flame/fire followed by electrical injury in 124 (32.3%) patients, Scald/contact in 65 (16.9%) and finally chemical in 49 (12.8%) patients. The allocation of patients into groups depending on the location of the occurrence of incident found that majority i.e. 194 (50.5%) of the injuries took place at home, followed by incidents at workplace in 148 (38.5%) patients and 42 (10.9%) injuries occurred in an outside locality. Study patients grouped in accordance to the intent of burn pointed to the fact that a total of 295 (76.8%) were self incurred followed by assault in 45 (11.7%) patients, non-intentional by others in 29 (7.6%) and finally deliberate self harm in 15 (3.9%) patients. A comparison of demographic characteristics with severity of burn (TBSA) was done and the results are demonstrated in Table 1. It was found that age of the patient and place and intent of burn were found to have a significant relationship with severity of burn received by the patient.

3.2. Health hazards, physical and psychological characteristics

In the study cohort, 91 (23.7%) were smokers while 62 (16.1%) patients were habituals of sleeping pills/tranquilizers intake.