

# EPIDEMIOLOGY OF BURNS IN PATIENTS PRESENTING TO A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objective:** To study and explore the predominant causes and patterns of injuries in burn patients.

**Material and Methods:** This cross sectional study was conducted in Surgical Unit A of Khyber Teaching Hospital, Peshawar from July, 2013 to June, 2014. The study population comprised of male and female patients afflicted with burn injuries. Patient characteristics (age, gender) causes, mechanism and percentage of total body surface area (TBSA) burnt were explored. A detailed history was taken and examination done before treatment was started. Percentage of burn was determined using 'rule of nine'. For statistical analysis, patients were divided into different groups and results expressed as means and percentages.

**Results:** During the study period, 242 patients were admitted with burn injuries. Ages of patients ranged from 1 to 91 years. 148 (61.15%) patients were males and 94 (38.84%) were females. Out of the 242 patients, 203 sustained accidental burn injuries, while 39 sustained suicidal injuries. Sixty-four patients sustained scald burns which included 39 males and 25 females. Sixty-three patients sustained injuries from kerosene oil. Number of patients sustaining burns from electricity, flames and gas cylinders were 37, 47, and 30 respectively. Out of a total of 94 female patients, 26 sustained injuries from kerosene oil. A mean 37.06% area was burnt in female patients, whereas 36.48% area was burnt in male patients afflicted with burns. No significant relationship existed between the % TBSA burnt and gender of patients included in the study.

**Conclusion:** Intentional self-inflicted burns, female gender, and scald burns and burns from kerosene oil would largely contribute to a high mortality rate in hospitalized patients.

**Key Words:** Burn, injury, body, surface area, rule of nine.

## INTRODUCTION

A burn is mostly caused by heat or due to electricity, friction or contact with chemicals resulting in injury to the skin or other organic tissue. The incidence of burn injuries was ranked fourth amongst all the mishaps in 2004, nearly accounting for 265 000 deaths annually, majority of which make up low- and middle-income countries<sup>1</sup>. An important cause of death in developing countries of South Asia is burn injuries. According to World Health Organization, South Asia region alone, contribute over one-half of the total number of fire-related burn deaths worldwide<sup>2</sup>. The incidence of burn injuries in our region ranges from 112 to 518 per 100,000 cases in a year with a mortality rate of 5.6 per 100,000 cases<sup>3</sup>.

Studies in South Asia report more cases of female injuries and mortality than males<sup>3,4</sup>. A recent study conducted in Civil Hospital, Karachi reports higher mortality in female patients as compared to their male counterparts<sup>5</sup>. Most of the burn incidents occurs in domestic settings because of house hold appliances, inflammable agents at home, clothing burns and in some cases also self inflicted<sup>6,7,8</sup>. Majority of burn injuries sustained by children occur at home as an accident<sup>9</sup>. Thus most of these injuries are preventable.

All cases require some degree of medical attention and many of the patients end with severe morbidity or even death<sup>10</sup>. People affected are mostly of poor socioeconomic status and of employable age. Initial management of burns is very important. First aid measures like wound cooling and removal of source of injury significantly improves outcome, decreases morbidity and also health costs<sup>11,12</sup>. Lack of facilities in most public sector hospital and insufficient personnel to take care of this group of patients increase the morbidity and mortality.

Keeping in view the importance of this very common cause of morbidity and mortality, we conducted a

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study to establish the epidemiology of burns in patients presenting to our hospital. The objective of this study was to describe the epidemiological pattern of burn patients in our setup and to recognize the risk factors that can affect the outcome in burn patients and assess the role of age, gender, degree of burn, mechanism of burn and the percentage of total body surface area (TBSA) involved in burn and their relation with mortality.

## MATERIAL AND METHODS

The study was conducted in Surgical Unit A of Khyber Teaching Hospital, Peshawar, Pakistan from July 2013 to June, 2014. It comprised of male and female patients admitted with burn injuries. Histories were taken from the patients where possible or from their attendants where the patients were unable to provide a history. Patient characteristics (age, gender), causes, mechanism and percentage of total body surface area (TBSA) burnt were explored. Data was collected by using a proforma including demographic data, etiology, burn type, and percentage of body surface area burned. Patients of any age, degree of burns and both sexes were included. A detailed examination was done before treatment was started. Percentage of burn was determined using 'rule of nine'. For statistical analysis, patients were divided into different groups and results expressed as means and percentages.

## RESULTS

During the study period, 242 patients were admitted with burn injuries. Ages of patients ranged from 1 to 91 years (mean = 19.21 years). 148 (61.15%) patients were males and 94 (38.84%) were females. Out of the 242 patients, 203 sustained accidental burn injuries, while 39 sustained suicidal injuries. Females were involved in a greater number of suicidal injuries as compared to males; 21 against 18.

Sixty-four patients sustained scald burns which included 39 males and 25 females. Scalds constituted the largest cause of burns in our patients. Sixty-three patients sustained injuries from kerosene oil; this being the second largest cause of burns in our patients. Number of patients sustaining burns from electricity, flames and gas cylinders were 37, 47, and 30 respectively. Out of a total of 94 female patients, 26 sustained injuries from kerosene oil; the largest cause of burns in female patients.

No significant relationship existed between the % TBSA burnt and gender of patients included in the study. 38.32% TBSA was burnt with electric burns, 32.34% with flame burns, 36.83% with gas cylinders, 45% with kerosene oil and 30.77% with scald burns.

## DISCUSSION

Burn injuries constitute a major health concern with respect to morbidity and mortality, as well as cost of management particularly in a developing country like Pakistan, where few specialized units exist in the public sector. Despite continued efforts to prevent burn injuries, to reduce casualties to the minimum, and to increase safety, together with recent advances in the management of burn injuries, such injuries remain one of the leading causes of injury, morbidity and mortality worldwide, causing more than 5 million deaths each year or 16,000 deaths each day.<sup>13</sup> Over 90% of burn injuries, mainly fire-related, occur in low- and middle-income countries, areas that generally lack the necessary infrastructure to reduce the incidence and severity of burns.<sup>14</sup>

Similar to many studies,<sup>15</sup> our study showed that burn injuries were found more among males in all age groups (61.15% vs 38.84%), reflecting the strong influence of gender on the risk of injury. However, several studies have also reported a predominance of burnt females.<sup>16,17</sup> Regarding the causes of burns, the current study showed that males were more frequently affected by scald burns, burns from kerosene oil and flame burns (27.02%, 25% and 21.62% of total male patients respectively). Females are more susceptible to self-inflicted burns or injuries caused by kerosene oil. Commonly, in developing countries burn injuries are most often caused by fire-related accidents in home environment. A large number of burns occurred at homes where they are mostly the women who tend to work with fires and stoves, especially for cooking.<sup>16,18</sup> Likewise, a noteworthy feature of this study is that gas-related fire injuries were more common among female than male patients. This is explained by the fact that culturally majority of our women folk choose to be housewives or have limited autonomy to engage in public or social activities by themselves. It is also likely that low level of literacy, flammability of women's local clothes and unsafe application/design of stove and heaters — being the main sources of cooking and heating — pose further burden on female injuries than males in the region.<sup>19</sup>

An unpleasant aspect of domestic injuries in this study is women victims of self-inflicted burns. Contrary to previous research,<sup>15</sup> intentional self-harm was responsible for a considerable number of burn admissions in this area, ranging from 12.16% in males to as high as 22.34% of all burn admissions in females. Again, this issue may be explained by unmet needs of women such as their low level of knowledge and attitude, tribal is-

sues, culture etc. Persistent self-inflicted injuries among females can signal deeper rifts in society that warrant broader examination and discussion.

The study findings revealed that in our locality most burn injuries are caused by flames (including kerosene) and scalds, with the minority caused by exposure to chemicals or electricity, which is the same finding reported by other authors.<sup>15,16,20,21,22</sup> This is largely due to the fact that flammable liquids such as gas and kerosene are nearly the most frequently used domestic fuels in Pakistan. The significant correlation between per cent TBSA burned and causes of burns showed that TBSA of 45% in kerosene oil-burned patients compared with other types of burns such as scalds. These findings suggest that kerosene oil and intentional injuries are two most important determinants of burn injuries, even though similar studies have pointed to flame as the mere determinant.<sup>6</sup>

Moreover, the study findings suggest that patients' age and gender are other important factors for determining burn injuries, where a higher number of deaths are associated with increasing age, and female patients. Cultural deficiency and socioeconomic deprivation together with easy access to inflammable materials would possibly contribute to the high frequency of self-inflicted burns in females.<sup>10</sup> Understanding the motive behind self-inflicted burns is vital if policy-makers' intervention is to be made successful.

## CONCLUSION

Proper education is needed at home and especially for females, which will reduce burn injuries and its complications.

## RECOMMENDATIONS

Effort should be made to increase literacy rate amongst women, and to design and produce safe home and kitchen appliances for cooking, preparing food and heating.

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### **AUTHOR'S CONTRIBUTION**

Following authors have made substantial contributions to the manuscript as under:

- Ahmad M:** Concept and design, data collection, literature review.
- Yousaf A:** Data analysis and manuscript writing.
- Muslim M:** Literature review.
- Ahmad N:** Compiling and reviewing, critical analysis.
- Maroof SA:** References collection, data analysis.
- Aurangzeb M:** Review the article.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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