Original Article

Epidemiological Assessment of Burn Injury Locations and Their Associations with Patient Demographics: Implications for Civilian Settings

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ABSTRACT

Background: Burn injuries remain a major cause of morbidity and mortality, imposing significant burdens on healthcare systems worldwide. Understanding the patterns and associated factors of burn injuries can inform prevention and treatment strategies. We aimed to characterize the burn incidents and their correlation with the location of occurrence.

Methods: This retrospective study analyzed data from 1,659 patients with burn injuries admitted to Amir-Al Momenin Hospital in Shiraz, Iran, between 2020 and 2022. Patient data, including age, sex, burn etiology, location, education level, outcome, extent of injury, and hospitalization duration, were analyzed using descriptive statistics and correlation assessments.

Results: Most patients were aged 18 to 64 years (63.3%), and 72% were male. Most burns occurred at home (69.9%), with explosions (32.9%) as the most common cause. Education level below diploma was most common (46.99%). Median hospitalization duration was 10 days, and most patients fully recovered (70.8%). Significant correlations were found between burn location and age, gender, education, and etiology ($P<0.05$). No significant correlations were observed between location and extent of injury, outcome, or hospitalization duration.

Conclusions: Home-based burns remain the most prevalent, with clear demographic associations. These findings highlight the importance of targeted prevention and educational programs, particularly for military housing environments where similar risk factors may exist.

KEYWORDS
Burns; Epidemiology; Home Safety; Demographic Factors

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INTRODUCTION

Burn injuries are among the most devastating forms of trauma, leading to significant physical and psychological consequences, prolonged rehabilitation, and considerable healthcare costs [1–3]. Globally, burns are the fourth most common injury, with over 11 million cases reported annually[3]. In the United States alone, approximately 600,000 burn-related visits to emergency departments occur each year [4]. Mortality rates vary significantly, with children in certain regions, such as sub-Saharan Africa, facing disproportionately high risks [1,3]. Overall, burns account for an estimated 180,000 deaths annually worldwide [1].

Burn injuries are influenced by numerous demographic and environmental factors. Studies have consistently shown a male predominance in burn patients, with children under 10 years representing a significant proportion in some settings [5,6]. Scalds are often reported as the leading cause of burns globally [7]. Lower educational attainment has also been linked to increased burn risk [8].

While the burden of burn injuries has been well documented, few studies have comprehensively analyzed how the location of burn incidents interacts with these demographic and clinical factors. Furthermore, given the parallels between civilian home environments and military housing or barracks, these insights have direct implications for military healthcare systems. In this study, we aimed to evaluate the relationship between burn incident locations and patient demographics in a civilian population in Shiraz, Iran.

METHODS

This retrospective study was conducted using records from the Burn Ward of Amir-Al Momenin Hospital in Shiraz, Iran, covering the period from 2020 to 2022. Ethical approval was obtained from the Ethics Committee of Shiraz University of Medical Sciences (IR.sums.rec.1402.582), and the study adhered to the principles outlined in the Helsinki Declaration.

Data collected included age, sex, burn etiology, location of burn, education level, outcome, Total Body Surface Area (TBSA), and hospitalization duration. Burn locations were classified as home, workplace, or public places. Statistical analyses were performed using SPSS version 22 (IBM Corp., Armonk, NY, USA). Normality was assessed with the Shapiro-Wilk test. Non-normally distributed quantitative variables were analyzed using the Kruskal-Wallis's test, while qualitative variables were assessed using the chi-square test. A *P*-value of <0.05 was considered statistically significant.

RESULTS

Demographic Characteristics

Of 1,659 patients, 1,193 were male (71.9%) and 461 were female (27.8%), with 5 missing gender data. Ages ranged from <1 to 97 years (median 32). Most patients (63.3%) were aged 18–64 years.

Education & Outcomes

Nearly half of the patients had less than a diploma (46.99%), followed by diploma (24.42%), illiterate (15.13%), and university education (13.45%). Most patients fully recovered (70.8%), while 18% died. Median hospitalization duration was 10 days (range: <1 to 76 days).

Etiology of burn injuries

Explosion and fire were the two leading causes of burn injuries in this study population. Explosion accounted for the highest proportion of cases, involving 546 patients (32.9%), followed closely by fire, which was responsible for 526 cases (31.7%). Overall, these findings show that flame-related and explosion-related injuries were the dominant mechanisms of burn trauma in this cohort (Figure 1).

Location of burn incidents

Most burn incidents occurred at home, which was the most common location by a wide margin, accounting for 1,160 patients (69.9%). Public places were the second most frequent setting, involving 260 cases (16.0%), followed by workplace-related burns in 239 patients (14.4%). This pattern suggests that the household environment remains the main setting for burn injuries in this population, highlighting the importance of home-based burn prevention strategies, public education, and safety measures aimed at reducing domestic burn risks.

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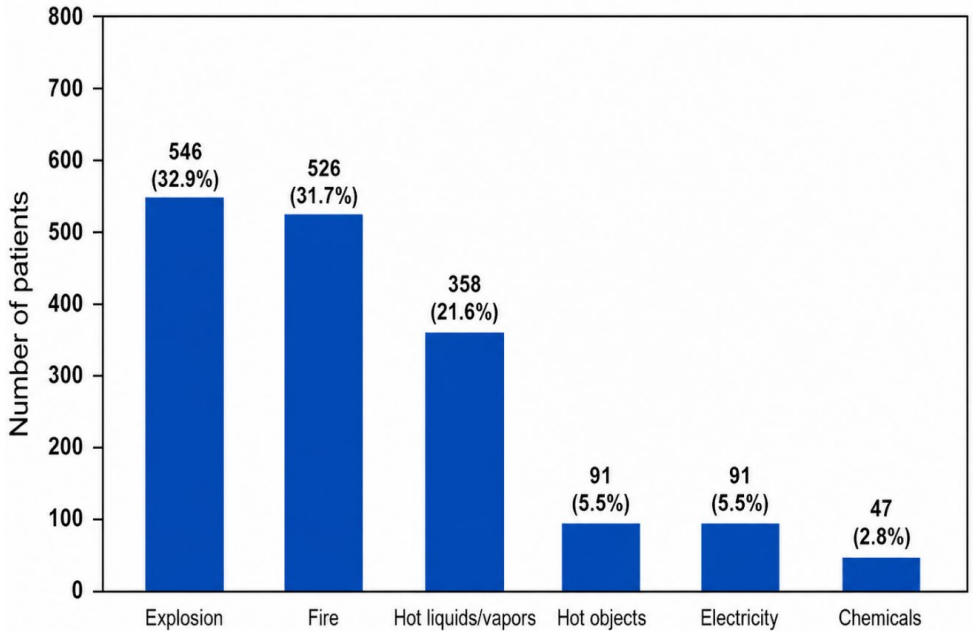

Figure 1: Etiology of burn injuries

Correlations

Significant correlations were found between burn location and age ($P < 0.001$), gender ($P < 0.001$), education ($P < 0.006$), and etiology ($P < 0.001$). Home was the most common site across all education levels and for both sexes (61.07% of male, 91.06% of female burn cases). No significant correlation was found between burn location and TBSA, outcomes, or hospitalization duration.

DISCUSSION

This study highlights the predominance of home-based burns, consistent with global trends [1,3,4]. The strong associations with gender, education level, and etiology underscore important demographic risk factors for burn injuries.

Interestingly, explosions emerged as the leading cause of burns, contrasting with studies from other regions where scalds are more common [7]. This finding might reflect region-specific factors, such as household gas use, fuel storage practices, and industrial proximity to residential areas. These explosion-related injuries also bear relevance to military environments, where exposure to explosive materials during training or combat increases burn risk.

The median hospitalization duration of 10 days was shorter than reported in some other settings, which might reflect differences in injury severity, resource availability, and treatment practices [9-11].

The significant correlation between lower education levels and burn incidence aligns with previous research [8]. Educational interventions—particularly in settings like military housing—could play a vital role in prevention. Moreover, the male predominance in our data (72%) mirrors findings in military burn populations, where occupational hazards and risk-taking behaviors may contribute to higher burn rates among men [5,12].

Given the civilian risks, these results suggest that systems should prioritize burn prevention programs, focusing on home and occupational safety within civilian communities.

CONCLUSION

Home-based burns are the most common, with clear links to demographic factors such as gender and education. Tailored prevention strategies and educational campaigns in these environments could help reduce burn incidence and improve outcomes.

ETHICAL STATEMENT AND CONSENT

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences (IR.sums.rec.1402.582). Informed consent was waived due to

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the retrospective nature of the study. All data were anonymized to protect patient confidentiality.

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