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Original Research Paper

Forensic Medicine

" ANALYSIS OF FATAL BURN INJURIES IN NEW DELHI, INDIA"

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ABSTRACT This article provides a detailed analysis of burn injuries and associated outcomes based on several key demographic and clinical factors. This study examines age distribution, sex distribution, causes of burn injuries, percentage of burns, and causes of death within the reported cases. The findings reveal notable patterns, such as a higher prevalence of burn injuries in the 16-30 age group, a predominant occurrence of flame burns, and a significant number of cases with burns area covering more than 60% of the body surface. The study also highlights the leading causes of death, with septicemia identified as the primary contributor. These insights contribute to a comprehensive understanding of the complex landscape of burn injuries, guiding targeted preventive measures, medical interventions, and public health strategies.

KEYWORDS : Profile; Burns injuries; Fatal Burns

INTRODUCTION

Throughout history, humanity needs the power of fire for basic comforts and survival. Fire, a vital element for sustaining life, also introduced the risk of burn injuries. In India, fatal burns persist as a significant public health challenge affecting all segments of society, leading to elevated risks of morbidity and mortality. Whether in cities or villages, fire is omnipresent in our homes. Annually, around 60,000 individuals in India experience burns, with over 50,000 seeking hospital treatment and approximately 10,000 succumbing to thermal injuries.[1] The aftermath of burns, particularly when extensive skin damage occurs, often results in severe microbial infections, contributing to patient fatalities, with septicemia accounting for 45% of such mortalities.[1] Disturbingly, extrapolated data from three major government hospitals in Delhi indicates an annual toll of 1.4 lakh lives lost to burn injuries in India, equivalent to one death every four minutes.[2] Despite these alarming figures, burn injuries remain largely unrecognized in the country. The multifaceted nature of burn injuries involves diverse etiological factors and demographic profiles. The direct correlation between the percentage and depth of burn injuries serves as a determining factor for the cause of death.

MATERIALS AND METHODS

This retrospective study was carried out at the Department of Forensic Medicine, Maulana Azad Medical College & Associated Hospital, New Delhi, focusing on burn injury cases subjected to medicolegal postmortem examinations from January 2018 to December 2022. The inclusion criteria encompassed all instances of death resulting from burn injuries that were brought to the medicolegal postmortem center of the tertiary care hospital for thorough examination. To maintain the study's focus and integrity, certain exclusion criteria were applied, specifically excluding cases involving decomposed bodies and deaths associated with other serious, life-threatening traumatic injuries, such as head injuries, which could potentially influence the accurate determination of the cause of death. Throughout the study period a total of 3699 autopsies were carried out of which 333 cases of burn were identified their age, sex, type of burns, agent causing burns, total body surface area involve and cause of death were noted.

Ethical Approval: This retrospective study maintain confidentiality by not disclosing any information regarding the identity or personal details of the deceased. Hence, approval from the Institutional Ethics Committee is not required.

RESULTS

Age distribution among the cases (Table 1), are providing a comprehensive overview of the demographic composition. The data is categorized into five age groups, each accompanied by the corresponding number of cases and the percentage they represent within the total dataset. The youngest age group, 0-15 years, accounts for 13.81% of the cases, with a total of 46 reported instances. The 16-30 years age range constitutes the largest proportion, comprising 39.63% of the cases, with a total of 132 reported incidents. Following closely, the 31-45 years age group represents 27.62% of the cases, totaling 92 reported instances. The 46-60 years and above 60 years age groups contribute 12.01% and 6.90%, respectively, with 40 and 23 reported cases. This breakdown provides valuable insights into the distribution of cases across different age demographics, aiding in a more understanding of the affected population.

Table 1: Age Distribution

Age group	Number of Cases	Percentage
0-15 years	46	13.81
16 -30 years	132	39.63
31-45 years	92	27.62
46-60 years	40	12.01
Above 60 years	23	6.90

Sex distribution within the dataset, presenting the number of cases for both males and females along with their respective percentages. Among the reported cases, there are 180 males, constituting 54.05% of the total, while females account for 153 cases, representing 45.94%. This breakdown provides a clear overview of the gender distribution among the affected individuals. The presented percentages offer insights into the relative prevalence of the condition within each gender group,

contributing valuable information for further analysis and understanding of the demographic patterns associated with the reported cases.

Type of burn injuries as presented in table no 2, shedding light on the distribution of cases based on the nature of the incidents. Flame burns emerge as the predominant cause, constituting 48.64% of the total cases, with a reported number of 162 incidents. Scalds represent another significant contributor, accounting for 45.04% of the cases, with a total of 150 reported instances. Chemical burns, though less common, are still noteworthy, comprising 2.40% of the cases, with 8 reported incidents. Similarly, electrical burns contribute to the overall distribution, making up 3.90% of the cases, with a reported number of 13 incidents. This comprehensive breakdown of type burn injury causes facilitates a deeper understanding of the prevalent factors leading to such incidents, offering valuable insights for preventive measures and targeted interventions in public health and safety initiatives.

Table 2: Type of Burn Injuries

Cause of Burn Injuries	Number of Cases	Percentage
Flame Burns	162	48.64
Scalds	150	45.04
Chemical Burns	08	2.40
Electrical Burns	13	3.90

The percentage of total body surface area involved in burn as shown in table no 3. The data is segmented into three categories: burns covering above 60%, burns ranging from 31% to 60%, and burns spanning 0% to 30%. The majority of cases, constituting 70.27%, fall into the category of burns above 60%, with 234 reported incidents. Burns affecting 31% to 60% of the body surface area account for 18.01% of the cases, totaling 60 instances. The remaining 11.71% of cases involve burns covering 0% to 30% of the body surface area, with 39 reported incidents.

Table 3: Total body surface area involved in burns

Percentage of Burns	Number of Cases	Percentage
Above 60	234	70.27
31- 60	60	18.01
0-30	39	11.71

The causes of death among the reported cases (Table 4), are offering critical insights into the factors contributing to mortality in the context of the presented data. Septicemia as the leading cause of death, accounting for a substantial 68.76% of the cases, with 229 reported instances. Hypovolemic burn shock represents another significant contributor, comprising 18.91% of the cases and resulting in 63 reported deaths. Asphyxia is identified as a cause in 11.41% of the cases, with 38 reported deaths attributed to this factor. In a smaller proportion, renal failure is cited as the cause of death in 0.90% of the cases, with three reported instances. This comprehensive breakdown aids in understanding the primary factors leading to mortality in the studied population, facilitating targeted interventions and healthcare strategies to address and mitigate these specific causes of death.

Table 4: Cause of Death

Cause of Death	Number of Cases	Percentage
Septicemia	229	68.76
Burn Shock	63	18.91
Asphyxia	38	11.41
Renal Failure	03	0.90

DISCUSSION

Throughout history, burn injuries have afflicted people across diverse societies, presenting significant medical, psychological, and socioeconomic challenges. These challenges extend beyond individual victims, impacting families and communities in developed and developing countries alike.

In our study, the highest incidence of fatalities was observed in the 16 to 30 age group, constituting 39.63% of the cases. This finding when compared to the studies conducted in Egypt where the highest percentage of burn cases was reported in the 0 to 10 age group[3], indicating a discrepancy in age distribution patterns. When we compare this finding with the study conducted in Karnataka demonstrated that the 14-30 age group had the maximum burn injury cases[2], supporting our findings.

The sex distribution in our study revealed 54.05% male victims these observations were comparable to studies from various regions of India. Pakistan and Holland. [17,18,19,20,21], in contrast with studies in North India and Karnataka showing a higher percentage of female victims[5,6].

The most prevalent type of burn in our study was flame burns, accounting for 48.64%, consistent with findings in West Bengal, Indore, and Delhi [9,10,11]. Analysis of the percentage of burns demonstrated a higher fatality rate in cases with burns above 60%, in line with studies conducted in Delhi, Loni, and Odisha [11,13&12] . The primary cause of death in our study was septicemia, accounting for 68.76%, these findings were similar to the study conducted in Delhi and other studies where septicemia and shock were identified as major contributors to mortality[11,15&16]. These similarity and variations in our findings, when compared with existing literature, emphasize the complex and multifaceted nature of burn injuries, necessitating comprehensive approaches in preventive and therapeutic strategies.[3-16]

CONCLUSION

In conclusion, this study provides comprehensive insights into various aspects of burn injuries. Analysis of age and sex distributions reveals demographic patterns, while examination of burn types, extent of body surface area involved, and causes of interventions. Understanding these factors is crucial for devising effective healthcare strategies aimed at reducing the incidence and severity of burn injuries and improving outcomes for affected individuals.

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