

Original Research Article

Pattern of burn injury admissions at a teaching hospital of Karnataka, India: a three year retrospective study

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ABSTRACT

Background: The study aims to review current trends in epidemiology, demographics and pattern of burn injury over three year period.

Methods: A retrospective study was done using the records of all burn patients admitted from January 2013 to December 2015 at Teaching Hospital, HIMS Hassan. The records were analysed for socio demographic profile, pattern of injuries and outcome.

Results: 390 patients were enrolled in the study. Woman patients marginally outnumbered men (52.6% vs. 47.4%). Accidental burns were 92.8%. 84.6% of the patients sustained burns at their home. Flame burn constituted 62.6 % and scald burns 31% of the total burns.

Conclusions: Burns is still an issue of concern. Our study highlights the need for a burns data- base to know the reasons and what measures could prevent the occurrence. Number of patients referred is high indicating the need for specialist services at the District level.

Keywords: Accidental burns, Epidemiology, Fire safety, Pattern of injuries, Scalds

INTRODUCTION

Burn injuries and their sequelae are major causes of morbidity and mortality worldwide. It has both psychosocial and economic impact to the patient and to their family. It is one of the preventable condition for which education is essential. Adequate knowledge of the epidemiological characteristics and associated risk factors and a good practice of burn management can reduce the mortality and morbidity of burn patients.

Burn injuries rank among the most severe types of injuries suffered by the human body with an attendant high mortality and morbidity rate.¹

Burns constitute a major public health problem globally, especially in low and middle-income countries where over 95% of all burn deaths occur. Fire-related burns alone account for over 300,000 deaths per year.² Burn deaths are classified among the 15 leading cause of deaths in India. Microbial infection after burns, where a large portion of the skin is damaged, is a very serious complication that often results in the death of the patients. About 45% of the mortality in burns patients is caused by septicemia.^{3,4}

In India alone 7 million people suffer from burn injury, out of which, 7 lakh need hospital admission and 2.4 lakh become disabled. As per the data extrapolated from the information received from three major government

Hospital in Delhi, approximately 1.4 lakh people die of burn injuries annually. This comes to one death every 4 minutes due to burns; however, burn injury is mostly unrecognized in our country.⁵

With the establishment of National Programme for prevention and management of burn injuries (NPPMBI) each identified district hospitals will have to fill up data in the prescribed format and communicate the same to the monitoring cell at DGHS for the purpose of analysis.⁵

In different communities the aetiological factor of burn injuries varies considerably, hence a careful analysis of the epidemiological factors in every community is needed before planning and implementation of a sound prevention programme.⁶

Hence, this study was undertaken to study the socio-demographic profile of burn patients and also to evaluate the aetiology, manner, and circumstances of occurrence of burn injuries along with their outcome.

METHODS

This is a three year retrospective record based study approved by Institutional Research Committee and cleared by Institutional Ethical Committee. All patients (n=390) admitted in burn ward of Surgery department during the study period of three years from January 2013 were included in the study. Study setting includes dedicated burns ICU and Burns ward, Surgery department of HIMS teaching hospital.

Inclusion criteria

All patients admitted in burn ward of surgery department during the study period.

Exclusion criteria

- Acute burns cases treated as outpatients.
- Cases admitted for treatment of post burn contractures.

The records of all the patients admitted in burn ward at HIMS, Teaching hospital were analysed from January 2013 to December 2015 using a specially designed pre-tested form for the collection of epidemiological information. Total Body Surface Area of burn was assessed using Wallace's Rule of Nine and Rule of Five among children.

Information was sought regarding socio demographic profile, length of hospital stay, type, causes, place of burns, total body surface area affected (tbsa), degree/depth of burns, outcome, causes of death, surgical procedures performed.

Statistical analysis was done using microsoft excel for data entry and epi info software for analysis. Descriptive statistics to summarize, student t test and chi square test to co-relate risk factors.

RESULTS

A total of 390 patient records were examined in the study. The age of the patients varied from 4 months to 85 years. The mean age was 28 years (SD±16.51 years). Median age was also 28 years while mode was 35 years. Among these, 4.9% (19 patients) were aged 1 year or lesser while 3.3% (13 patients) were aged 65 years and above (Table 1). Woman patients were more than men (52.6% vs. 47.4%) (Figure 1).

Table 1: Distribution of patients according to the different age group.

Age group (years)	Frequency (n)	Percentage (%)
≤14	79	20.3
14-25	94	24.1
25-30	69	17.7
30-40	79	20.3
≥40	69	17.7
Total	390	100

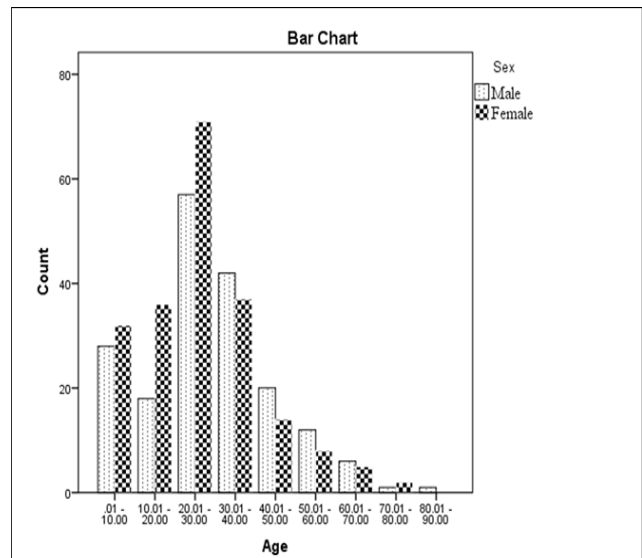


Figure 1: Age-sex distribution of the patients.

Flame burns were the most common type of burns (62.6%). It was the most common type of burns among women as well (70.2%). Flame burns were more common among females (59%) when compared to males (41%), (χ^2 p value=0.0009). Scalds were 31% of all burns and there was no statistical difference between the genders. Electric and chemical burns were reported only among males and constituted less than 6% of all cases. Rescue burns were reported in only 3 cases.

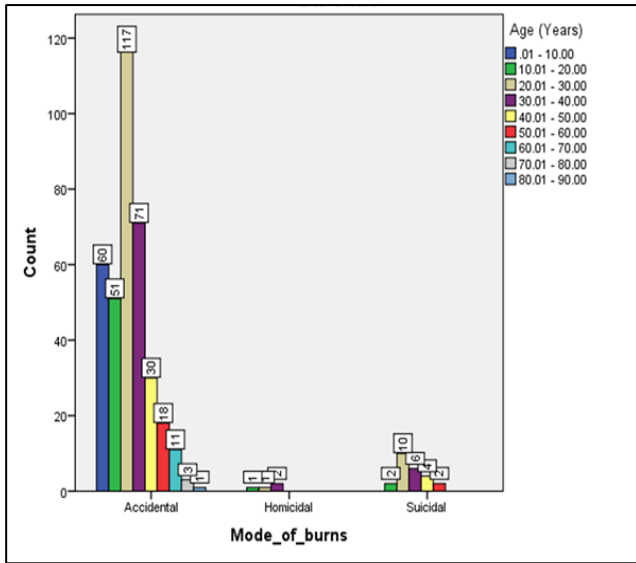


Figure 2: Age wise distribution of mode of sustaining burns.

Flame burn was predominantly found in the age group of 14-25 years (29.5% of flame burn) though it did not differ statistically with ages more than 25 years. However, this was different from patients aged less than 14 years, who had only 5.7% for flame burns. In this

group, scald burns was higher (53.3% of scald burns). This was significantly less in the other groups.

Among the burns victims, 35.9% were housewives, 35.6% were daily wage labourers, 14.1% were students, and 13.3% were children while 1% was unemployed (Table 2).

Majority of the burns occurred at home (84.6%), followed by at workplace (10.5%) and outdoor. Among the cases in women, 97.6% occurred at home while among men, 70.3% occurred at home.

Majority of the burns involved less than 25% of BSA (49.2%). Average extent of burns involved was 32.9% of BSA. Among female cases, 58.4% sustained burns involving less than 25% of the body surface area (BSA), 31.4% sustained burns involving 26-50% of BSA, 6.5% had burns involving 51-75% BSA while about 3.8% had more than 75% BSA involvement. Among males, 43.8% sustained less than 25% burns, 34.1% sustained 26-50% burns, 14.1% sustained 51-75% burns while about 10.7% sustained more than 75% burns. Children (88.5%), students (72%) and labourers (77%) sustained more superficial burns than deep or mixed burns. Housewives also suffered from more superficial (59%) and deep burns.

Table 2: Types of burns and category of patients.

Specific type of burns	Housewife (%)	Labourer (%)	Students (%)	Children (%)	Unemployed (%)	Total (% total burns)
Flame-Chulla	12 (8.6)	1 (0.7)	0 (0)	0 (0)	1 (25)	14 (3.6)
Flame-indigenous kerosene lamp	9 (6.4)	7 (5)	4 (7.3)	0 (0)	0 (0)	20 (3.8)
Flame-kerosene stove	65 (46.4)	33 (23.7)	4 (7.3)	3 (5.8)	0 (0)	105 (26.9)
Flame-LPG cylinder	12 (8.6)	27 (19.4)	11(20)	4 (7.7)	0 (0)	54 (13.8)
Flame-pouring of kerosene	14 (10)	15 (10.8)	1 (1.8)	0 (0)	0 (0)	30 (7.7)
Scald-hot beverage	0 (0)	1 (0.7)	4 (7.3)	11 (21.2)	0 (0)	16 (4.1)
Scald- hot oil	1 (0.7)	5 (3.6)	5 (9.1)	6 (11.5)	1 (25)	18 (4.6)
Scald-hot water	16 (11.4)	20 (14.4)	21 (38.2)	27 (51.9)	1 (25)	85 (21.8)
Chemical-acid	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.3)
Electric-livewire	0 (0)	11 (7.9)	1 (1.8)	0 (0)	0 (0)	11 (2.8)
Others	8 (5.7)	7 (5)	4 (7.3%)	1 (1.9)	1 (25)	21 (5.4)
Not recorded	2 (1.4)	12 (8.6)	1 (1.8)	0 (0)	0 (0)	15 (3.8)
Total	140 (100)	139 (100)	55 (100)	52 (100)	4 (100)	390 (100)

Majority of children (75%), students (69%) and labourers (50%) had suffered from less than 25% burns, while majority of housewives (38.6%) suffered 25-50% burns.

Most of the burns due to livewire (81.8%), indigenous kerosene lamp related accidents (60%), hot beverages (88%), hot oil (72%) and hot water (74%) resulted in burns less than 25% of BSA. Most of the burns due to chulla (43%), kerosene stove (46.7%), LPG cylinder (39%), pouring of kerosene (30%) and acid (100%) resulted in burns involving 25-50% of BSA. Among

burns that involved 50-75% of BSA, majority (39%) was due to kerosene stove, followed by those due pouring of kerosene (24%) and LPG cylinder related (22%).

Among burns that involved more than 75% of BSA, the predominant causes included flame burns like kerosene stove (41%), LPG cylinder (13.8%), pouring of kerosene (13.8%), and burns due to chulla (6.9%) and scald burns due to hot water (6.9%). None of the other specific types of cause resulted in burns more than 75%.

Table 3: Mean days of hospital stay and mean total body surface area burnt according to various factors.

Characteristics		Mean hospital stay (Average 6.9 days)	Mean TBSA (Average 36.09)	P value
Sex	Male	5.13	30.7	<0.05
	Female	4.39	41.2	
Cause	Flame	5.41	42.9	<0.000
	Scald	3.15	21.3	
	Electrical	10.0	28.5	
	Chemical	4.5	12	
Intent	Accidental	4.9	34.5	<0.05
	Suicidal	2.43	64.2	
	Homicidal	1.0	30.0	
Outcome	Recovered	5.9	21.3	<0.000
	Referred	3.6	51.5	
	Discharged against medical advise	1.5	17.3	

Superficial burns were more common among men (53.9%) than women. Deep burns were more common among women (69.2%). This was statistically significant ($\chi^2=17.447$, p value=0.000). Most of the children (75%), students (65.5%) and labourers (56%) sustained superficial burns while deep burns were found in 51.4% of housewives. Burns due to chulla (78.6%), indigenous kerosene lamp (65%), scald burns like hot beverages (81%), hot oil (66.7%) and hot water (78.8%) and electric burns (54.5%) resulted mainly in superficial burns. However, burns due to flames from kerosene stove (54.3%), LPG cylinder (57.4%), pouring of kerosene (73.3%) resulted in deep burns. The acid (chemical) burns showed a mixed pattern.

DISCUSSION

Majority of the burns were reported in our study were in younger age group which was found statistically significant (p<0.05) indicating greater exposure to burns agent in this age group. Younger age group burns was found to be common in studies done at similar tertiary care centres.⁶⁻¹⁰

Females showed higher burns rate similar to many other studies who have reported increased prevalence in females.^{1,6-8} Although superficial burns were more common among men (53.9%) than women. Deep burns were more common among women (69.2%). This was statistically significant ($\chi^2=17.447$, p value=0.000) because of burns due to flames from kerosene stove (54.3%), LPG cylinder (57.4%), pouring of kerosene (73.3%) resulted in deep burns. Female domestic responsibilities make her more susceptible to injuries.⁷ Flame burn was reported in majority of cases followed by Scalds and electric burns.^{8,9} In present study majority belonged to rural areas (95%) and below poverty level (80%). Safe cooking practices, use of electricity in

cooking and education level are important areas to reduce burn incidence.¹⁰

Majority of the burns were accidental (92.8%), followed by suicidal burns (6.2%). Most of the suicidal cases are reported as accidental to avoid legal procedures. Accidental burns and suicidal burns were reported mainly from the 20-30 years age group .While the occurrence of accidental and suicidal burns did not statistically differ between the two genders ($\chi^2=3.6$, p=0.158), all the homicidal burns were reported in female patients. Similar results are reported from studies conducted in India and abroad.^{6-8,11-14}

Mean total body surface area (TBSA) was 36.09%. Mean TBSA reported by Jain M et al, was 45.33%, and in Egypt, Hameda et al, reported mean TBSA 32±5.7% similar to our study.^{10,15} More than 25% TBSA was reported in 265 (60.3%) patients of whom 47% recovered, 48% referred 3% got discharged against medical advice. Among 184 (41%) patients who reporting >40% TBSA burns 100% were referred to higher centre for further management.

Hospital stay of burns victims ranged from few hours to 49 days. Average days of admission were 6.9 days. Mean hospital stay in other studies also varied from 6 days to 12 days.^{9,10,14,16}

Downward trend in burn incidence, length of hospital stay, referral rate and severity were observed in authors’ three year study period.

Majority of the burns occurred at home (84.6%), followed by at workplace (10.5%) and outdoor. Thus preventive health education at household level and community level is a component to be strengthened with the help of health workers and NGOs through the

implementation of National Programme on prevention and management of burn injuries.

Limitations of the study are we could not get follow up data of discharged and referred cases. Since its record based study information such as time interval between injury and admission, first aid practised at home etc could not be collected. Further studies are required to investigate the prognostic factors of burns outcome to improve the recovery rate of burns patient.

CONCLUSION

The study gives a comprehensive overview of socio demographic characteristic of burn patients admitted to Burns Unit and burns ICU of Surgery Department of HIMS, Hassan over a three year period. Burns were predominately accidental in nature involving productive age group especially females. Flame is the common cause of burn injury in our study. Majority of burns are preventable; so public health programmes about various etiological factors and their preventive measures are necessary.

Study highlights the need for data base of burn victims to understand the trends and reasons for burns among the patients admitted to burns ward. Standard operating protocols for referral and necessary management tools at the District Hospital should be strengthened.

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