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Original Research Article

Clinico-epidemiological study of burn patients admitted in a tertiary care hospital of Solapur, Western Maharashtra

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ABSTRACT

Background: Burn injuries constitute a major public health problem and account for a significant cause of high mortality and morbidity amongst the Indian population. This results in heavy social, economic and clinical burden to the nation. The aim of the study was to evaluate the demographic and clinical profile of burns patients admitted in a tertiary care center and to study the socio-demographic and clinical profile of burn patients and to assess the outcome of burn patients.
Methods: Hospital based descriptive study with cross sectional design was done using the records of all burn patients admitted in burn ward of surgery department during 1st January 2019 to December 31st 2019.
Results: Burn injuries were most common in the age group of 41-60 years. The male to female ratio was 0.65: 1. Most of the burn incident took place in rural area (73%) and rest (27%) in urban area. Most of the mode of burn injury (88.7%) were accidental burns, 8.2% had alleged history of suicide and in rest 3.1% homicide was suspected. Mortality ratio was 33.30% and 66.70% of patients got discharged from the hospital. A higher TBSA involvement is statistically associated with an increased risk of mortality ($p<0.05$).
Conclusions: The prevention strategies for burns should address the hazards of specific burn injuries, awareness education for vulnerable population and targeted first aid training. The burn units should be established well to reduce the mortality.

Keywords: Cross-sectional, Record based, Epidemiological, Burns, Mortality, Total body surface area

INTRODUCTION

Burn injuries are an important public health problem both in developing and developed nations due to prolonged periods of morbidity, disability and mortality amongst young and middle-aged adults, accounting for an estimated 1,80,000 deaths annually.[1] Goldman describes burns as 'the silent epidemic'.[2] Burn injuries happen all over the world beyond geographical boundaries and adversely affects mankind. Every year about 200000 people die from burn injuries worldwide (WHO report, 2020).[3] In India more than 23,000 burn associated deaths and more than 10,00,000 nonfatal moderate to severe burns occurred in the year 2020.[3] Every year 15% deaths in India occur due to burn injuries.[4] Burns have severe financial and psychosocial consequences not only to the persons affected but also to their family and society in general.[5]

In all societies, burns represent severe medical, social and psychological issues. In a developing country like India, it is still more challenging due to poor medical facilities, lack of safety measures, absence of public awareness, dowry, poverty and illiteracy all of which have a significant impact on the outcome; which in turn is associated with significant mortality and morbidity. Burn injuries continue to be a demanding problem due to underprivileged medical amenities, lack of safety measures, deficiency of community awareness, poverty and illiteracy. Burn has also a social dimension, linked with accidental, suicidal or homicidal causes.[5]

Clinical studies addressing the factors contributing to increased mortality clearly indicate the role of microbial infection leading to sepsis and shock. Bacterial colonization and multiplication were much more in burns area than surgical wounds, due to the huge area exposure and prolonged exposure to hospital flora.[6] Infection is one of the major factors of morbidity and mortality of burns patients, 75% of mortality rate of burn injuries interlinked with sepsis specifically in developing countries. Knowledge about the local data on the prevalence of infection, microbiological profile and antimicrobial sensitivity pattern is the basal need to develop efficient burn care facility to minimize mortality due to septic shock.

Epidemiological studies is the first step in the understanding of precautionary and management strategies and plays an essential role in detection of risk factors and high-risk groups.[7,8]

Despite the significance of burns both from clinical as well as the social point of scrutiny, there is wide insufficiency of research material on burns in India. The aim of the study was to evaluate the demographic and clinical profile in Solapur, Western Maharashtra

Aim and objectives

The aim and objectives of the study were (a) to study the socio-demographic and clinical profile of burn patients; and (b) to assess the outcome of burn patients.

METHODS

Record based observational descriptive study with cross sectional design was conducted on burn patients admitted in burn ward of surgery department, Dr. V. M. G. M. C and Shri C. S. M. S. R, Solapur, a tertiary care hospital in Western Maharashtra during 1st January 2019 to December 31st 2019 (1 year).

Sample size and selection

Universal sampling technique was employed for selection of study participants. The study was conducted on 159 patients based on the records over a period of 1 year ranging from January 2019 to December 2019. All patients admitted in burn ward of surgery department during the study period were included. Acute burn cases treated as outpatients were excluded.

A proforma was used to collect demographic data such as age, sex, place of residence, time of occurrence, place of burn and clinical profile such as mode of injury, TBSA involved, degree of burn areas affected, percentage of burns, nature and type of burns, duration of stay and treatment outcome.

The data collected were entered into MS excel sheets and analysis was carried out using SPSS software. Measurement data were expressed in mean±SD and categorical data were expressed in percentage and frequency. The Chi-square test, Parametric test (t test and ANOVA test) were used. The results were expressed as bar chart, pie chart and tabulated forms. The statistical significance level of the test was expressed as α=0.05.

RESULTS

During the study period, 159 patients were admitted to the burns ward. Out of 159 patients, 63 (39.6%) were males, 96 (60.4%) were females (Figure 1). The overall male to female ratio was 0.65:1. The age of patients ranged from 10 years to 72 years. Burn injuries were observed maximum 99 (62.30%) in the age group of 41-60 years and minimum number of patients 18 (11.30%) were observed in more than 60 years age group (Figure 2). The mean and standard deviations of ages for the female patients were 35.67±9.65. The mean and standard deviations of ages for the male patients were 49.46±10.25. Majority of the patients were married, 71.69% (N=114) and unmarried patients contributed to 28.30% (N=45). In most of the cases 73% (N=116), burn incident occurred at rural areas, whereas in urban areas only 27% (N=43) of burn incident occurred (Figure 3).

Most of burn injury was due to accidental burns (88.7%) followed by suicidal burns (8.2%) and homicidal burns (3.1%). Among the suicidal cases 46.15% were young married females. Accidental burn was observed more 60.28% (N=85) in females than males 39.7% (N=56). Same findings were observed in suicidal burns where females were the most victim 69.23% (N=9) than males 30.77% (N=4). But Homicidal burn was observed more 60% (N=3) in males than females 40% (N=2). The difference was found not statistically significant ($p>0.05$) (Table 1).

Maximum number of patients (38.37%) were sustained burns with TBSA of 26-50% and minimum number of patients (10.06%) were admitted with TBSA of 51-75% and 56 patients (35.22%) sustained burns with TBSA<25% and 26 patients (16.35%) admitted with TBSA of <75%. Nearly all the burns patient 92.30% (N=24) admitted with TBSA of >75% were died and nearly all the patients 96.43% (N=54) admitted with TBSA of <25% had been discharged. The difference was found highly statistically significant ($p<0.01$) (Table 2).

Major outcome 68.7% (N=97) of accidental burns were survived and discharged from hospital and major outcome 60% (N=3) of homicidal burn patients got discharged from the hospital, whereas the major outcome 53.8% (N=7) of suicidal patients were died. Most of the patients (66.67%) got discharged from the hospital and remaining 33.33% died during hospital stay. The difference was found not statistically significant ($p>0.05$) (Table 3). More than half of the patients (57.90%) who stayed less than 1 day was dead. Nearly all the patients (about 96.30%) who stayed more than 14 days got discharged from the hospital.

Maximum number of the patients 37.74% (N=60) stayed between 1 to 7 days and minimum number of patients 11.95% (N=19) stayed less than 1 day in tertiary care hospital. The difference was found highly statistically significant (p<0.01) (Table 4).

Maximum number of patients who stayed in hospital less than 1 day (42.10%) was sustained with TBSA of >75% and minimum number of patients (10.53%) were sustained with TBSA of 51-75%. Maximum number of patients who stayed between 1-7 days (33.33%) was admitted with TBSA of 26-50% and minimum number of patients (15%) were admitted with TBSA of 51-75%.

Maximum number of patients who stayed between 8-14 days (50%) was admitted with TBSA of 26-50% and minimum number of patients (3.70%) were admitted with TBSA of >75%. Maximum number of patients who stayed more than 14 days (50%) was admitted with TBSA of <25% and minimum number of patients (3.84%) were admitted with TBSA of >75%. The difference was found highly statistically significant (p<0.01) (Figure 4).

Table 1: Gender-wise distribution of patients with mode of burn injury (N=159).

Mode of burn injury	Gender N (%)		Total (N=159) (%)
	Male (N=63)	Female (N=96)	
Accidental	56 (88.8)	85 (88.5)	141 (88.7)
Suicidal	4 (6.4)	9 (9.4)	13 (8.2)
Homicidal	3 (4.8)	2 (2.1)	5 (3.1)
Total	63 (100)	96 (100)	159 (100)

Note: X^2=1.29, p=0.52 (not significant p>0.05), df=2.

Table 2: Association between total body surface area burnt and outcome of treatment (N=159).

TBSA (%)	Treatment outcome N (%)		Total (%)
	Death	Discharged	
Less than 25	2 (3.77)	54 (50.94)	56 (35.22)
26-50	17 (32.08)	44 (41.51)	61 (38.37)
51-75	10 (18.87)	6 (5.66)	16 (10.06)
More than 75	24 (45.28)	2 (1.89)	26 (16.35)
Total	53 (100)	106 (100)	159 (100)

Note: X^2=69.9, p<0.01 (highly significant), df=3.

Table 3: Association between mode of injury and treatment outcome of burns patient (N=159).

Mode of burn injury	Treatment outcome N (%)		Total (%)
	Death	Discharged	
Accidental	44 (31.21)	97 (68.79)	141 (100)
Suicidal	7 (53.85)	6 (46.15)	13 (100)
Homicidal	2 (40)	3 (60)	5 (100)
Total	53 (33.33)	106 (66.67)	159 (100)

Note: X^2=2.84, p=0.24 (p>0.05-not significant), df=2.

Table 4: Association between duration of stay and treatment outcome of burns patient (N=159).

Duration of stay (in days)	Treatment outcome N (%)		Total N (%)
	Death	Discharged	
<1	11 (57.90)	8 (42.10)	19 (100)
1-7	26 (43.33)	34 (56.67)	60 (100)
8-14	15 (28.30)	38 (71.70)	53 (100)
>14	1 (3.70)	26 (96.30)	27 (100)
Total	53 (33.33)	106 (66.67)	159 (100)

Note: X^2=19.12, p<0.01 (highly significant), df=3.

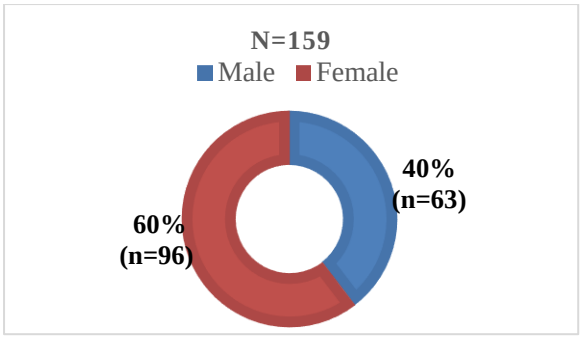

Figure 1: Gender-wise distribution of students (N=159).

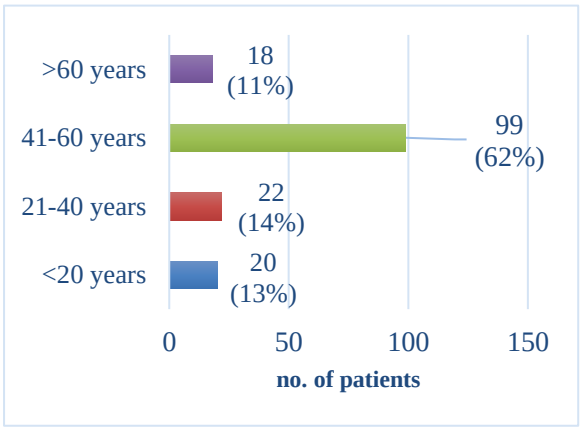

Figure 2: Age-wise distribution of burn patients (N=159).

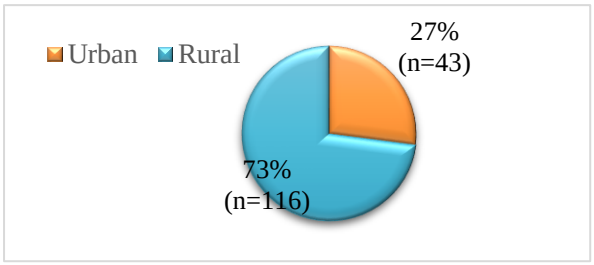

Figure 3: Distribution of patients according to the place of burn incident (N=159).

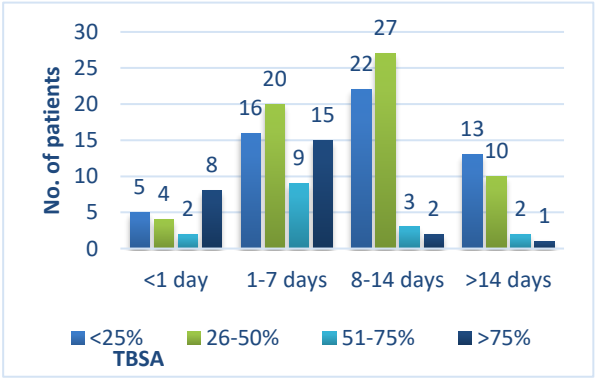

Figure 4: TBSA wise distribution of burn patients with duration of stay (N=159).

DISCUSSION

In this study, majority (62%) of the burn's cases were falling in the age group of 41-60 years. Similar studies have been reported by Honnegowda et al, Nadkarni et al where majority of the patients were falling in 26-50 years age group.[9,10] The mortality and prolonged morbidity in this productive age group irrespective of the gender imparts a high socio economical loss to the country. The psychological impacts inflicted on the family members definitely affects the quality of their life, worst affected being the children. These findings were in accordance with the data form other parts of the country and is being supported by the global data also.[11] As per the NFHS 5 (19-21) report of India, the male to female ratio in this region is 0.98:1. Male to female ratio in present study was 0.65:1. The observation of female predominance among burn patients was similar with other studies from Tamil Nadu and the national data from other states also coincides with this observation.[10-12] This could be attributed to the male-dominant society and females' close proximity to fire throughout the day and night. More number of married persons (71.69%) encountered burn injuries compared to unmarried (28.30%) in this study. Among them married young females (61%) outnumbered married males (39%). This observation was supported by other studies from various regions of India.[13]

The increased percentage of contribution of married young females in this kind of fatal injury throws light on the social and psychological factors prevailing in the society that determines the vulnerability of this subset of population. Regionalized marital practices like dowry, psychological burden in view of relationship with relatives of husband's side, emotional disturbances related to delay of child birth, economic dependence of young married women on their male counterparts, lack of education are all certain serious issues that need to be contemplated upon in view of this young married female predominance among burn victims in this area.

Most of the victims among female are house wives who spend more time in kitchen and have easy access to the most commonly used agent kerosene. Accidental domestic gas explosions also target the female population who are readily available in the kitchen area. In our present study, most of the burn incident took place in rural areas (73%) than urban areas (27%). Similar study findings were observed in various studies like Nadkarni et al, Haralkar et al.[10,12] In our study, mode of burn injury was high due to accidental burns (88.7%) followed by suicidal burns (8.2%) and homicidal burns (3.1%). Similar study findings were observed in various studies like Nadkarni et al, Haralkar et al, Krishnamurthy et al.[10,12,14] Major outcome of the burns patient in the present study was discharged (66.67%) and remaining 33.33 % died during the hospital stay. Similar study finding was observed by Nadkarni et al but the studies in earlier part of 21st century findings shows that majority of the burn's patient died and least number of patients got discharged from the hospital.[10,13,15]

Limitations

The major limitation of the present study was that the sample sizes were limited to the students of a government medical college, and hence the results based on the used sample sizes could not be generalized to all the populations. Due to the questionnaire being self-answered by the participants, there was also a high chance of errors or misrepresentation of information. Less demographic variables were also a limitation.

CONCLUSION

Burns were predominately involving productive age group especially females. Most of the burn incident took place in rural areas. Among 159 patients 1/3rd of the patients admitted in the burn ward was dead and about 2/3rd of the patient got discharged from the hospital. Mortality among the patients with history of suicidal burns was higher than that in homicidal and accidental burns. A higher TBSA involvement is statistically associated with an increased risk of mortality ($p<0.05$). Burns are one of the leading causes of preventable morbidity and mortality provided the prevention strategies address the hazards of specific burn injuries, awareness education for vulnerable population and targeted first aid training. Well established burn units are essential to reduce the mortality. Psychologists have a role in relieving the stress related problems among younger generation. Hope after burns must be given to the survived burn patients and physiotherapy and rehabilitation are very important in reducing the morbidity.

Recommendations

The epidemiology of thermal burns varies in different parts of the globe due to literacy, civilization, social and cultural activities. Since India is a country of various culture and customs, clinical and epidemiological studies are required to evaluate the aetiology of thermal burns, population at risk and to assess the preventive measures of burns.

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