BURNS IN A SUBURBAN TEACHING HOSPITAL: A retrospective record review in Kanchipuram, India.

ABSTRACT

Background: Burn injuries rank among the most severe type of injury with high morbidity and mortality worldwide. Burn injuries not only affect patients physical health but also affects their social and psychological well being along with severe economic loss to the individual, their family and to the society. About 90% burn injuries are preventable, but poor adherence of safety measures and awareness leads to disability and disfigurement throughout their life. Hence, the need for various demographic variables to understand the cause and pattern in our region are required.

Objectives: To describe the demographic and socio-cultural aspects of burn patients and to learn the cause of burn victims in our region.

Materials and Methods: A record based retrospective study was conducted at Saveetha Medical College and Hospital, Thandalam, Kanchipuram district. The medical records of all patients over a period of 4 years (January 2017 to December 2020) were reviewed. Data were recorded on a pre-structured and pretested questionnaire. Chi-square test was done to study association between socio-demographic variables and burn injury and ($p<0.05$) was considered statistically significant.

Results: A total of 208 burn cases were involved in this study out of which 56.7% were females and 43.3% were males. Most of the burn patients were 31-45 years and lived in rural areas. The majority of burn injuries were accidental; thermal burns was the most common cause of deep burns.

Conclusion: Socio-demographic factors are important in raising educational programs and awareness in rural areas for improving quality of life.

Keywords: Burns injuries, Socio-demographic variables, mortality

INTRODUCTION

Burn injuries rank among the most severe type of injury with a high morbidity and mortality of victims worldwide.[1]According to the WorldHealth Organization, despite many advances

in medical care, burns account for an estimated 1,80,000 deaths annually, worldwide. In India, the second most populous country in the world, over 1,00,000 people are affected with burns ranging from moderate to severe injuries.[2] The most common cause for burn injury in India is household fire accident.[3]

The outcome of the burn depends on factors like degree of burn, duration of exposure, total body surface area involved, type of injury, site, age, sex and co-morbidities. Furthermore, burn injuries and their sequelae are not limited to the physical health of patients but affect their social, and psychological well being along with severe economic loss to the individual, their family and to the society.[4] Those who survive with disability and disfigurement often live with stigma and rejection by the society.[2]Burn injuries are common among women who work in kitchen ,whereas burn injury in men are mainly work related like chemical or electric burns.

The kitchens in rural and suburban areas of India is on floor level or platform based and in many rural areas there is no separate kitchen for cooking. In the Floor level kitchen the stove would be placed on the floor and the women would be sitting beside it which increases the risk of clothes catching fire.[5]

Burn injuries account among the main causes of disability-adjusted life-years (DALYs) lost in low- and middle-income families in India.[6] The rate of non-fatal childhood injury from burns is over 7 times higher in low- and middle-income families than in high-income families and the elderly population also remains at higher risk for burn injury in India.

According to National Program for Prevention of Burn Injuries, in India burn care is challenging due to inadequate medical facilities in rural areas, poor adherence of fire safety measures due to lack of public awareness, illiteracy, poverty, all of which have a significant impact on burn care management which would be preventable if resolved.[7] Each year, a considerable proportion of deaths in India occur because of burn injuries. The aetiological factors of burn injuries differ substantially in different communities and regions and therefore the requirement for epidemiological studies is needed before the planning and implementation of a sound prevention program.[8] The appropriate knowledge of the epidemiological factors and associated risk factors and a good practice of burn management can reduce the mortality and morbidity of burn patients.

This study was undertaken with objectives to study the demographic and socio-cultural aspects of burn patients and to find out the cause of burn victims in Saveetha Medical College and Hospital.

MATERIAL AND METHODS:

This is a record-based retrospective study conducted in India at Saveetha Medical College and Hospital, Thandalam, Kanchipuram district, which is a semi-urban area with heavy agricultural and industrial activities. The medical records of the burn victims admitted to the

burns ward of Plastic Surgery and Burns department and children admitted in the burn unit of paediatric ward in our hospital over a period of 4 years (January 2017 - December 2020) were reviewed.

Approval from the Institutional Health Research Ethics Committee was obtained before the commencement of the study. Consent was obtained from the Medical Superintendent of the hospital to see the case records. Data regarding socio-demographic profile of burn patients were recorded on pre-structured and pretested questionnaire. Epidemiological parameters like age, sex, literacy, arrangement of kitchen, type of burn, total body surface area involved, degree and depth of burns were taken. Education level was grouped as illiterate, primary school, higher secondary and graduate, through this literacy rate was measured. Burns are classified depending on the depth of injury. It is classified into three degrees. First degree: Superficial involving only epidermis; Second degree: is divided into Superficial partial thickness which involves upper dermis (papillary region) and Deep partial thickness involving lower dermis (reticular region); and Third degree: Full thickness involving subcutaneous structures that is hypodermis.[9]

All data were entered in MS EXCEL sheet and was analyzed using SPSS software package. Results were reported as percentages. Chi-square test was done to test the significance of association between socio-demographic variables and burn injury. ($P< 0.05$) was considered statistically significant.

RESULTS

A total of 208 burn cases were involved for this study. Of the 208 patients, 118(56.7%) were females and 90(43.3%) were males. Majority of the burn patients were between the age group of 31-45 years (38.95%) and higher risk groups, less than 15 years old accounts for 8.17% and elderly age group accounts for 8.68% . In India the prevalence of burn injuries is higher in adults than in children. Most of them belong to rural areas (63.94%) and others occupy adjacent semi-urban areas (36.06%). Around (55.74%) have floor level arrangement of kitchen and (44.26%) have platform based kitchen as shown in [Figure:1]. Most of the burn patients were married (76.96%). Out of these 208 injured burn patients, 29 (13.94%) were illiterate, 42 (20.19%) were of primary school level, 88 (42.31%) were of higher secondary level and 49 (23.56%) were graduates in our region. [Table:1]

Characteristic	Frequency (N=208)	Percentage (%)
Age group (in years)		
<15	17	8.17%
16-30	57	27.4%

31-45	81	38.95%
46-60	35	16.8%
>60	18	8.68%
Gender		
Male	90	43.3%
Female	118	56.7%
Marital status		
Married	160	76.96%
Unmarried	48	23.04%
Occupation		
Employed	109	52.44%
Unemployed	99	47.56%
Residence		
Rural	133	63.94%
Semi-urban	75	36.06%
Arrangement of kitchen		
Floor	116	55.74%
Platform	92	44.26%
Education		
Illiterate	29	13.94%
Primary school	42	20.19%
Higher secondary	88	42.31%
Graduate	49	23.56%

Table 1:Demographic characteristics of burn victims

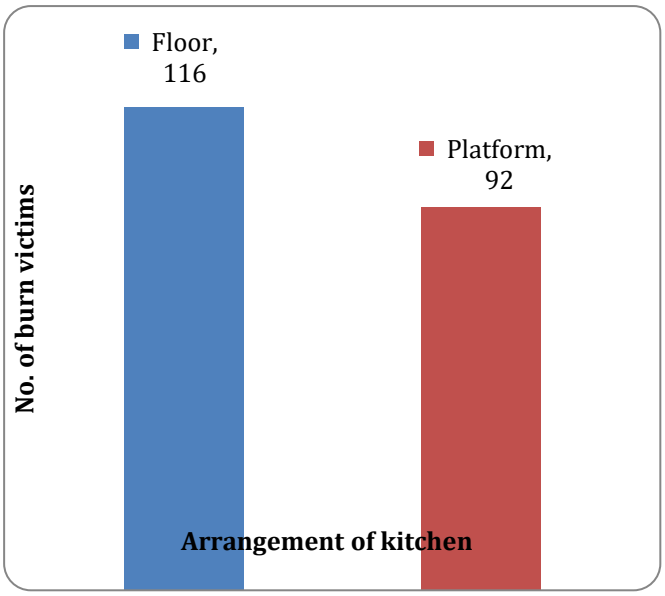

Figure 1: Arrangement of kitchen of burn victims

Majority of burns were accidental in nature (92.7%) compared to suicidal (5.3%) and homicidal burns (2%). Thermal burns was the common cause accounting for 49.50% of total burns, followed by scalds (19.2%), electrical (15%), contact (9.59%) and chemical burns (6.71%). Total body surface area (TBSA) involvement of burn were more for 11-20% group (36.05%) and were least for more than 40% group (2.9%) as shown in [Figure:2]. Among these TBSA burnt, 113 patients (54.33%) showed deep burns. Highest percentage of affected body area involved is upper limb (37.51%) followed by lower limb (26.92%), trunk (23.07%) and least for head and neck region (12.5%). Burn victims affected with head, neck and trunk injury suffer from respiratory burns. [Table:2]

Distribution	Frequency (N=208)	Percentage (%)
Nature of burn		
Accidental	193	92.7%
Homicidal	4	2%
Suicidal	11	5.3%
Depth of burn		
Superficial	95	45.67%
Deep	113	54.33%
Type of burn		
Chemical	14	6.71%
Electrical	31	15%
Thermal	103	49.50%

Scald	40	19.2%
Contact	20	9.59%
TBSA involvement (% of burn)		
<10	69	33.17%
11-20	75	36.05%
21-30	44	21.15%
31-40	14	6.73%
>40	6	2.9%
Affected body area		
Head and neck	26	12.5%
Trunk	48	23.07%
Upper limb	78	37.51%
Lower limb	56	26.92%

Table 2:Distribution of burn injuries according to nature, depth, type, TBSA burnt and affected body area

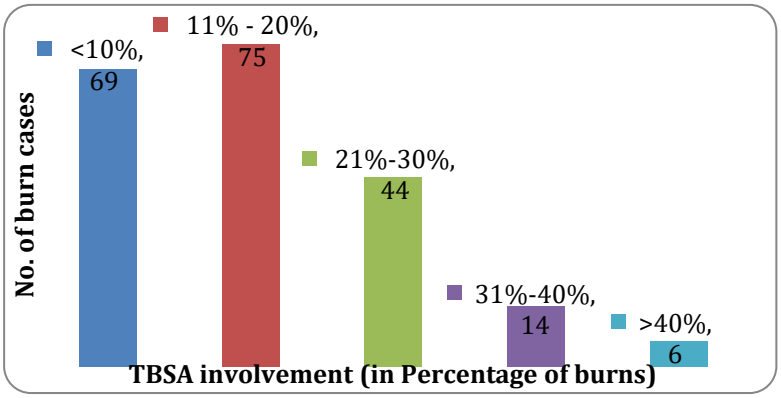

Figure 2: TBSA burn involvement of burn victims

In this study, chi-square indicates that the association of TBSA burnt percentage among selected demographic variable was significant for marital status, arrangement of kitchen (floor level and platform based), depth of burn (superficial and deep), nature of burn (accidental, homicidal and suicidal) and type of burn (chemical, electrical, thermal, scalds and contact burns). No significance was found between TBSA burnt and other socio-demographic variables like age, gender and residence as they share equal knowledge and awareness for burn injuries in both semi-urban and rural areas.[Table:3]

Table 3:Association between TBSA burnt and socio-demographic variables

Socio-demographic variables	TBSA burnt		Total	P-value
	<25%	>25%		
Age groups (in years)				
<15	13	4	17	0.849
16-30	40	17	57	
31-45	58	23	81	
46-60	22	13	35	
>60	12	6	18	
Gender				
Male	65	25	90	0.97
Female	85	33	118	
Marital status				
Married	106	54	160	**<0.001****
Unmarried	43	5	48	
Residence				
Rural	92	41	133	0.207
Semi-urban	58	17	75	
Arrangement of kitchen				
Floor	62	54	116	**<0.001****
Platform	69	23	92	
Depth of burn				
Superficial	83	12	95	**<0.001****
Deep	66	47	113	
Nature of burn				
Accidental	145	48	193	**<0.001****
Homicidal	2	2	4	
Suicidal	2	9	11	
Type of burn				

Chemical	11	3	14	**<0.001****
Electrical	29	2	31	
Thermal	64	39	103	
Scald	30	10	40	
Contact	15	5	20	
****Statistically significant (p<0.05)**				

DISCUSSION

Burn injuries are among the most serious injuries and a major global public health hazard where the majority of victims suffer with high morbidity and mortality. Our retrospective study through the review of medical case records showing socio-demographic variables related to burn patients became helpful in prevention of burn injuries. Female predominance is more for burn injuries in our study.[10,11] In Rural India, housewives cook on floor level kitchen using charcoal or wood as fuel, which is dangerous and fire easily get caught on their clothes, increasing the susceptibility to burn injuries .Domestic violence on females due to dowry harassment and physical abuse are other major factors in India contributing to female predominance of burn victims .[10,12]

Our data showed that the age group between 16 to 45 years is the most vulnerable to burn injuries for both genders according to their workfield.[5] In our region 5% of burns contribute to children and rest occupies adults which is in contrast with another study where children are the burn victims.[13] The Total body surface area (TBSA) burnt for children with more than 10% increases the risk of mortality whereas in adults with more than 20% TBSA involvement increases the risk of morbidity due to wound infection in patients with second degree deep burns; and with more than 30% TBSA and third degree burns , high mortality rate is due to hypovolemic shock in the patients.

In our study majority of burn victims had attained higher education which is in contrast to another study where majority of patients were illiterate.[14] This shows even after having adequate education in semi-urban and rural residents ,there is still lack of awareness on burn first-aid management and delay in seeking immediate medical care for burn injury ,resulting in the increase rate of the morbidity and mortality in India. Regarding marital status, most of the burn patients were married similar to another study.[15] Married women are more than men to die of burn injuries in India. The early marriage of females and involvement in kitchen work at an early age make them susceptible to burn injury. Dowry harassment is also another reason for women death due to burn injury.

Most of the burn injuries were accidental in nature, which was consistent with other studies and thermal burns being the most commonest cause for burn injuries, because people especially in rural areas still use firewood, kerosene stoves for cooking and use of kerosene lamp for lighting in rural areas because of insufficient electric power supply, which falls down spilling kerosene and causing burns.[11,16,17]

The outcome of the treatment depends on time of the patient presenting to the hospital to provide necessary treatment, the type and depth of burns, fluid resuscitation, medication and nutrition to burn patients. If the treatment is delayed, chance of getting infections and other complications increases. Among the total cases, only few of the patients came for follow up after discharge for complications like contractures, keloids , due to lack of awareness , reluctance and negligence by the family members to seek medical care for management of post burns complications.

CONCLUSION

The current study gives important information for the need of educational programs on fire safety and burn injury preventive measures in rural areas using national mass media approach to provide them knowledge and awareness and by teaching in schools about the basic preventive measures would be helpful in reducing the burden of burn injuries. First aid measures like stopping the burns by removing clothes and irrigating the burns, wrap the patient in clean clothes, extinguishing the flame by allowing them to roll on the ground, covering the victim by woollen rug should be taught especially for the people at risk , who still use firewood, kerosene stoves . Enforcing Strict policies against women's physical abuse and dowry deaths will prevent high female death due to burns.
Extensive awareness program in rural areas and Establishment of burn care units in rural hospitals will ensure major improvement in morbidity and mortality due to burn inury.

REFERENCES

1. Atiyeh BS, Costagliola M, Hayek SN. Burn prevention mechanisms and outcomes: pitfalls, failures and successes. burns. 2009 Mar 1 and 35(2):181-93.

2.World Health Organization. Burns fact sheet. URL: http: //www. who.int /mediacentre /factsheets/fs365/en.

3. Sarma BP. Epidemiology, Morbidity, Mortality And Treatment In Burns-A Changing Scenario In Four Decades In The State Of Assam.

4. Rosenberg L, Rosenberg M, Rimmer RB, Fauerbach JA. Psychosocial recovery and reintegration of patients with burn injuries.InTotal burn care 2018 Jan 1 (pp. 709-720).Elsevier.

5. Shankar G, Naik VA, Powar R. Epidemiological study of burn patients admitted in a District Hospital of North Karnataka, India. Indian Journal of Burns. 2014 Jan 1 and 22(1):83.

6. 1, Peck MD. Epidemiology of burns throughout the world. Part I: Distribution and risk factors. Burns. 2011 Nov and 37(7):1087-100.

7. Gupta JL, Makhija LK, Bajaj SP. National programme for prevention of burn injuries.Indian journal of plastic surgery. 2010 Sep and 01):S6-10., 43(S.

8. Jaiswal KA, Aggarwal H, Solanki P, Lubana PS, Mathur RK, Odiya S. Epidemiological and socio-cultural study of burn patients in MY Hospital, Indore, India. Indian Journal of Plastic Surgery. 2007 Jul and 40(02):158-63.

9. Evers LH, Bhavsar D, Mailänder P. The biology of burn injury.Experimental dermatology. 2010 Sep and 19(9):777-83.

10.Verma SK, Chaturvedi S, Gupta S. A sociodemographic profile and outcome of burn patients admitted in a tertiary-care hospital. International Journal of Medical Science and Public Health. 2016 Nov 1 and 5(11):2290.

11. Kumar M, Yasmin E, Kumar C, Kashyap V. Pattern of burn injury among patients admitted in a Tertiary Care Hospital of Jharkhand. International Journal of Community Medicine and Public Health. 2018 Jul and 5(7):3056-60.

12.Ahuja RB, Bhattacharya S. Burns in the developing world and burn disasters. Bmj. 2004 Aug 19;329(7463):447-9.

13.Outwater AH, Ismail H, Mgalilwa L, Temu MJ, Mbembati NA. Burns in Tanzania: morbidity and mortality, causes and risk factors: a review. International journal of burns and trauma. 2013;3(1):18.

14. Lal P, Rahi M, Jain T, Ingle GK. Epidemiological study of burn injuries in a slum community of Delhi.Indian journal of community medicine. 2006 and 31(2):24-.

15. Shanmugakrishnan RR, Narayanan V, Thirumalaikolundusubramanian P. Epidemiology of burns in a teaching hospital in south India. Indian Journal of Plastic Surgery. 2008 Jan and 41(01):34-7.

16. Dash JK, Mohapatra I. An Epidemiological Study of Burns Patients Admitted in a Tertiary Care Hospital of Bhubaneswar, Odisha. Int J Health Sci Res. 2017 and 7(3):8-13.

17. Lami FH, Al Naser RK. Epidemiological characteristics of burn injuries in Iraq: A burn hospital-based study. Burns. 2019 Mar 1 and 45(2):479-83.