

# An Epidemiological Study of Burns Patients Admitted in a Tertiary Care Hospital of Bhubaneswar, Odisha

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Received: 22/01/2017

Revised: 10/02/2017

Accepted: 13/02/2017

## ABSTRACT

**Introduction:** Burn injuries are a major global public health problem. An epidemiological study being the first step in planning preventive and management strategies, the study was planned to throw light on exact nature of burn injuries.

**Objectives:** To study the epidemiological factors in relation to burn cases at a tertiary care level teaching hospital

**Methods:** A cross-sectional study of all burn injury cases admitted at tertiary care level teaching hospital, over a period of one year from January 2014 to December 2014. Universal sampling method was employed. All burn patients who were admitted in burns unit, or legally accepted guardians, in case of serious patients who consented were included; those who did not give informed written consent were excluded. Total number of participants in the study period was 74. A semi-structured questionnaire was used for obtaining socio-demographic details and details about burns injury. Data was entered into Microsoft excel worksheet and analysed using EpiInfo software version 3.5.4. Institutional Ethics committee approval was obtained.

**Result:** Flame burn was the most common cause of burns accounting for 45.95% of the total burns. Scald burn was seen in 36.49% subjects and electric burn in only 10(13.51%) subjects. Overall mortality was found to be 10.81%.

**Conclusion:** Total body surface area burnt was found to be associated with mode of burns, arrangement of cooking stove/chullah on floor in case of kitchen burns; while mortality among burn victims was found to be highly significantly associated with the total body surface area.

**Keywords:** Cross-Sectional, epidemiological, burns, mortality, flame burn, scald burn.

## INTRODUCTION

Burn injuries are an important public health problem both in developing and developed nations, accounting for an estimated 2, 65,000 deaths annually. [1] Goldman describes burns as “the silent epidemic”. [2] Burns represent an extremely stressful experience for both the burn victims and their families. Patients with extensive burns frequently die, and for those with lesser injury, physical recovery is slow and painful. Non-fatal burns are a leading

cause of morbidity, including prolonged hospitalization, disfigurement and disability, often with resulting stigma and rejection.

Burns are among the leading causes of disability-adjusted life-years (DALYs) lost in low- and middle-income countries. Though the burns mortality has decreased in the recent past owing to the increasing expertise in medical and surgical fields; nevertheless, the burn injuries continue to remain a challenging problem. Physical and psychological sufferings imposed on the

patients can be distressing to the victims themselves as well as to their families.

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.

In India, approximately, there are 6 million burns cases annually, of which around 0.7 million cases require hospitalization, of which approximately, 0.12 millions die annually. Survival rate for burns patients in developing countries like India is around 50% for burns less than 40% while those in developed countries it is around 75-90% for 50% burns. Burn injuries cause significant morbidity and mortality, both in developing and developed countries and have considerable physical, psychological and economic effects on the patients, their families and society. <sup>[3]</sup>

There is little information on the pattern of outcome among burns patients in this region. Hence, this study was conducted to throw light on the exact nature of the incident of burn injury and to gain an insight into the epidemiological determinants of burn patients.

## **MATERIALS AND METHODS**

A cross-sectional study was conducted over a period of one year, from January 2014 to December 2014, in burns unit of the Department of Burns, Plastic & Reconstructive Surgery of IMS & SUM Hospital, a tertiary care hospital in Bhubaneswar. Universal sampling technique was employed for selection of study participants.

*Inclusion and Exclusion Criteria:* All the burns patients who were admitted during the study period and gave consent for the study were included. The patients or legally accepted guardians, in case of serious patients, who did not give consent were excluded from the study. Also, patients who

expired prior to the interview were excluded from the study.

Altogether 83 burn patients were admitted during the study duration. Of these, four patients did not give consent and five patients expired prior to the first interview and hence were excluded from the study. Thus, the total sample size was 74.

A semi-structured questionnaire was used including socio-demographic details of the participant as well as details about the burns injury. Participants were interviewed face to face after they were stabilized in the burns unit of the Department of Burns, Plastic & Reconstructive Surgery. The help of the nursing staff and female medical social worker was taken to establish rapport with the study subjects and their relatives.

A questionnaire devised specifically for use in this study was used to gather: demographic information, information about the burn injury/condition as well as about pre-morbid psychiatric and medical disorders.

### *Burn related information*

The extent of the burn, localization of burn, the manner in which the burn injury was sustained and where the burn was sustained were obtained from the medical notes. The extent of burn injury was calculated according to Wallace rule of nine, <sup>[4]</sup> based on total body surface area (TBSA) burnt which was later re-confirmed with the help of the treating surgeon.

### *General demographic information*

Information about age, sex, marital status, occupation was obtained.

Burns are injuries of skin, mucous membranes and/ or underlying soft tissue which may be caused by a variety of agents such as heat, electricity, radiation, and corrosive substances. A burn injury was diagnosed as defined by the WHO's ICD-10 classification system (T20- T32) which includes injuries caused by exposure to smoke, fire and flames (X00-X09), contact with heat and hot substances (X10- X19), exposure to electric current (W85-87), lightning(X33) and exposure to corrosive substances (X46, X49). This definition

includes scalds as well as burns caused by electrical heating appliances, electricity, flame, friction, hot air and hot gases, hot objects, lightning, and chemical burns. Radiation related disorders of the skin and subcutaneous tissue and sunburn are not included in the WHO classification of burns. [5]

The study participants were then followed up during their hospital stay till their discharge to note their outcome whether they survived or not.

Ethical clearance was obtained from the Institutional Ethics committee prior to the start of the study. Written informed consent was obtained from the study participants before obtaining any information from them. Utmost care was

taken to maintain privacy and confidentiality.

**Data analysis:** Data was entered into Microsoft excel and analysed using EpiInfo software version 3.5.4. Frequency distributions were calculated for all the variables. Chi square test was used for testing the significance of association between socio-demographic parameters and burn injury at p value of 0.05

## RESULTS

During the study period, of the 74 burn patients who consented for the study 31(41.89%) were females and 43 (58.11%) were males. Age and sex-wise distribution of patients is presented in figure 1

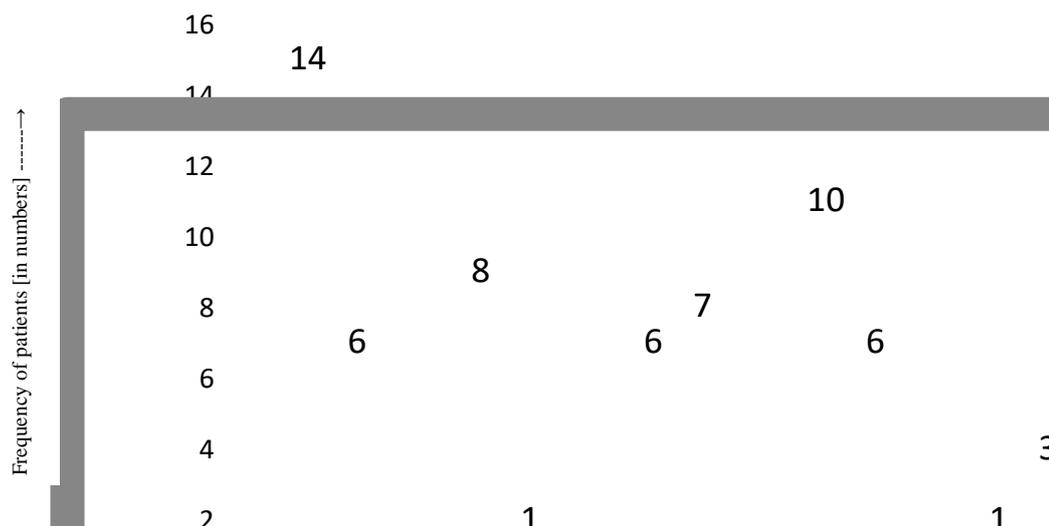


Figure 1: Age and sex wise distribution of burn patients

Age distribution of patients was highest in less than 10 years age group (27.3%), followed by 31 to 40 years (21.62%) and least number of burn patients (5.41%) in 41 to 50 years age group. Age ranged from 6 months to 70 years with a mean of 26.66 years and standard deviation (S.D.) of 20.14 years. Males outnumbered females in all age groups except between 21-30, and more than 50 years age groups. 74(100%) were belonging to Hindu religion. As regards to education, 31(41.89%) were illiterate and 43 were literate. 48.65% of them belonged to joint family.

Table 1: Details about burns injury

Details about burn injury	Number(n=74)	Percentage (%)
<b>Mode of burns</b>		
Flame	34	45.95
Scald	27	36.49
Electrical	10	13.51
Chemical	2	2.70
Lightning	1	1.35
<b>Nature of burns</b>		
Accidental	71	95.95
Homicidal	1	1.35
Suicidal	2	2.70
<b>Percentage of TBSA involved</b>		
<25%	43	58.11
25-50%	19	25.68
50-75%	10	13.51
>75%	2	2.70
<b>Time interval between burns injury &amp; hospitalization</b>		
<1 hour	5	6.76
1-6 hour	30	40.54
>6 hours	39	52.70

Table 1 shows the details about burns injury. It shows that flame burn was the most common cause of burns accounting for 45.95% of the total burns.

Maximum number of patients (58.11%) had burns less than 25% TBSA and also the overall maximum number. Majority 71(95.95%) of the burn injuries were allegedly accidental. Flame burn was the commonest cause of burn (45.95%), followed by scalds.

Table 2 shows the distribution of socio-demographic variables based on the TBSA burnt. A significant association was also found between TBSA burnt and age less than ten years. No significant statistical difference was found between TBSA burnt and other socio-demographic variables. Of the burns occurring in kitchen, in 93.10% of cases, the cooking was done with the stove/chullah placed at the floor; similarly the percentage of TBSA (>50%) was also more (79.31% in floor arrangement, while 3.45% when done over platform)

Table 2: TBSA burnt according to socio-demographic variables

Socio-demographic variables	TBSA burnt		Total	p value*
	< 50%	>50%		
<b>Age group (years)</b>				
< 10	20	0	20	0.03*
11-20	7	2	9	0.92
21-30	9	4	13	0.33
31-40	12	4	16	0.61
41-50	3	1	4	0.79
>50	10	2	12	0.76
<b>Marital status</b>				
Married	29	9	38	0.27
Unmarried	32	4	36	
<b>Arrangement of kitchen (n =29)</b>				
Floor	4	23	27	0.76
Platform	1	1	2	
<b>Mode of burn</b>				
Flame	27	7	34	0.75
Scald	25	2	27	0.15
Electrical	6	4	10	0.12
Chemical	2	0	2	0.77
Lightning	1	0	1	0.39
<b>Nature of burns</b>				
Homicidal	1	0	1	0.39
Suicidal	1	1	2	0.77
Accidental	59	12	71	1.00
*Statistically significant at p<0.05				

The overall mortality was 10.81%. Maximum mortality was observed in the 41-50 years age group. Table 3, shows the outcome in the group of study participants.

Table 3: Outcome of burns patients according to socio-demographic variables

Socio-demographic variables	Outcome		Total	p value*
	Survival	Death		
<b>Age group (years)</b>				
< 10	20	0	20	0.16
11-20	8	1	9	0.59
21-30	11	2	13	0.92
31-40	14	2	16	0.84
41-50	2	2	4	0.08
>50	11	1	12	0.89
<b>Marital status</b>				
Married	32	6	38	0.29
Unmarried	34	2	36	
<b>Mode of burn</b>				
Flame	28	6	34	0.17
Scald	27	0	27	0.05*
Electrical	8	2	10	0.65
Chemical	2	0	2	0.51
Lightning	1	0	1	0.21
<b>Nature of burns</b>				
Homicidal	1	0	1	0.21
Suicidal	1	1	2	0.51
Accidental	64	7	71	0.74
<b>TBSA burnt</b>				
<50%	59	2	61	0.0001*
>50%	7	6	13	
*Statistically significant at p<0.05				

Seventy-five percent of the mortality was associated with > 50% TBSA, and this was found to be highly statistically significant.

## DISCUSSION

The epidemiology of burns varies from one part of the world to another as it depends on the level of civilization, industrialization, and culture among other things. [6]

In the present study, age distribution of patients was highest in less than 10 years age group (27.3%), followed by 31 to 40 years (21.62%) and least number of burn patients (5.41%) in 41 to 50 years age group. Similar results were obtained in other studies. [7,8] High incidence among young people might be explained by the fact that they are generally active and exposed to hazardous situations at home and outside.

Flame burn was the most common cause of burns accounting for 45.95% of the total burns, followed by scald burn seen in 27(36.49%) subjects in the present study. This was probably because of faulty and unsafe cooking practices. Similar results were obtained in various studies done in India as well as in other countries. [9-13]

In the current study, only 5 (6.76%) subjects were hospitalized within one hour of burns injury. It shows that people were unaware of importance of immediate hospitalization which is very important for burns patients for their resuscitation and treatment. Similar to our findings, a study in Indore observed that only few patients (9.7%) arrived in hospital within six hours of the incidence. [10] Also, a study done in Pakistan reported that nearly half of the patients presented within 12 hours (46%) to hospital. [14]

In our study, flame burns accounted for more extensive burns than scalds and electrical because of more body surface involved. Similar results were observed in a study in Indore [C]. Majority of the subjects, 23(79.31%) out of the 29 kitchen burn cases, in our study with > 50% TBSA involvement were using floor for cooking purpose. Similar results were obtained in a study done in Mumbai which reported that 76 women cooked at *sigris* on the floor. In 98% of cases the cause of burns was an exploded pressure stove on the floor. [15] The present study had its limitations in the form that it was carried out in a tertiary care hospital and hence, there is a possibility of selection bias considering that only serious patients are being referred to a tertiary care institute. In addition a long duration study needs to be done for the long term follow up of burn victims. Due to the sensitive nature of the issue there may be social desirability bias.

## CONCLUSION

All the domestic burns injuries in the present study were kitchen burns. Faulty and unsafe cooking practices are mainly responsible for domestic burn injuries. Training regarding safety measures like periodic maintenance of gas stoves, gas pipes, use of LPG regulators, etc. must be inculcated among the general population using mass media. Although burn injuries are common most of the accidents that happen at home, they are largely preventable. Accurate information about

this issue must be conveyed to the population. Nearly 52.7% of patients reported after six hours of burn to a health-care facility. Public awareness and availability of good burn care facilities in all public institutions as near to the place of accident as possible could help avert mortality and morbidity associated with burns. Sensitisation on primary burn care management should thus be one of the priorities

## ACKNOWLEDGEMENTS

To the study participants, for their co-operation and valuable time. We are very much thankful to the nursing and other staff of the burn unit, who helped during the study.

**Conflict of interest:** None

**Funding:** No sources of support provided

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How to cite this article: 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; 7(3):8-13.

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