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A clinico-epidemiological study of female burn patients admitted in a tertiary care hospital of Bhubaneswar, Odisha

Plastic Surgery

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ABSTRACT

Burn injuries, due to the associated mortality and morbidity, are a major global public health problem. The study was planned to analyze the causes, demographic factors, magnitude of burn injuries and outcome of treatment of these patients. **Objectives:** To study the epidemiological factors in relation to female burn cases at a tertiary care level teaching hospital. **Methods:** A cross-sectional study of all female burn injury cases admitted over a period of two years from 1st January 2015 to 31st December 2016 by universal sampling was undertaken; using a semi-structured questionnaire. Data was analysed using EpiInfo. **Result:** Flame burn was the most common cause of burns accounting for 66.02% of the total burns. Scald burn was seen in 31.08% subjects and electric burn in only 2(1.94%) subjects. Overall mortality was found to be 27.18%. **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, female

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]. 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. Goldman describes burns as *"the silent epidemic"*[2]. An estimated 1,84,000 persons died of burn injuries in the countries of South East Asia Region (SEAR) in 2002 with 6.55 million disability adjusted life years (DALY) lost due to burns. The fire-related mortality in the SEAR accounts for more than half of the global burden of fire-related burns.

About two-thirds of the global burden of fire-related burns among females was estimated to have occurred in SEAR[3]. 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.

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. According to the National Burns Programme, 91,000 of these deaths are women; a figure higher than that for maternal mortality. Women of child bearing age are on average three times more likely than men to die of burn injuries[4].

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[5].

There is little information on the pattern of outcome among female burn 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 the female burn patients.

Materials and Methods:

A cross-sectional study was conducted over a period of two years, from 1st January 2015 to 31st December 2016, 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 female burn 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 111 female burn patients were admitted during the study duration. Of these, five patients did not give consent and three patients expired prior to the first interview and hence were excluded from the study. Thus, the total sample size was 103.

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[6], 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[7].

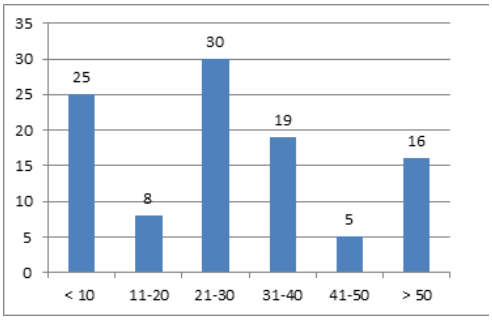
The study participants were then followed up during their hospital stay till their discharge to note their outcome whether they survived or not. Ethical clearance was obtained from the Institutional Ethics committee prior to the start of the study. Written informed consent was obtained from the study 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, 103 female burn patients consented for the study. Age distribution of patients was highest in 21-30 years age group (29.13%), followed by less than ten years (24.27%) and least number of burn patients (4.85%) in 41 to 50 years age group. Age ranged from six months to 78 years with a mean of 28.60 years and standard deviation (S.D.) of 20.03years. Age distribution of patients is presented in figure 1

Figure 1: Age distribution of the female burn patients



101(98.06%) were Hindus. As regards to education, 29(28.16%) were illiterate and 74 were literate. 62.14% of them belonged to joint family. 72(69.90%) of the patients were married.

Table 1 shows the details about burns injury. It shows that flame burn was the most common cause of burns accounting for 66.02% of the total burns.

Table 1: Details about burns injury

Details about burn injury	Number (n=103)	Percentage (%)
Mode of burns		
Flame	68	66.02
Scald	38	31.08
Electrical	2	1.94
Chemical	0	0.00
Lightning	1	0.96
Nature of burns		
Accidental	102	99.04
Homicidal	1	0.96
Suicidal	0	0.00
Percentage of TBSA involved		
<25%	38	36.89
25-50%	39	37.86
50-75%	17	16.51
>75%	**9**	**8.74**
Time interval between burns injury & hospitalization		
<1 hour	8	7.77
1-6 hour	28	27.18
>6 hours	67	65.05

Maximum number of patients (37.86%) had burns less than 25-50% TBSA and also the overall maximum number. Majority 102(99.04%) of the burn injuries were allegedly accidental. Flame burn was the commonest cause of burn (66.02%), followed by scalds.

Table 2 shows the distribution of socio-demographic variables based on the TBSA burnt. A significant association was found between TBSA burnt and age less than ten years and 21-30 years age group. Marital status also showed a significant association with TBSA burnt percentage. Of the 96(93.02%) who suffered from burns at home, 56(58.33%) had kitchen burns. No significant statistical difference was found between TBSA burnt and other socio-demographic variables.

Table 2: TBSA burnt according to socio-demographic variables

Socio-demographic variables	TBSA burnt		Total [n=103]	p value*
	< 50% [n=75]	>50% [n=28]		
Age group (years)				
< 10	2	0	25	**0.001**
11-20	5	3	8	0.79
21-30	17	13	30	**0.03**
31-40	14	5	19	0.84
41-50	3	2	5	0.89
>50	11	5	16	0.92
Marital status				
Married	47	25	72	0.02
Unmarried	28	3	31	
Arrangement of kitchen (n =56)				
Floor	24	12	36	0.35
Platform	10	10	20	
Mode of burn				
Flame	40	28	68	**<0.0001**
Scald	32	0	32	**<0.0001**
Electrical	2	0	2	1.00
Chemical	NIL	NIL	-	-
Lightning	1	0	1	0.60
Nature of burns				
Homicidal	1	0	1	0.60
Suicidal	NIL	NIL	-	-
Accidental	74	28	102	0.60
***Statistically significant at p<0.05**				

The overall mortality was 27.18%. Maximum mortality (35.72%) was observed in the 21-30 years age group, followed by those above 50 years. Although 25(33-30%) of the patients were in the <10 years age group, but mortality was least and this was also statistically highly significant. This can be explained by the lesser severity of burn injuries in this 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 [n=103]	p value*
	Survival [n=75]	Death [n=28]		
Age group (years)				
< 10	24	1	25	0.006
11-20	5	3	8	0.79
21-30	20	10	30	0.51
31-40	13	6	19	0.84
41-50	3	2	5	0.88
>50	10	6	16	0.48
Marital status				
Married	47	25	72	**0.01**
Unmarried	28	3	31	
Mode of burn				
Flame	41	27	68	**0.0002**
Scald	31	1	32	**0.0006**
Electrical	2	0	2	1.00
Chemical	NIL	NIL	-	-
Lightning	1	0	1	0.60
Nature of burns				

Homicidal	1	0	1	0.60
Suicidal	NIL	NIL	-	-
Accidental	74	28	102	0.60
TBSA burnt				
<50%	68	7	75	**<0.0001**
>50%	7	21	28	
***Statistically significant at p<0.05**				

69.90% of the females were married of whom 24.27% died; of the 31(30.10%) unmarried females, mortality was as less as 2.91%. This was also found to be statistically significant. 75 percent (21 out of 28) of the mortality was associated with > 50% TBSA, and this was found to be highly statistically significant.

DISCUSSION:

The clinic-epidemiological profile of burn patients varies from one part of the world to another as it depends on the level of civilization, industrialization, and culture among other things[8].

In the present study, age distribution of patients was highest in 21-30 years (29.13%), followed by less than ten years (24.27%). In a study by Dash et al the highest numbers were in the 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[9]. Similar results were obtained in other studies[10.11]. 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 66.02% of the total burns. Similar results were obtained in various studies done in India as well as in other countries[12-16]. In a study by Dash et al 45.95% were flame burns, followed by scald burn seen in 36.49%9. This was probably because of the fact that the previous study was done both on males and females.

In the current study, only 7.78% of the study subjects were hospitalized within one hour of burn injury. In a study by Dash et al 6.76% subjects were hospitalized within one hour of burns injury[9]. 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[13]. Also, a study done in Pakistan reported that nearly half of the patients presented within 12 hours (46%) to hospital.[17].

In our study, flame burns (100%) accounted for more extensive (>50%TBSA) burns than scalds and electrical because of more body surface involved. Similar results were observed in a study in Indore[13]. In our study, 36(64.28%) out of 56 kitchen burn cases, were using floor for cooking purposes. In a study by Dash et al, majority of the subjects 79.31%, had > 50% TBSA involvement and were using floor for cooking purpose[9]. 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[18].

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. The failure to recognize burn injuries among women as a major concern is rooted in gender inequality. Health professionals and health systems need to recognize the gendered pattern of burns injuries in India. 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. Sensitization on primary burn care management should thus be one of the priorities

Conflict of interest: None

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