

An epidemiologic study of 302 patients with burn injuries admitted in burn ward at a tertiary care hospital, Latur

Sachin W Patil^{1*}, Lata B Godale², Atul V Wadagale³

¹Assistant Professor, Department of Community Medicine, Government Medical College, Nagpur, Maharashtra, INDIA.

²Professor, Department of Community Medicine, Malla Reddy Medical College for Women, Hyderabad, Telangana, INDIA.

³Assistant Professor of Biostatistics, Department of Community Medicine, Government Medical College, Latur, Maharashtra, INDIA.

Email: dr_sachin1985@yahoo.in, latagodale@gmail.com

Abstract

Introduction: Injuries represent one of the most important public health problems faced by both developing and industrialized nations. Burn injuries rank amongst the most severe type of injuries suffered by human body with high mortality and morbidity rates. An estimated 184,000 persons died of burn injuries in countries of SEAR in 2002, with 6.55 million DALYs lost due to burn. India recorded 22,454 deaths due to burns during the year 2008. So the objective was to study epidemiological profile of burn cases admitted in Govt. Medical College and Hospital, Latur. **Material and Methodology:** Present study is a Hospital based cross-sectional observational study. All burn patients admitted in burn ward under surgery department in Tertiary Care hospital attached to Government Medical College, Latur over a period of one year i.e. from July 2012 to June 2013 were studied. During study period, total 302 patients were admitted in burn ward due to various degrees of burn. **Results:** Majority of hospitalized burn patients was adult females of age group 15-45 years age. Accidental burn was the most common mode of burn injuries and flame was most common cause for burn injuries whereas intentional burns like suicidal and homicidal constitute only a small percentage in total. Mortality in burn victims was found very high i.e. 45.4%. **Conclusion:** This study provides exclusive overview of the hospitalized burn patients. Effective prevention program and IEC for combating with the burn is needed in India.

Key words: Epidemiological profile, observational study, burn, mortality.

*Address for Correspondence:

Dr. Sachin W Patil, Assistant Professor, Department of Community Medicine, Government Medical College, Nagpur, Maharashtra, INDIA.

Email: dr_sachin1985@yahoo.in

Received Date: 22/10/2015 Revised Date: 16/11/2015 Accepted Date: 12/12/2015

Access this article online	
Quick Response Code:	Website: www.statperson.com
	DOI: 01 January 2016

INTRODUCTION

Man has invented fire since the times immortal. It is centuries from now that human using the fire for their cooking, safety, protection from cold and also for industrial production of goods. In India, fire is worshiped as divine power and also included as the Panchmahabhutas i.e. Water (Jal), Air (Vayu), Earth (Prithvi), Sky (Aakash) and Fire (Agni). Fire can be considered as human's first double-edged sword because with the comfort, it also brings miseries and devastating situations throughout human history. Goldman describes

burns as "the silent epidemic" because since long years, fatal burns have continued to be a major public health problem in all over world.¹ Burns are a global public health problem, accounting for an estimated 195,000 deaths annually most of which occurred in low and middle income countries. Almost half of the total deaths are occurred in WHO South-East Asia Region. Burns are the fourth most common type of trauma worldwide following traffic accidents, falls, and interpersonal violence.² Developing countries like India have a high incidence of burn injuries, creating a formidable public health problem. High population density, illiteracy, and poverty are the main demographic factors associated with a high risk of burn injury. The exact number of burns is difficult to determine: judicious extrapolation suggests that India, with a population of over 1 billion, has 700,000 to 800,000 burn admissions annually.³ Females suffer burns more frequently than males. Women in South-East Asia Region have the highest rate of burns, accounting for 27% of global burn deaths and nearly 70% of burn deaths in the region. The high risk for female is associated with open fire cooking or inherently unsafe

cooking stove which can ignite loose clothing.⁴ This is mainly a reason for high accidental burn in females. Social, economic and cultural factors interact to complicate the management, reporting, and prevention of burns. Along with open flames used for different purposes, self directed or interpersonal violence are also important risk factors in studying the burn cases.

Dowry deaths are mainly concern with the reproductive age female deaths in India. Almost every day, we encounter the incidence of young married women being burnt or tortured to commit suicide by their husband or in-law for dowry. Along with adults, geriatric age group and childrens are also vulnerable to the risk of burn. It is 11th leading cause of death of children aged 1-9 years and also 5th most common cause of non-fatal injuries in childrens. The present study was conducted to study epidemiological profile of burn patients admitted in tertiary care hospital where mortality and morbidity of burn patients in different age and sex group were studied.

MATERIALS AND METHOD

Present study is a Hospital based cross-sectional observational study. All burn patients admitted in burn ward under surgery department in Tertiary Care hospital attached to Government Medical College, Latur over a period of one year i.e. from July 2012 to June 2013 were studied. During study period, total 302 patients were admitted in burn ward due to various degrees of burn. For purpose of study, burn injury is defined as any type of injury, intentional (suicidal, homicidal) or unintentional (accidental) caused by the energy either in form of flame (direct) or in other forms like electrical, scald, lightning (indirect) which can produce burn wound. After obtaining an informed consent, the data regarding the demographic and socio-cultural i.e. type, mode, cause, outcome etc. was collected with the help of predesigned and pre-tested Proforma from all the burn patients who were admitted in burn ward under surgery department during the study period. The data was obtained from all the patient after admission, while in case of children or patients who were not well enough as a result of severe injury, it was obtained from relatives or who accompanied with them. The data of interviewed burn patients regarding outcome was also collected using hospital records available in Medical Record Department. The analysis of data was done using MS Excel and SPSS version 18.0 by percentages, chi square test and Fisher's test etc.⁵ The P value if less than 0.05 was considered statistically significant.

RESULTS

Burns injuries are common injuries, which bring problems to societies throughout the world. Burn injuries

have been a major cause of concern since prehistoric days to the present era of modern medicine. In terms of lifestyle the effects of a severe burn injury could perhaps the described as irreparable in all areas of the patient's life.

Table 1: Distribution of burn cases according to age and sex

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
≤5 year	010	08.0%	006	03.4%	016	05.3%
6-15 years	005	04.0%	015	08.5%	020	06.6%
16-30 years	057	45.6%	100	56.5%	157	52.0%
31-45 years	035	28.0%	030	16.9%	065	21.5%
46-60 years	013	10.4%	014	07.9%	027	09.0%
>60 years	005	04.0%	012	06.8%	017	05.6%
Total	125 (41.4%)	100%	177 (58.6%)	100%	302 (100%)	100%

$\chi^2 = 12.498$ DF = 5 p = 0.027 (significant)

Maximum burn victims were from age group 16-30 years (52%) followed by 31-45 years (21.5%) of age. Out of total 302 burns, 177 (58.6%) were females and 125 (41.4%) were male patients. Male to female ratio was found 0.7:1.

Table 2: Marital status and sex wise distribution of burn cases

Marital status	Male		Female		Total	
	No.	%	No.	%	No.	%
Married	077	29.61	131	50.39	208	80.00
Unmarried	031	11.92	021	08.08	052	20.0%
Total	108	41.53	152	58.47	260	100%

$\chi^2 = 8.747$ DF= 1 p=0.001 (highly significant)

The married people (80%) are found affected with burn injuries more than unmarried peoples (20%).

Table 3: Cause of burn and sex wise distribution of burn cases

Cause of burn	Male		Female		Total	
	No.	%	No.	%	No.	%
Flame	080	64.0	155	87.6	235	77.8
Scald	020	16.0	018	10.2	038	12.6
Electric	018	14.4	003	01.7	021	07.0
Chemicals	005	04.0	001	00.5	006	02.0
Crackers	001	00.8	000	00.0	001	00.3
Lightening	001	00.8	000	00.0	001	00.3
Total	125	100	177	100	302	100

Fisher's Exact test = 31.142, p= 0.000

Flame was the commonest cause in 235 (77.8%) burns cases followed by scalds 38 (12.6%). Electric burn was seen in 21 i.e.7.0% burn patients.

Table 4: Mode of burn and sex wise distribution of burn cases

Mode of burn	Male		Female		Total	
	No.	%	No.	%	No.	%
Accidental	094	75.2%	138	78.0%	232	76.8%
Suicidal	022	17.6%	021	11.8%	043	14.3%
Homicidal	009	07.2%	018	10.2%	027	08.9%
Total	125	100%	177	100%	302	100%

$\chi^2 = 2.488$, DF= 2, p= 0.308 (not significant)

76.8% of the burn cases were because of accidental burn followed by 14.3% were suicidal and about 08.9% burn cases were homicidal cases. These greater accidental burns may be due to the carelessness during handling of fire.

Table 5: TBSA and sex wise distribution of burn cases

TBSA	Male		Female		Total	
	No.	%	No.	%	No.	%
<19 %	033	26.4	022	12.5	055	18.2
20-39%	039	31.2	029	16.4	068	22.5
40-59%	020	16.0	031	17.5	051	16.9
60-79%	019	15.2	040	22.6	059	19.5
≥80%	014	11.2	055	31.0	069	22.9
Total	125	100	177	100	302	100

$\chi^2 = 30.936$, DF= 9, p= 0.000 (highly significant)

From 125 male burn patients, 72 (57.6%) had TBSA less than 40% whereas in female patients, out of 177 burns 55 (31.0%) had TBSA >80% followed by 40 (22.6%) between 60-79% TBSA. Females outnumbered males in severity of burn as most of the patients above 40% TBSA burn were females.

Table 6: Distribution of burn cases based on outcome

Outcome	No. of burn cases	Percentage
Recovered	086	28.5
Functional disability	017	05.6
Death	137	45.4
AMA discharge	062	20.5
Total	302	100

At the end i.e. after deaths or recovery or discharge of burn patient, the case sheets were forwarded to medical record department from where outcome was studied. Out of 302 burn patients, 28.5% cases were recovered. The mortality was found 45.4%.

DISCUSSION

Burns injuries are common injuries, which bring problems to societies throughout the world. Burn injuries have been a major cause of concern since prehistoric days to the present era of modern medicine. In terms of lifestyle the effects of a severe burn injury could perhaps be described as irreparable in all areas of the patient's life. Burn is one of the major public health problems as it is difficult to treat and restore the health of the burn victim to the fullest.

In the present study, out of total 302 burn patients admitted in tertiary care hospital during study period, 41.4% were males and 58.6% were females with male to female ratio of 0.7:1. Similar findings to the present study i.e. burns more in females than males are reported by Gupta R *et al* (2012)¹ (83%), Vaghela P C *et al* (2012)² (82.26% female burn) and Bhagora R V *et al* (2011)³

(79% female patients), But Shankar G *et al* (2010)⁶ (54.7%) and Lal P *et al* (2006)⁷ (54.4% female burn) found nearly similar percentage of burns in females. This may be due to the close proximity of females to fire in homes throughout the day and night. However the study conducted by Ibran E A *et al* (2012)⁸ (56.2% male), Rimdeika R *et al* (2008)⁹ (67% male patients), Gupta A K *et al* (2011)¹⁰ (54% males), found male dominance in their study. In contrast, Fathallah Z F (2005)¹¹ in his study reported 26.9% males, 31.3% were females and 41.8% were children. In present study, 16-30 years (52.0%) was the predominant age group which was affected by burn followed by the 31-45 years (21.5%) age group. Burn patients with age ≤ 5 years and more than 60 years constitute 5.3% and 5.6% respectively. Gupta R *et al* (2012)¹ (59.6% victims from age group of 15 to 30 years), Ibran E A *et al* (2012)⁸ (74.5% from 16-40 years age group followed by 13.6% of 0-15 year patients) and Vaghela P C *et al* (2012)² (42.09% from 21-30 years and only 01.50% from 0-10 years age group) shows similar results as observed in our study. A study by Gupta A K *et al* (2011)¹⁰ found as much as 79% of burn patients from age group between 15-45 years. As this is a reproductive age group and 15-45 years of age is generally active and exposed to hazardous situations both at home and work places, so they are more prone to the burn injuries. In contrast, a study done at Eastern European country Lithuania by Rimdeika R *et al* (2008)⁹ shows upto 14 years of age was the most vulnerable age group (41.1%) to burn. Kitara D L *et al* (2011)¹² (64.3% patient below 10 years) and Ekrami A *et al* (2010)¹³ (less than 10 years age group 27.4%) also found highest burn incidence in children below 10 years. In India, Bhatt R *et al* (2011)¹⁴ in Ahmadabad civil hospital found that 45.34% of burn patients were younger than 26 years. The inappropriate handling of fire and inquisitive, explorative nature of children was the reason of burns reported by them. Majority of the adults in present study were married contributing to 80.0% of the total cases and unmarried were 20.0%. In married burn patients, maximum i.e. 131 (86.2%) were females. Gupta R *et al* (2012)¹ (83.9% married and among them 88.5% were females), Ghaffar U B *et al* (2002)¹⁵ (72.5% of victims married) and Domple V K *et al* (2013)¹⁶ (72.1%) also found similar results to present study however Haralkar S J *et al* (2011)¹⁷ in their study found 95.73% of their patients married and only 4.27% unmarried burn patients. This observation is similar but percentage of married is much higher than present values. Akther J M *et al* (2010)¹⁸ also reported married patient more than unmarried similar to present study. In our study, flame was the commonest cause in 77.8% burn cases followed by scalds (12.6%). Electric burns were found in significant number of

patients i.e. 7.0%. A single patient suffered from burns due to lightning (0.3%) and another one by fire crackers (0.3%). Ibran E A *et al* (2012)⁸ reported similar findings that according to the cause of burns, majority of the patients (79.0%) had fire burn followed by electric burns (7.7%), scalds (5.2%) and chemical burns (3.0%). Also Shrivastava P S *et al* (2012)¹⁹ found flame burn was the most common cause of burns accounting for 80.6% of the total burns. Gupta AK *et al* (2011)¹⁰ and Shankar G *et al* (2010)⁶ also have similar findings like our study. This was probably because of faulty and unsafe cooking practices in kitchen. But Bhagora R V *et al* (2011)³ and Mirmohammadi S J *et al* (2011)²⁰ in their study found 99% and 95.8% of burns respectively caused by flame which are very high than present (77.8%) studies. Other study of Fathallah Z F (2005)¹¹ found only 52.9% burn cases where causative factor was flame which is much less than our study observation. But Ahmadijouybari T *et al* (2013)²¹ shows that main cause of unintentional burns was hot liquids (54.0%) followed by flammable materials (40.0%). Also Kitara D L *et al* (2011)¹² found similarly that majority of burns were caused by hot water (65%) followed by open flames (25%) and hot porridge (10%). Guimarães Leão C E *et al* (2011)²² found different results that burn due to liquid alcohol was the most common etiologic agent, affecting 34.4% patients; this was followed by direct contact with superheated liquids (28.1%), especially water and oil (17.6%). Out of total 125 male burns, 94 (75.2%) were accidental, 22 (17.6%) were suicidal and 09 (07.2%) were homicidal. Jaiswal A K *et al* (2007)²³ found that 72.1% of the accidental burns in male which was similar to present study but suicidal burns (7.5%) were much less and homicidal burns (20.4%) higher than present study. Out of 177 female burns, 138 (78.0%) were accidental, 21(11.8%) were suicidal and 18 (10.2%) were homicidal burns. Vaghela P C *et al* (2012)² in their study shows among all female deaths, the most common manner was accident (77.40%) compare to suicide (21.30%) and homicide (1.30%). Jaiswal A K *et al* (2007)²³ found that 65.8%, 15.9%, 18.3% females suffered from accidental, homicidal and suicidal burns respectively. Ahmed I *et al* (2009)²⁴ found that out of total 82.02% accidental deaths, 81.50% occurred in females and 12.92% patients were had homicidal burns and all were females. This may be because of the fact that in India, dowry system is still very common and most of the homicidal deaths in female were related to the dowry, torture by family members and also because of gender discrimination.

Present study revealed that 57.6% of the male patients had TBSA less than 40% whereas in female patients, majority i.e. 31.0% had TBSA >80% followed by 22.6% between 60-79% TBSA. Only 11.2% of male

patients had TBSA 80% or more. For TBSA of 40 and above in all the categories, females have outnumbered males. Bhagora R V *et al* (2011)³ found 89% cases who sustained >50% TBSA burn. Of these cases, 17% were males and 72% were females which is similar to present study. Jaiswal A K *et al* (2007)²³ in his study classified burn as 0-20%, 21-40%, 41- 60% and >60% of body surface area and found 8.1 %, 15.5 %, 20.4 % and 56 % TBSA burn in males and for females 4.1%, 8.2 %, 20.6% and 67.1% TBSA burn respectively. Shankar G *et al* (2010)⁶ found out in his study that 58.5% of females had TBSA more than 40% which is less than the present study (71.1%) and 74.9% males had less than 39% of TBSA burn which is more than present study (57.6%). Lal S *et al* (2013)²⁵ found 93.98% females were with severe burn injury had more than 40% of TBSA compared to males (80.77%) whereas in present study 71.1% females had burns more than 40% was found which is less.

In the present study, 28.5% cases recovered. 05.6% had a residual disability and 20.5% discharged against medical advice. The overall mortality was 45.4%. Ibran E A *et al* (2012)⁸ in their study found 64.2% cases recovered from injury and discharged from hospital which is much higher than present study and overall mortality rate was 31.2%. Haralkar S J *et al* (2011)¹⁷ found mortality 65.78%, 16.44% were discharged against medical advice, 13.78% were discharged with complete cure and 4% were discharged with residual functional disability. The high mortality rate may be explained by the high incidence of major flame burns, delay in seeking medical help, higher degree and TBSA of burn, high incidence of septicaemia and lack of resources both on part of the patients and the hospital. Dimple V K *et al* (2013)¹⁶ found out that out of 208 burn patients, 49% got cured which was much higher than present study, 22.1% was discharged against medical advice, 24% died and 4.8% referred to higher center. In contrast, Ekrami A *et al* (2010)¹³ observed 8% mortality rate in his study which is much less than presents study.

CONCLUSION

Majority of hospitalized burn patients were adult females of age group 15-45 years age. Accidental burn was the most common mode of burn injuries and flame was most common cause for burn injuries whereas intentional burns like suicidal and homicidal constitute only a small percentage in total. Mortality in burn victims was found very high i.e. 45.4%.

RECOMMENDATIONS

The approach for burn prevention should be multi-disciplinary and coordinated and may be accomplished by providing education so as to build

awareness in general population. Proper training of first aid in burn incidence should be given at all stages like in school curriculum, Mahila Mandal's meeting and other social meetings of women empowerment.

REFERENCES

- Gupta R, Kumar V, Tripathi SK. Profile of the fatal burn deaths from Varanasi region, India. *Journal of clinical and diagnostic research* may 2012;6(4):608-611.
- Vaghela PC, Ahir GN, Patel MH. Epidemiology of fatal burn cases in G.K. General Hospital, Bhuj. *National Journal of Community Medicine* 2012; 3(2):326-329.
- Bhagora RV, Darji JA, Panchal DN, Kalele SD, Parmar DJ. Profile of burns cases brought for post-mortem examination at mortuary of Sir T. Hospital, Bhavnagar. *NJIRM* 2011; 2(4):109-112.
- Park K. *Park's Textbook Of Preventive And Social Medicine*. 21th ed. Jabalpur: M/S Banarsidas Bhanot Publishers; 2011.
- Mahajan BK, *Methods in Biostatistics*. 8th ed. New Delhi: CBS Publication; 2010.
- Shankar G, Naik VA, Powar R. Epidemiological study of burn injuries admitted in two hospitals of north Karnataka. *Indian j commun med* 2010; 35(4):509-512.
- Lal P, Rahi M, Jain T, Ingle G.K. Epidemiological study of burn injuries in a Slum Community of Delhi. *Indian J Commun Med* 2006; 31(2):509-512.
- Ibrani EA, Rao MH, Ali SA, Saleem A. Epidemiologic profile and outcome of hospitalized burn patients: 5 year experience at Burns Centre, Civil Hospital, Karachi. *Journal of the Dow University of Health Sciences Karachi* 2012; 6(1):29-31.
- Rimdeika R, Kazanavičius M, Kubilius D. Epidemiology of burns in Lithuania during 1991–2004. *Medicina (Kaunas)*. 2008; 44(7):541-547.
- Gupta AK, Uppal S, Garg R, Gupta A, Pal R. A clinico-epidemiologic study of 892 patients with burn injuries at a tertiary care hospital in Punjab, India. *J Emerg Trauma Shock* 2011; 4(1):7-11.
- Fathallah ZF. Epidemiological profile of burn injuries in Basrah. *Bas J Surg* 2005; 74.
- Kitara DL, Aloyo J, Obol JH, Anywar DA. Epidemiology of burn injuries: A basis for prevention in a post-conflict, Gulu, northern Uganda: A cross-sectional descriptive study design. *Journal of Medicine and Medical Science* 2011; 2(7): 990-996.
- Ekrami A, Hemadi A, Latifi M, Kalantar E. Epidemiology of hospitalized burn patients in Taleghani Hospital during 2003-2007, *Bratisl Lek Listy* 2010; 111(7):384-388.
- Bhatt R, Sonalia KN, Chhaya J, Bhabhor H. Epidemiological study of occurrence of burns among females admitted in burn ward of Civil Hospital, Ahmedabad. *Indian Journal of Burns* 2011; 19(1):56-59.
- Ghaffar UB, Husain M, Rizvi SJ. Thermal burn: An epidemiological prospective study. *J Indian Acad Forensic Med*. 2008; 30(1):10-14.
- Domple VK, Kharilkar HA, Nandkeshav RA, Inamdar IF, Gadekar RD, Doibale MK. Epidemiology and Management Outcome of Burnt Patients admitted at Tertiary Hospital, Nanded, Maharashtra - A Prospective Study. *Nat J Res Com Med* 2013; 2(1):60-65.
- Haralkar S J, Tapare V S, Rayate M. Study of Socio-Demographic Profile of Burns Cases admitted in Shri Chhatrapati Shivaji Maharaj General Hospital, Solapur. *NJCM*. 2011; 2(1): 19-23.
- Akther JM, Reddy PS, Khan MI, Chauhan M K, Shahapurkar V V. Epidemiology of Burned Patients Admitted In Burn Unit of a Rural Tertiary Teaching Hospital. *Pravara Med Rev* 2010; 2(4):11-17.
- Shrivastava PS, Shrivastava SR. An epidemiological study of adult female burns patients admitted in a tertiary care hospital. *Prog Health Sci* 2012; 2(2):21-28.
- Mirmohammadi SJ, Mehrparvar AH, Jalilmanesh M, Kazemeini K, Delbari N, Mostaghaci M. An Epidemiologic Survey on Burns in Yazd from 2008 till 2009. *Acta Medica Iranica* 2012; 50(1):70-75.
- Ahmadijouybari T, Najafi F, Moradinazar M, Karamimatin B, Karamimatin R, Ataie M, et al. Two-year hospital records of burns from a referral center in Western Iran: March 2010-March 2012. *J Inj Violence Res* 2013; 6(1):276.
- Leão CEG, Andrade ESD, Fabrini DS, Oliveira RAD, Machado GLB, Gontijo LC. Epidemiology of burns in Minas Gerais. *Rev. Bras. Cir. Plást.* 2011; 26(4):573-577.
- Jaiswal AK, Aggarwal H, Solanki P, Lubana PS, Mathur RK, Odiya S. Epidemiological and socio-cultural study of burn patients in M. Y. Hospital, Indore, India. *Indian J Plast Surg* 2007; 40:158-163.
- Ahmed I, Farooq U, Afzal W, Salman M. Medicolegal aspect of burn victims: A ten years study. *Pak J Med Sci* 2009; 25(5):797-800.
- Lal S, Yadav GK, Gupta R, Shrivastava GP, Singh S, Bain J. Mortality pattern of burn patients admitted in S. G. M. Hospital Rewa: A teaching institute of central India. *Journal of the Scientific Society* 2012; 39(3):130-135.

Source of Support: None Declared
Conflict of Interest: None Declared