

VARIOUS SOURCES AND MODE OF BURNS: DESCRIPTIVE STUDY

Raman Ohary¹, Shaily Sengar²

^{1,2}Assistant Professor, Department of Surgery, ²Department of Obstetrics & Gynaecology,
MSDS Medical College and Hospital Farrukhabad Uttar Pradesh, India

ABSTRACT

Background: The World Health Organization estimates that the lifetime incidence of severe burns is 1% and that more than 300,000 people die annually from fire-related burns worldwide. Thermal injury is one of the major causes of morbidity & mortality in surgical patients & their successful management remains a challenge to modern medicine. **Aim:** Study of various sources and mode of burn. **Method:** Total of 764 patients admitted to the surgical ward and burn unit were included in the study. On admission, preliminary inquiries were made regarding the demographic profile, cause, mode of burn injury, surface area, and depth of burns were noted. **Result:** In most of the burn patient, the cause of burn was flame (75.9%), followed by moist heat (17.27%) and electricity (6.67%). Maximum no. of burn cases the source of heat was chimney (42.28%), followed by the stove (15.18%), as the next most common source. In most of the patient were accidentally burnt (96.20%) among which the majority were females. **Conclusion:** The most common cause of burn injury was flame. In most burn patients, the source of heat was a chimney, and most of the burn injuries were accidental.

Keywords: Burns; Source; Mode of injury.

INTRODUCTION

Since the evolution of man, he has created fire, used it to prepare his meals and to keep him warm, but with this advantage, the injuries caused by the fire has come as a necessary evil accompanying the good.

With the advent of gasoline, automobiles air travel, bombs in warfare, the threat of burn has progressed to a great magnitude with the introduction of nuclear weapons; the threat has further expanded to a formidable extent. The World Health Organization estimates that the lifetime incidence of severe burns is 1% [1] and that more than 300,000 people die annually from fire-related burns worldwide [2]. Thermal injury is one of the major causes of morbidity & mortality in surgical patients & their successful management remains a challenge to modern medicine.

The burn is a serious traumatic wound produced by thermal energy or chemical substances upon the protective covering of the body, damaging the underlying tissues [3]. Burn injury is a multifaceted multidimensional injury, which deranges almost all the functions of the body depending on the extent of the injury. The wound ranges from microscopic destruction at the cellular level in the first-degree burn to complete coagulation of all

layers of skin [4]. Burn wound is a catastrophe. It affects the psychology of patients & the cost & suffering to the family is also an issue for concern. These injuries have been simulated to a parasite, it imbibes & throws out the vital ingredients of water, protein & electrolytes. It causes pain, anxiety & leaves the patient with everlasting disabilities & disfigurement.

In burns involved at large surface area. The patient is exposed to death first from shock & secondly from toxemia d/t absorption of toxins from the injured surface & thirdly from loss of function of the absent skin covering & fourthly from exhaustion due to the long & continued fight for recovery.

There are several causes of burns thermal, chemical, electrical & solar or radiational. Fatal burns & scalds are widely indoor accidents. Chief causative agents are homemade lighting sources such as chimney, matches, chullas, fireplaces, hot liquids, metals & explosion of oil or gas stoves [5].

MATERIALS AND METHODOLOGY

Study design: An observational descriptive study

Ethics approval: The institutional ethics committee approved the study, and informed consent was taken from the participants or blood relatives

Research place: Department of General Surgery, S. S. Medical College & associated S. G. M. Hospital, Rewa (M.P.)



eISSN: 2395-0471
pISSN: 2521-0394

Correspondence: Shaily Sengar, Assistant Professor, Department of Obstetrics & Gynaecology, MSDS Medical College and Hospital Farrukhabad Uttar Pradesh, India. Email: shailysengar@gmail.com

Sample size: Study was carried out in 764 patients admitted in the surgical ward

Study period: Two years

Inclusion criteria: The study includes patients of burns who were admitted through surgical OPD or casualty Department.

Methodology: On admission, preliminary inquiries were made regarding name, age, sex, religion, occupation, residence cause, and mode of burn injury. General & systemic examinations were performed to find out any associated problem. The extent was expressed in terms of total body surface area, calculated by the Lund and Browders chart [3]. Depth of burn (superficial or deep) estimated by clinical methods. Percentage and depth of burns were recorded in prescribed proforma.

Patients were divided into four groups based on the percentage and depth of the burn and part of the body surface involved and age of the patients for systemic therapy and local. Patients were resuscitated, and burn wound was treated by the open and closed dressing. The treatment was initiated by establishing an intravenous line.

Patients were discharged when they recovered from the primary shock. Patients who had superficial burns with the involvement of less than 10 %, involving the extremities or face without the involvement of eye or ear were discharged with a continuation of oral antibiotic remaining tetanus prophylaxis and dressing at their residence with advice for follow up in surgery OPD.

Other patients were discharged either on request or who had facilities for dressing at nearby medical centers or/and referred to other centers where facilities for primary skin grafting or surgical correction of developing deformities were present.

Patients were encouraged for physiotherapy at their residence and were advised for follow up in OPD.

Statistical analysis: Data was analyzed and expressed as percentage

RESULTS

Table 1: Distribution of Cases According to the Causes

Causes	N (%)
Flame	580 (75.9)
Moist Heat	132 (17.27)
Electricity	51 (6.67)
Electrocution	44
Lightening	07
Chemical	01 (0.13)

It is evident from the above table that in the majority of the burn patient, the cause of burn was flame (75.9%), followed by moist heat (17.27%) and electricity (6.67%).

Table 2: Distribution of Cases According to Source of Heat

Source of Heat	N
Chimney	323 (42.28)
Hot Liquid/Water	134 (17.53)
Chulla	70 (9.16)
Stove	60 (7.85)
Electrocution	44 (5.75)
LPG Stove	40 (5.24)
Fire (Kerosene)	38 (4.97)
Cooker	21 (2.75)
Home Fire	13 (1.7)
Deepak	10 (1.31)
Lighting Stroke	7 (0.91)
Cracker	4 (0.52)

It is evident from the above table that in maximum no. of burn cases the source of heat was chimney (42.28%), followed by the stove (15.18%), as the next most common source.

Table 3: Distribution of Cases According to Mode of Injury

Mode of Injury	N (%)		Total No.
	Male	Female	
Accidental	285 (96.93)	450 (95.74)	735 (96.2)
Suicidal	06 (2.04)	19 (4.04)	25 (3.27)
Homicidal	03 (1.02)	01 (0.21)	04 (0.52)

It is evident from the above table that in the majority of patients were accidentally burnt (96.20%) among which majority were females.

Table 4: Distribution of Cases According to Burnt surface Area

Burn Surface Area (%)	No. of Patient (%)
0-20	220 (28.8)
21-40	206 (26.96)
41-60	158 (20.68)
61-80	80 (10.47)
81-100	100 (13.09)

It is evident from the above table that in the majority of patients (28.80%), the body surface area burnt was 0-20%, followed next by 21-40% surface area burnt constituting (26.96%).

Table 5: Distribution of Cases According to Depth of Burn

Depth of Burn	Total No. of Patient (%)
Superficial + Deep	559 (73.17)
Superficial	205 (26.83)

It is evident from the above table that in the majority of patients had combined superficial + deep burns (73.17%) and 26.83% of patients had superficial burns only.

DISCUSSION

The burn is a serious traumatic wound produced by excessive heat upon the protective covering of the body, damaging the underlying tissues causing circulatory disturbances and mild or severe constitutional disturbances. If untreated burn injuries result in intense suffering and protracted course of illness possible disfigurement with psychological trauma to patients, cost, and sufferings to the family involved.

The largest surface wounds seen in the surgical wards are the results of burns. The burn is a leading killer in the world, and according to the available statistics about 20,000 people die every year from burns in India. Majority of them are women and children. Although the mortality rate and morbidity have decreased with a better understanding of the pathophysiology and greater stress on correction of the fluid and electrolyte imbalance, improved methods of resuscitation. Yet in the words of **Kentish**, "The final outcome is in the hands of unseen observer quite beyond the power of man".

The incidence of burn is higher in India than in Western countries. In India, the rural population is affected more than the urban population this may be attributed to various reasons such as the use of unguarded domestic heating appliances by putting on floors for cooking, use of open flame equipment, faulty heating, and electrical systems, poverty, ignorance, overcrowding, and lack of responsibilities. The most common cause of burn injury was flame followed by moist heat [4,5]

Source of heat and mode of injury:

Chimney: In the present study vide table no. 1 & 2 most of the burn cases were domestic burn. The most common source of the burn was Chimney, i.e. 42.28% followed by hot liquid water 15.18%, Chula 9.16%, electrocution 8.38% Stove 7.85%, kerosene 4.97% LPG gas 5.28% and Pressure Cooker - 2.75%, Fire, Deepak 1.31% lightning 0.65% and cracker 0.52%.

Kerosene oil Chimney was the main source of burn in the present study. In India, people residing in rural areas use this Chimney as a source of light because they do not have electricity supply at their homes. This Chimney is indigenously made, by people of glass bottle or tin jar. A whole is made over the cap of the bottle, and a piece of cloth is passed through this hole and dipped in a glass bottle which contains kerosene oil. When this type of Chimney falls due to any cause, the glass bottle gets broken, and kerosene oil filled in it spreads all over

and later on catches fire. Sometimes the cap loosely fitted over it gets open accidentally, and kerosene oil spreads all over catching fire.

Another type of Chimney that is made up of tin jar, a valve of cycle tube is fitted over the cover of tin, and a piece of cloth is passed through this valve and dipped in the tin-containing kerosene oil, when the cover of the tin gets open, the oil spreads all over and catches fire.

These kerosene Chimneys, which are unguarded and uncovered, are used by poor people of India. Secondly, the height of their flame is uncontrolled, and therefore, the clothes catch fire from these Chimneys and patients sustained burn injuries. The majority of patients (735 out of 764, i.e. 96.20 %) were burned accidentally when their clothes or body touched the fire or source of fire or source of heat fell over the body. The decrease in incidence due to burning by chimneys can be explained as more and more village have electric supply now.

Students use the locally prepared lamp during their study because of electrical failure, and power cut, particularly in the village got accidental burn either due to falling of lamp or due to sleep when they fell over the lamps.

The lamp is available in the market; they were covered with glass also causes burn when during filling with kerosene oil, people do not use funnel and kerosene oil spreads all over and causes burn.

Stoves: The next common cause was pumping type kerosene oil stoves accounted for 7.85% of burns. It is the most popular means of cooking among poor people in rural areas because kerosene oil is the cheapest fuel. The cost of wooden logs and cooking gas is very high and not affordable by the poor people. Poor people use poor quality and old stoves. They were burst easily after vigorous pumping of stoves. Secondly, they used unfiltered kerosene oil in stoves so that embedded impurities obstructed the opening of burner. When housewives used a pin for removing the obstruction, excessive spillage of oil flowing out carelessly from the stoves over the floor and the body and when matchstick was used to lighten the stoves, the explosion of fire occurred, and the clothes caught fire quickly, and the patients sustained burn injuries.

Thirdly these patients kept the stoves on the ground and were sitting on the same floor. The rate of the accident was high because the clothes catch fire easily, especially in whom where the loose end of Saree hanging around them. Synthetic Saree and Salwar suit commonly worn by females was tight and difficult to remove when they catch fire causes extensive and deep burns.

Earthen Chula/Angithi: In the present study, earthen Chula/ Angithi constitutes 9.16% of burn patients. In rural areas, people/homemakers handmade Chula on the ground and the cook also sits on the same floor, the rate of accidents was more in females because the loose end of Saree or Dupatta hanging around them catches fire easily.

Scalds: They were responsible for 15.18%. They occurred due to accidents spillage of boiling water, oils, milk and beverages like hot tea, coffee etc. Children were most commonly affected due to the negligence of working parents. Inflammable oils are responsible for 4.97 % of burns i.e. 38 cases out of 764 total cases. All the kerosene oil burns were suicidal burns.

L.P.G. Gas Chula: Vide table no. 8 of observations, LPG gas Chula burns constitute 5.24%. LPG gas Chula burns involved mainly the middle-class housewives while cooking their meals; these middle-class people can afford gas cylinders and LPG gas Chulas.

Electrical Burns: Electric burns involved mainly the male victims due to the touching of live wires while working in the fields. Electric burns contribute to 8.38% of the total, i.e. 44 cases out of 764. Most of the victims were adult males as they spend most of their time outdoors and accidental breaking up to overhead electric supply cable falling on the patient or else during repair of these cables over electric poles in mechanics.

Lightning stroke also affected 07 patients out of 764, and the majority were males because males spend most of their time outdoor. Only one child and one elderly female were affected due to defective indoor electrical equipment.

Increase in the incidence of burns due to electricity is because of the more widespread use of electricity for public supply and electrical appliances.

Pressure Cooker: Cooker was the responsible for 2.75 % of burns in the present study (vide table no. 8 of observations) people of rural areas were poor and used poor quality of pressure cooker, which was easily burst, and victims got burnt.

Home fire constitutes 4.97% of burn cases, which include open fire for warming in winter and burning coal and hut. Firecrackers were responsible for 0.52% burn. Deepak (earthen lamp) was responsible for ten burn patients out of 764 cases, i.e. 1.31%, which were accidental burn. In the present study, one case of homicidal burn by kerosene was also noted.

The majority of burns (96.20%) were of accidental type. Suicidal burns were 3.27%, and homicidal burn was 0.52% recorded [6, 7] which is consistent with the incidence reported in other studies such as Kumar et al., [8] Rewa 2011 (Accidental-95.33%, Suicidal-2%, Homicidal-0.66%), Jaiswal et al. [9] Indore (Accidental-67.7%, Suicidal-18.9%, Homicidal-2%), and Mir et al. [10] Kashmir 2012 (Accidental-87%, Suicidal-9%, Homicidal-4%). The percentage of body surface area and depth of burn are very important parameters not only in the management of burn injuries but also for assessing the prognosis of a patient suffering from burn injuries.

In observations, majority of patients (28.80%) had 0-20% of body surface area burnt, and 26.96% patients had 21-40% of body surface area burnt, i.e. 55.4% (426 out of 764 patients) had up to 40% of body surface area burnt.

The minimum 10.47% cases suffered 61-80% of body surface area burn and 13.09% cases suffered 81-100% of body surface area burn. The majority, (73.17%) of patients had superficial + deep burns while only 26.83% had superficial burns alone. The depth of burn is dependent on the source of heat, the thickness of skin, duration of contact, and the heat dissipating capability of the skin.

CONCLUSION

The most common cause of burn injury was flame followed by moist heat, least due to chemical burn was recorded. In the majority of burn patients, the source of heat was chimney followed by hot liquid. Most of the burn injuries were accidental (96.20%), suicidal burns were (3.27%), and 04 cases of homicidal burns were noted. In the majority of patients (31.41%) body surface area burnt was 0-20%, 27.78% of patients had 21-40% of the burnt body surface. 20.15% of patients had 41-60% burn, and more than 80% had 11.78, and 61-80% had 9.16. Majority of patients had superficial + deep burns (73.17%), 26.83% had superficial burns only.

REFERENCES

- [1] Murray CJL, Lopez AD. The global burden of disease. A comprehensive assessment of mortality and disability from diseases injuries and risk factors in 1990 and projected to 2020 (Harvard University School of Public Health, 1996). [Ref list]
- [2] WHO. A WHO plan for burn prevention and care (World Health Organization, 2008)
- [3] Lurid CC, Browder NC. "The estimation of areas of burns. Surg Gynecol Obstet. 1944; 79:352-8
- [4] Church D, Elsayed S, Reid O, Winston B, Lindsay R. Burn wound infections. Clin Microbiol Rev. 2006;19:403-34
- [5] Timothy DL, Barbara AL, Jackie AH, Margaret S, Keely AQ, Vinitha RN, et al. Demographics of Pediatric Burns in Vellore, India. J Burn Care Res 2009;30: 50-54
- [6] Sowemimo GOA. Burn injuries in Lagos. Bums. 1983;9:280-3.
- [7] Pegg SP, McDonald CE, Tracey P. Epidemiology of burns attending causality department of Brisbane. Bums. 1983;9:416-21
- [8] Kumar A. A Thesis Entitled Epidemiology of Burn Injury in Children. A.P.S. University Rewa M. P. 2011.
- [9] Jaiswal AK, Aggarwal H, Solanki P. Epidemiological and socio-cultural study of burn patients in M. Y. Hospital, Indore, India. Indian J Plast Surg 2007;40:158-63
- [10] Mir M, Anjum S, Mir R, Sheikh G, Mir M, Reshi F. Etiological and demographic profile of burn injury in Kashmir valley. Internet J Plast Surg 2012;8:1-5