www.jmscr.igmpublication.org
Impact Factor 5.244
Index Copernicus Value: 83.27
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: http://dx.doi.org/10.18535/jmscr/v4i9.86

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Effect of Environmental Factor in Burn Patients – A Review

Authors
Neelesh Shrivastava[1], Dr Mayank Jain[2], Dr A.P.S.Gaharwar[3], Dr Brijesh Singh[4] Dr Shishir Pandey[5]
[1]Sr. Resident, Dept of Surgery, S.S. Medical College, Awadesh Pratap Singh University, Rewa
[2]JR, Dept of Surgery, S.S. Medical College, Awadesh Pratap Singh University, Rewa
[3]Professor & HOD, Dept of Surgery, S.S. Medical College, Awadesh Pratap Singh University, Rewa
[4]Assistance Professor, Dept of Surgery, S.S. Medical College, Awadesh Pratap Singh University, Rewa
[5]JR II, Dept of Surgery, S.S. Medical College, Awadesh Pratap Singh University, Rewa
Corresponding Author
Neelesh Shrivastava
Sr. Resident, Department of Surgery, S.S. Medical College, Awadesh Pratap Singh University, Rewa
Email: *namita1.shrivastava@gmail.com*

ABSTRACT
Introduction- *Burn injury is a serious public health problem, The Burn injury rank among the most severe type of injury suffered by the human body with an attendant high mortality and morbidity rate. Various environmental factors like flaming, lightning, flashing, hot water, hot oil cause severe burn and subsequent death, this study to find out effect of these factors on burn patients.*
Objective-to find out effect of environmental factors and its effect on burn patients
Material and Method- *This is a prospective study which carried out in all patients of burn injury who were admitted in Burn unit of Sanjay Gandhi Memorial Hospital associated with S.S. Medical College, Rewa (M.P.) during the period of 1st Aug. 2014 to 31st July 2015*
Result- *Highest incidence of burn admission was seen in the month of March 2015 (8.9%) followed by October 2014 (7.3%) and November 2014 (7.2%). Lowest incidence was seen in the month of September 2014 (2.6%) followed by August (3.5%), majority (83.9%) of burn patients were from rural background , 16.03% cases were from urban background, majority of burn are accidental (87.7%) in nature, Flame burns (71.74%) was the most common cause followed by scald (18.23%) and electric (9.2%). ,chemical burn involved 100% of male population while its overall incidence is very less i.e. 0.8%, that majority of the burn patients clinically have Superficial + Deep burns (67.13%) these burns are usually involved the larger TBSA . Superficial burns were seen in 28.85% cases and deep burns were 4.0% out of total burn cases*
Conclusion- *majority of burn injuries occurs in summer with female predominance. Different environmental sources like flam, electricity and chemicals cause mainly superficial burns which associated with further stage of septicaemia and death. For planning and implementing prevention programme the approach has to be coordinate.*
Keyword- *burn, flam, mortality, environmental factor.*

Introduction

Injury continue to attract the attention of researchers all over the word. Burn injury rank among the most severe type of injury suffered by human body associated with high mortality and morbidity rate. Burn injury can be accidental, suicidal or homicidal. Burn can occur due to domestic accidents like clothes catching fire from unscreened fire like chulha in kitchen and open oil lamps, stove blast, LPG leaking or cylinder blast; electrical short circuiting & scalds due to hot liquids and escaping hot steam. Burn can be in form of occupational hazards like fire accidents, industrial explosions, flashes from electrical short circuiting, bomb blast, exposure to chemicals, fire crackers, lightening stroke, etc. In India with a population of over 1 billion, there are about 3 million admissions of burn patients annually. The high incidence makes burn as an endemic hazard.

This study was planned to study the effect of different environmental factors which affect the burn patient in the form of severity of injury and mortality.

Material and Method

This is a prospective study of burn study which was carried out on burn patients admitted in burn unit in Department of Surgery, S.S. Medical college and associated G.M.H. & S.G.M. Hospital, Rewa from 1st August 2014 to 31st July 2015.Burn patients were admitted through OPD or causality, or brought by 108 ambulances.

Result

Seasonal presentation-

It is evident from our study (table no-1) that Highest incidence of burn admission was seen in the month of March 2015, (8.9%) followed by October 2014 (7.3%) and November 2014 (7.2%). Lowest incidence was seen in the month of September 2014 (2.6%) followed by August (3.5%) so the burn injuries is mostly affected the patients in warm and dry weather.

Table No.1 Month wise incidence of burn patient

S.No.	Month	Total Burn admissions	Total admission in surgical ward	Percentage (%)
1.	Aug.14	26	723	3.5%
2.	Sept.14	20	741	2.6%
3.	Oct.14	54	730	7.3%
4.	Nov.14	49	673	7.2%
5.	Dec.14	38	731	5.1%
6.	Jan.15	43	590	7.3%
7.	Feb.15	46	679	6.8%
8.	March.15	54	608	8.9%
9.	Aprail.15	31	624	4.9%
10.	May.15	47	687	6.8%
11.	June.15	46	764	6.2%
12.	July.15	45	836	5.4%
Total		499	8386	5.9%

Sex

It is evident from below table no-2, that in gender wise distribution of total patients admitted females (59.31%) were more than male (40.68%) population.

Table no.-2, Sex wise distribution of burn Patients

S. No.	Sex	Total no. of burn admission	Percentage
1	Male	203	40.68%
2	Female	296	59.31%
Total		499	100%

Mode of burn

It is evident from below table no-3, that majority of burn are accidental (87.7%) in nature while intentional burn accounts for suicidal (9%) and homicidal (3.3%).

Table No.3 Distribution of Patients According to Mode

S.NO.	MODE OF BURN	TOTAL CASES	PERCENTAGE
1.	ACCIDENTAL	438	87.7%
2.	SUICIDAL	45	9.0%
3.	HOMICIDAL	16	3.3%
TOTAL		499	100%

Cause of burn

It is evident from below table no-4, that Flame burns (71.74%) was the most common cause followed by scald (18.23%) and electric (9.2%). In our study chemical burn involved 100% of male population while its overall incidence is very less i.e. 0.8%.

Table No.4 Distribution of Patients According to Cause of burn

S.NO.	CAUSE	TOTAL CASES	PERCENTAGE (%)
1	Flame	358	71.74%
2	Scald	91	18.23%
3	Electric	46	9.2%
4	Chemical	04	0.8%
Total		499	100%

Source of burn

It is evident from below table no-5, that equipments that causes flame burns were chimney (28.1%), chulha (12.2%) and kerosene (15.3%). Hot liquids (water, milk, tea,oil,dal.vegetable etc) (17.3%) accounts for scald burn.

Table No.-5 Gender wise distribution according to source of burns

S.No.	**Source of Burn**	**Total**		**Male**		**Female**	
		N	%	N	%	N	%
1.	Chimney	140	28.1	36	25.7	104	74.3
2.	Hot liquids	86	17.3	51	59.3	35	40.7
3.	Kerosene	76	15.3	23	30.2	53	69.7
4.	Chulha	61	12.2	15	24.6	46	75.4
5.	Electric wire	46	9.2	37	80.4	09	19.6
6.	Open fire	16	3.2	11	68.7	05	31.2
7.	Burst stove	46	3.0	15	32.6	31	67.4
8.	Cooker	6	1.2	2	33.3	04	66.6
9.	Chemical	4	0.8	4	100	00	00
10.	Others	18	3.6	9	50	9	50
Total		499	100	203		296	

Depth of burn

It is evident from the below table no-6, that majority of the burn patients clinically have Superficial + Deep burns (67.13%) these burns are usually involved the larger TBSA. Superficial burns were seen in 28.85% cases and deep burns were 4.0% out of total burn cases

Table No. 6 Distribution of burns according to Depth of burn and Sex

S.No	Burn Depth	Total		Male		Female	
		N	%	N	%	N	%
1.	Superficial	144	28.8%	75	52.1%	69	47.9%
2	Superficial +Deep	335	67.1%	116	34.6%	219	65.3%
3	Deep	20	4.0%	12	60%	8	40%
Total		499		203		296	

Mortality according to different environmental cause

It is evident from the below table no-7, that there was a significant association between case fatality rate with cause of burn. Flame burn has a highest case fatality rate (37.07%) followed by scald (11%), electric burn (4.3%) .

Table No.7 Mortality of burn patients according to Cause

S.No	CAUSE	TOTAL CASE	EXPIRED		CFR
			N	%	
1.	Flame	358	185	93.97%	37.07%
2.	Scald	91	10	5.0%	11%
3.	Electric	46	02	1.0%	4.3%
4.	Chemical	04	00	-	00%

.

Mortality according to TBSA-

It is evident from below table no-8, that increase of TBSA burn significantly increases the case fatality rate ‘thus highest case fatality rate (97.4%) seen in 76%-100% TBSA.

Table No.8 Mortality of burn patients according to TBSA

S. No.	TBSA	Total Cases	Expired		CFR
			N	%	
1.	1%-25%	188	4	2.0%	2.1%
2.	26% -50%	110	27	13.7%	24.54%
3.	51%-75%	86	54	27.4%	62.79%
4.	76%-100%	115	112	56.9%	97.4%

Mortality related to complication-

It is evident from below table no-9, that the septicaemia shock was the most common cause of mortality comprising 56.85% of total cases followed by hypovolumic shock (36.54%) predominantly in immediate post burn time period. Other causes like Pneumonia (4%) responsible for delayed death in post burn period.

Table No. 9 Distribution of Patients According to Cause of death

S. No.	Cause of death	Total No. of Patients	Percentage
1	Septicemic shock	112	56.85%
2	Hypovolumic shock	72	36.54%
3	Pneumonia	4	2.0%
4	Others	9	4.56%
Total		197	100%

Outcome of burn patient-

It is evident from below table no-10, that in our study most of the patients were recovered (52.10%) during treatment .Out of total 499 cases 197 patients expired accounting for 39.47% of cases. During the study period 6.4% of cases discharged on request/ refer while 2.0% of cases absconded during the treatment.

Table No. 10 Distribution of Patients According to outcome of burn

S.No.	Condition on discharge	Total cases	Percentage (%)
1.	Recovered	260	52.10%
2	Expired	197	39.47%
3	Discharge on request/ refer	32	6.4%
4	Absconded	10	2.0%

Discussion

The burn is a serious traumatic wound produced by excessive heat upon the protective covering of body, damaging the underlying tissues causing circulatory disturbances and mild or severe constitutional disturbances. The largest surface wound seen in burn unit of surgical wards are result of burn, although morbidity and mortality has been decreased with better understanding of the path physiology and greater stress on correction of fluids and electrolyte imbalance, improved method of resuscitation.

In our study highest incidence of burn admission was seen in the month of March (8.9%), mainly in summer season. Similar trends were reported by previous study on burn P.Kumar et al.[3] and Jayanta et. al[2]

In present study maximum number of patients was females (59.3%), because females are usually involved in domestic works like cooking, etc. Domestic responsibilities of females plays important role in female predominance. Results are consistent with previous studies Chakraborty et al[1] reported 61.5% females. Deshpande[2] reported 59% females.

In present study, accidental burns were maximum accounting for 87.7% of all cases followed by suicidal cases 9% and homicidal burns were 3.3% recorded. As most of other studies done in various demographic areas shows that the accidental mode of burn was commonest because of hurry, lack of safety devices in occupational set ups, multitasking behaviour. Majority of burn injury incidents occurred in domestic environment, where the kitchen was the most common place of burn injury 67.53% of cases followed by living room 22.64%, as most of the burn victims were from rural population having congested rooms and lack electricity. Ashok K Gupta et al [7]reported that 72% of cases of burn occurred in closed spaces of which 52% in kitchens. Mostafa Hemeda et al [8]Ashish K Jaiswal et al[9] reported home as most common place of burn.

In present study causes of burn as recorded flames burns were 71.74%, scald 18.23%, electric burns were 9.2%, chemical 0.8%. Cooking practices and lightning in rural households use chimney, Chula, kerosene in large scale results in larger proportion of flame burns. Spillage of hot liquids in children age group occurred due to ground level cooking

practices and negligence of working parents. Chimney 28.1% was the leading source of heat in present study. Commonly used chimneys are indigenously/home made in bottles of glass or tin jar, in which kerosene is used as a burning agent.

In our study, TBSA was randomly distributed. It ranges from 1-100%., Flame burns had larger mean TBSA (56.09%) other causes. Intentional modes of burn injuries accounted for larger burnt TBSA, suicidal (71.2%) and homicidal (51.6%) than accidental (42.6%). Patients those who died (75.72%) during treatment have larger mean TBSA than who survived (23.19%). P Kumar[3] reported mean and median TBSA were 53.02% and 52.0% respectively. S Lal[10] reported that mean TBSA in their study was 77.57%. In Egypt, Mostafa Hemeda[8] reported the mean TBSA was 32±5.7%. Results of our present study are consistent with previous studies at various places.

In our study out of total 499 burn admissions during the year, 197 patients expired during the course of treatment resulting in the Total mortality rate of 39.47%. Case fatality rate was 56% in study by Marsh D[13] in Karachi. Ashok K Gupta [7] reported 40% mortality rate. Mukerji G[13] reported 21.8% mortality rate among total burn admissions. S Lal[10] reported high risk categories involve female sex, flame burns, intentional mode of burn, extensive TBSA involved.

Better survival rate was because of larger proportion of patients have lesser TBSA burn, easy and early access to health centre, improved referral facilities like 108 ambulance, increased awareness towards available health facilities, etc.

Septicaemia (56.85%) was the most common cause of death followed by hypovolemic shock (36.54%), pneumonia in (2.0%) of cases and other causes accounted for (4.56%) of cases. Due to, larger TBSA, late presentation, increased antibiotic resistance, lack of cradles, lack of proper hygiene, overburdened burn unit results in increased rate of wound infection thus leading to septicaemia. Gupta et al[7], and singh et[10] alalso reported that infection is the major cause of death. infection leading to secondary complications and ultimately, multiorgan failure was the major cause of death in burn cases could be tackled with the better use of burn facilities

Conclusion

Burn injuries are serious public health problem with highest mortality and morbidity. This Study, the effect of environmental factors help in understanding its consequences, which can be altered with modification and helps in improving outcome in target population. This study indicates that maximum of burn episodes were in summer, were accidental, domesticand were more common in females involved in cooking related activities..Flame burns due to chimney or kerosene lamps were major cause of burn. With increase in TBSA of burn, significantly increases the case fatality rate “thus highest case fatality rate seen in 76%-100% TBSA burn patients.Septicemia reflected as an major cause of mortality in burn patients .Burns still continue to be a major problem in young females in India. This indicates that the situation in India not changed much even in 21st century. Burn injuries are preventable through design and promotion of more aggressive prevention program. The approach has to be multidisciplinary and coordinated.

References

1. Sumanta Chakraborty, Sukamal Bisoi, Dipankar Chattopadhyay, et al. A study on demographic and clinical profile of burn patients in an apex institute of West Bengal. Indian J Public Health 2010;54 (1):27-29.
2. Jayant D Deshpande, Padmakar K Baviskar, Deepak B Phalke. Epidemiological study of hospitalized burn patients in rural area. International Journal of Biomedical and advance Research 2012;3(4):263-267
3. Kumar P, Chaddha A. Epidemiological study of burn cases and their mortality experiences amongst adults from a tertiary

level care centre. Indian Journal of community Medicine 1997;22(40):160-167.

4. Shankar Gowri, Naik Vijaya A, Rajesh Powar, et al. Epidemiology and outcome of burn injuries. J Indian Acad Forensic Med 2012;34(4):312-314.
5. Akther JM, Nerker NE, Reddy PS, et al. Epidemiology of burned patients admitted in burn unit of a rural, tertiary teaching hospital. Pravara Med Rev 2010;2(4):11-16.
6. Mir M, Anjum S, Mir R, et al. Etiological and demographic profile of burn injury in Kashmir valley. The Internet Journal of Plastic Surgery 2012;8(1):pp 1.
7. Ashok K Gupta, Sanjeev Uppal, Ramneesh Garg, et al. A clinico- epidemiological study of 892 patients with burn injuries at a tertiary care hospital in Punjab, India. J Emerg Trauma Shock 2011;4(1):7–11.
8. Mostafa Hemeda, Ashraf Maher, Amr Mabrouk. Epidemiology of burns admitted to ain shams University burns unit, cairo, Egypt. Burns 2003;29(4)352-358.
9. Ashish K Jaiswal, Himanshu Aggarwal, Pooja Solanki, et al. Epidemiological and socio-cultural study of burn patients in M. Y. hospital, Indore, India. Indian Journal of Plastic Surgery 2007;40(2):158-163.
10. Lal S, Yadav GK, Rachna Gupta, et al. 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.
11. Soltani K, Zand R, Mirghasemi A. Epidemiology and mortality of burns in Tehran, Iran. Burns 1998;24(4):325- 328.
12. Marsh D, Sheik A, Kalil A, et al. Epidemiology of adults hospitalized with burns in Karachi, Pakistan. Burns 1996;22(3):225-229.
13. Mukerji G, Chamania S, Patidar GP, et al. Epidemiology of paediatric burns in Indore, India. Burns 2001;27(1):33