REQUENCY AND OUTCOME OF MEDICO LEGAL CAUSES OF FLAME BURNS: A TERTIARY CARE HOSPITAL EXPERIENCE

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ABSTRACT

Objective: Objective was to determine frequency and outcome of medico legal causes of flame burns in burn patients.

Material & Methods: 125 subjects those fulfilling the inclusion criteria were enrolled after informed consent from Burn unit, Mayo Hospital Lahore. Their name, age, gender and address was noted. Then proper history was taken. Frequency of Flame burn was identified. Medico legal causes of Flame burns according to operational definitions were noted. After management of burn patients in Burn Unit of Mayo Hospital of Lahore, patient's outcome in terms of discharge or death was recorded on Proforma (attached).

Results: Out of 125 subjects, 89 sustained flame burns. There were 54 males (60.7%) and 35 females (39.3%). Medico legal cause was accidental in 86 patients (96.6%), homicidal in 2 patients (2.2%) and suicidal in 01 patient (1.1%). There were 76 patients (85.4%) with 10 to 30% total body surface area burnt, 7 patients (7.9%) with 31 to 50% total body surface area burnt and 6 patients (6.7%) with 51 to 70% total body surface area burnt. 74 patients (83.1%) were discharged after management of burns while 15 patients (16.9%) died during admission in Burn Unit. There were 15 cases of flash burns, 10 cases of electrical burns, 8 cases of scald and 3 cases of chemical burns.

Conclusion: The mortality, morbidity and disability associated with burn injuries are preventable to a large extent by educating society about safety measures, legislations, implementing good health and safety regulations and urgent management of burn victims.

Keywords: Flame burns, Frequency, medico legal cause, outcome

INTRODUCTION

An estimated 195 000 deaths every year are caused by burns – the vast majority occur in low- and middle-income countries. Non-fatal burn injuries are a leading cause of morbidity.

Women in the WHO South-East Asia Region have the highest rate of burns, accounting for 27% of burn deaths all over the world and nearly 70% of burn deaths in this region. Burns happen mainly in the home and workplace. But this type of trauma is preventable[i].

Burn injuries occur all over the world and have badly affected human race since ancient times till the present day[ii]. Burn Injuries are a major public health issue due to its high mortality, morbidity and disability amongst young and middle aged adults. Burn has also a social aspect. It may be associated with accidental, suicidal or homicidal causes[iii]. Worldwide approximately six million victims seek medication for burns per year. Majority of these patients are managed on outpatient basis[iv]. The decision of inpatient treatment in a specialized burn unit depends mainly on the extent of the burn, associated trauma and the overall condition of the burn victim[v,vi,vii,viii]. In developing countries, the problem of burn injuries is worse .It is because that care of burn victims requires specialized units that are costly and not always easily available[ix].

The good outcome of acute burn management has led to an increased demand for high quality rehabilitation. When optimizing burn care programs, there should be comprehensive knowledge of long term risk factors that lead to poor health and unemployment of the patient[x]. In a study conducted at M.Y. Hospital, Indore, frequency of flame burn was 80.3%, accidental cases were 67.7% and death occurred in 62.3% of cases[xi]. In another study conducted at PIMS, the major mechanism of burn in females was stove burst with 22% and in males direct flame with 18% of cases. Burns were accidental in 79%. Death occurred in 18% of male burn victims and 16% of female victims[xii]. Mayo hospital is one of the tertiary care hospitals of Punjab with the facility of Burn unit. I wanted to reassess these variables in our setup with ongoing treatment modalities. Thus a study of these epidemiological factors of burns in hospitalized victims is likely to have a bearing on overall picture available from entire country. It will help to plan an affective

prevention program as well as to improve the management of burn patients.

MATERIAL & METHODS

A descriptive Case series was carried out in Department of Plastic Surgery and Burn Unit Mayo Hospital, King Edward Medical University, Lahore from 1st January 2013 to 30th December 2013. After informed consent, using purposive, consecutive, non-probability sampling, all adult patients of either sex presenting with all types of burn like flame, chemical, electrical and scald burn involving 10% to 70% of total body surface area burnt determined by Wallace rule of nines were included Patients with history of previous surgical procedures and co-morbid conditions determined by history e.g. Diabetes mellitus were excluded. 125 patients completed the follow up and their data was analyzed using Statistical Package for Social Sciences (SPSS) version 17. Results were projected using descriptive statistics e.g. mean with standard deviation in case of continuous variables like age and percentages in case of categorical variables like gender, type of burn. Data was stratified for age groups and gender. Post stratification proportions were compared using chi square or Fischer exact test. A p value ≤ 0.05 was taken as significant.

RESULTS

This study included a total of 125 patients of both gender, sustaining all types of burns. Gender distribution is described in Table 1.

Frequency distribution according to type of burns is detailed in Table 2, Fig.8.

This study had objective to determine the frequency, medico legal cause and outcome of flame burns only. There were 89 patients of flame burns. Gender distribution in flame burns is showed in Table 3.

Data was stratified into five groups according to age in years (that is 12 to 22, 23 to 33, 34 to 44, 45 to 55, and 56 to 65). Frequency distribution of flame burns according to age is described in Table 4.

Distribution of flame burns according to medico legal cause is presented in Table 5. Frequency distribution of medico legal cause of flame burns according to gender is detailed in Table 6.

Data was also stratified into three groups according to total body surface area burnt (that is 10 to 30%, 31 to 50%, and 51 to 70 %). Frequency of total body surface area burnt with flame burns is shown in Table 7, Fig. 9. Frequency distribution of TBSA towards medico legal cause of flame burns is expressed in Table 8.

The outcome of flame burns in terms of discharge after management of burns or death is detailed in Table 9. Frequency distribution of outcome of flame burns according to gender is described in Table 10. Frequency distribution of outcome of flame burns towards total body surface area burnt is showed in Table 11.

Frequency distribution of outcome of flame burns according to age of patients is tabulated in Table 12.

Frequency distribution of outcome of flame burns in accordance with medico legal cause is detailed in Table 13, Fig 10.

Table I: Descriptive Statistics of sampled population (n=125)

characteristics		Count (Percentage)
Gender distribution	Male	54 (60.7%)
	Female	35 (39.3%)
Age distribution	12 to 22 years	16 (18.0 %)
	23 to 33 years	46 (51.7%)
	34 to 44 years	16 (18.0%)
	45 to 55 years	08 (09%)
	56 to 65 years	03 (3.4%)
Distribution according to Medico-legal Cause	Accidental	86 (96.6%)
	Homicidal	02 (2.2%)
	Suicidal	01 (1.1%)

Table II: Frequency Distribution of Flame Burns according to medico-Legal cause

			Medico legal Cause of Flame Burn			Total
			Accidental	Suicidal	Homicidal	
Gender	Male	Count	52	1	1	54
		% of Total	58.4%	1.1%	1.1%	60.7%
		Count	34	0	1	35

	Female	% of Total	38.2%	.0%	1.1%	39.3%
Total		Count	86	1	2	89
		% of Total	96.6%	1.1%	2.2%	100.0%

Table III: Frequency of Total Body Surface Area Burnt

TBSA	Frequency	Percentage
10 to 30 %	76	85.4
31 to 50 %	7	7.9
51 to 70 %	6	6.7
Total	89	100.0

Table IV: Frequency Distribution of Outcome of Flame Burns

Outcome	Frequency	Percentage
Discharged after treatment	74	83.1
Death	15	16.9
Total	89	100.0

Table V: Frequency Distribution of Outcome of Flame Burns according to Gender

			Outcome of Flame Burn		Total
			Discharged after treatment	Death	
Gender	Male	Count	41	13	54
		% of Total	46.1%	14.6%	60.7%
	Female	Count	33	2	35
		% of Total	37.1%	2.2%	39.3%
Total		Count	74	15	89
		% of Total	83.1%	16.9%	100.0%

Table VI: Frequency Distribution of Outcome of Flame Burns according to Age of Flame Burn Patients

			Outcome of Flame Burn		
			Discharged after treatment	Death	Total
Age of Flame Burn Patients	12 Years to 22 Years	Count	12	4	16
		% of Total	13.5%	4.5%	18.0%
	23 Years to 33 Years	Count	38	8	46
		% of Total	42.7%	9.0%	51.7%
	34 Years to 44 Years	Count	14	2	16
		% of Total	15.7%	2.2%	18.0%
	45 Years to 55 Years	Count	7	1	8
		% of Total	7.9%	1.1%	9.0%
	56 Years to 65 Years	Count	3	0	3
		% of Total	3.4%	.0%	3.4%
Total		Count	74	15	89
		% of Total	83.1%	16.9%	100.0%

Table VII: Frequency Distribution of outcome of Flame burns according to Medico legal cause

			Outcome of Flame Burn		Total
Medico legal Cause of			Discharged after treatment	Death	

Flame Burn					
	Accidental	Count	72	14	86
		% of Total	80.9%	15.7%	96.6%
	Suicidal	Count	1	0	1
		% of Total	1.1%	.0%	1.1%
	Homicidal	Count	1	1	2
		% of Total	1.1%	1.1%	2.2%
Total		Count	74	15	89
		% of Total	83.1%	16.9%	100.0%

DISCUSSION

Burn injuries and their related morbidity, disability and mortality is a public health issue of great importance in developing countries[xiii]. Economic development along with a remarkable decrease in the rate of infectious complications has lowered the morbidity, disability and mortality in developed countries[xiv]. Epidemiological studies of morbidity are a prerequisite for effective burn prevention programs because every community seems to have its own epidemiological characteristics and proper knowledge of the descriptive epidemiology of burns is required to select target groups for preventive actions.

The present study showed flame burn as the most common cause of burns in patients admitted in Burn Unit (71.2%) followed by flash burns (12%), scald (6.4%), electrical burns (8.0%) and chemical burns (2.4%). Similar results have been reported from Egypt [xv],[xvi] and Jordan[xvii]. Fewer studies report a similar or a higher proportion of scalds than flame injuries[xviii],[xix],[xx]. As risk of burn injury occurs frequently among the economically unprivileged class of society, it might be the result of poor living standards like living in older buildings, use of portable, open-flame type heating systems, faulty heating or electrical systems, crowded living condition and absence of smoke detectors[xxi]. This is also a fact that gas and kerosene are widely used as domestic fuel in Pakistan On the other hand, the picture reported from industrialized countries differs, where flammable liquids and gas stoves were the most common source of flame burns[xxii],[xxiii]. Burn agents are highly individualized in each country, largely depending on the standard of living and lifestyle. In spite of the finding that scalds were responsible for only 7% burn injuries in this sample, they were found to be the most frequent agent of burn injuries in reports from Japan[xxiv] and Nigeria[xxv], in which they represented 40-78%. The difference in the ranking of different agents could be attributed to the developmental stage of the country, the age composition of the sample and whether outpatients were included or not.

Age and gender are important epidemiological factors for burn injuries. The present study revealed that about half the cases were aged between 23-33 years represented 51.7%% of the cases and mean age was 28.98 years. However 18% of the cases were in group of 12- 22 years of age and 30.4% of the cases were aged between 34-65 years. The age distribution revealed by the present study is similar to that found in other studies[xxvi],[xxvii]. However, the difference between the relatively low percentage of old people in the present study and the higher percentage (16.7%) reported in a previous study[xxviii] can be explained by the social structure in our setup as older people usually live with their families, thus their exposure to hazardous situations is decreased.This pattern means that burns tend to occur more in particular age groups showing the certain developmental or behavioral patterns linked with age. . High incidence in young adults may be explained by the fact that they are generally active and exposed to risky situations both at home and at work.

It is usually thought that women are more affected in burn injuries. In contrast, our study showed that burns were more frequent in males (60.7%) than females (39.3%). Male to female ratio was 1.5:1. The reason may be that males in this area are the main stress-bearers and the only earning hands in the family. So they are more frequently exposed to hazardous situations as compared with their female family members.

According to this study, Medico legal cause was accidental in 96.6% of cases, homicidal in 2.2% cases and suicidal in 1.1% of cases. In another study done on burn victims in PIMS[17], there were 79% accidental cases, 15% homicidal cases and 6% suicidal cases. This discrepancy might be because of an underestimate of the true picture due to reluctance - for legal reasons – to report the real reason for the injury. Burn injuries appear to be a common method of deliberate self-harm in some countries of this region. In Iran, burns are responsible for 22% (male 14%, female 31%) of all suicide attempts and 17% (male 9%, female 26%) of suicide deaths[xxix]. Another study reports that burns are responsible for 41% of all suicide deaths in Iran[xxx].

Our study revealed that majority of patients (85.4%) had 10 to 30% total body surface area burnt,

while 7.9% cases had 31 to 50% total body surface area burnt and 6.7% cases had 51 to 70% total body surface area burnt. It also adversely affected the outcome of flame burns that larger the TBSA burnt, lesser the chance of discharge after treatment. It was showed that 94.7% of cases were discharged and 5.3% of cases died with 10 to 30% TBSA burnt. 28.6% of patients were discharged while 71.4% of patients expired with 31 to 50% TBSA burnt. All 06 patients representing 100% of cases with 51 to 70% TBSA, died. Most of the patients had 10-30% TBSA burnt. Mean TBSA burnt was 25%. It was also showed that mortality was related with TBSA burnt rather than age of patients as death occurred in all 6 patients who had 51-70% TBSA burnt irrespective of age. On the other hand all 3 patients with ages between 56 to 65 years were discharged after treatment.

The present study implied that 83.1% of patients were discharged after management of their burns while 16.9% of cases died during admission in Burn Unit. However more male patients (14.6%) expired as compared with female patients (2.2%) during treatment. Male to female ratio was 6.5:1. Mortality rate was higher (53.33 %) in age group of 23 to 33 years. It may be explained by the fact that data comprised mostly of young adults.

A Kuwaiti study[xxxi] reported an all age mortality rate of 0.6 per 100,000 per year while two Iranian studies have reported a much higher mortality rate of 4.6[xxxii] and 5.6[xxxiii] per 100,000 per year.The in-hospital mortality for all burn injuries amongst all ages ranges from as low as 5% (mean TBSA burnt = 10%) in Kuwait[80] to 37% (mean TBSA burnt = 38%) in Iran[xxxiv].

This study has limitations as it cannot provide a clear answer to the frequently asked question of gender-related differences in outcome, because no risk adjustment is performed to exclude the influence of effect-modifying factors such as TBSA, age, and etiology. However it is important to do further improvements in burn management, prevention of burn injury is crucial to decrease the morbidity, mortality and economic burden caused by severe burn injury[xxxv].Although burn patients may appear numerically few, they comprise a patient group which often requires considerable resources because of the need for repeated grafting procedures, hygienic precautions, treatment of infections and supportive care to patients and their families.

CONCLUSION

The present study provides a comprehensive overview of hospitalized burn patients in Punjab, Pakistan. Prevention is always the rule to be safe from burns but, once they occur, immediate and proper care should be given. As burn victims need specialized care, there is increasing demand for well equipped Burn Units to cater such patients. Measures should also be taken to provide proper education to prevent these accidents

REFERENCES

1. Burns.365^{0}N sheet Fact 2012 May. Available at:http://www.who.int/entity/mediacentre/factsheets/fs365/en/index.html
2. Ghafffar UB, Hussain M, Rizvi SJ. Thermal Burn: an epidemiological prospective study. J Indian Acad Forensic Med 2009;30:10-4
3. Vaghela PC, Ahir GN , Patel MH. EPIDEMIOLOGY OF FATAL BURN CASES IN G.K.GENERAL HOSPITAL, BHUJ. NJMC 2012;3(2):326-329
4. World Burn Foundation. [http://www.burnsurvivorsonline.com/].
5. American Burn Association: Appendix B to hospital resources document: guidelines for service standards and severity classifications in the treatment of burn injury. Bull Am Coll Surg 1984;69:24-28.
6. Chipp E, Walton J, Gorman D, Moiemen NS: Adherence to referral criteria for burns in the emergency department. Eplasty 2008;8:e26.
7. Anwar U, Majumder S, Austin O, Phipps AR: Changing pattern of adult burn referrals to a regional burns centre. J Burn Care Res 2007;28:299- 305.
8. Brusselaers N, Lafaire C, Ortiz S, Jacquemin D, Monstrey S: The consensus of the surgical treatment of burn injuries in Belgium. Acta Chir Belg 2008;108:645-650.
9. Lal P, Rahi M, Jain T, Ingle JK. Epidemiological study on Burn injuries in a slum community of Delhi. Indian J Community med 2006;31:96-7
10. Litler'e Moi A, Wentzel-Larsen T, Salemark L, Hanestad BR. Long term risk factors for impaired burn specific health and unemployment in patients with thermal injuries. Burns 2007;33:37-45
11. Jaiswal AK, Aggarwal H, Solanki P, Lubana PS, Mathur RK, Odiya S. Epidemiological and Sociocultural study of Burn patients in M. Y. Hospital, Indore, India. Indian J Plast Surg.2007;40(2):158-163
12. Ahmad M, Hussain SS, Khan MI, Malik SA. Experience of Burn Injuries at Pakistan Institute of

Medical science, Islamabad, Pakistan. Ann Burns Fire Disasters 2007;20(1):7-10
13. Attia AF, Sherif AA, Mandil AM, Massoud NM, Arafa MA, Mervat W, et al. Epidemiological and sociocultural study of burn patients in Alexandria, Egypt. East Mediterr Health J. 1997;3:452–61.
14. McLoughlin E, McGuire A. The causes, cost and prevention of childhood burns injuries. Am J Dis Child 1990;144:677-83.
15. Kamel FA. Some epidemiological features of burn patients admitted to the emergency department of the Main University Hospital and to Ras El-Teen Hospital in Alexandria [MPH thesis]. Alexandria, Egypt, dhood burns in Ghana: epidemiological characteristics and home-based treatment. Burns 1995;21:24-8.
16. el-Sonbaty MA, el-Oteify M. Epidemiology of burns in Assiut province during the last two years. Assiut Med J 1990;14:106-9.
17. el-Muhtaseb H, Qaryoute S, Abu Ragheb S. Burn injuries in Jordan: University of Alexandria, 1987.
18. Khan N, Malik MA: Presentation of burn injuries and their management outcome. J Pak Med Assoc 2006;56(9):394-397.
19. Calder F: Four years of burn injuries in a Red Cross hospital in Afghanistan. Burns 2002,28(6):563-568.
20. Ansari-Lari M, Askarian M: Epidemiology of burns presenting to an emergency department in Shiraz, South Iran.Burns 2003;29(6):579-581.
21. Callegari PR, Alton JDM, Shankowsky HA, et al. Bum injuries in native Canadians: a ten year experience. Bums 1989;15:15.
22. Jay KM, Bartlett RH, Danet R, Allyn PA. Burn epidemiology: A basis for burn prevention. J Trauma 1977;17:943-7.
23. Pegg SP, McDonald GP, Tracey-Patte CE, Mayze TD. Epidemiology of burns attending a casualty department in Brisbane. Burns Incl Therm Inj 1983;9:416-21.
24. Nagasaki T. Statistical analysis of burnt at Nagasaki Hospital in Hiroshima. Burns 1978;5:60-1.
25. Onuba O. Pattern of burn injury in Nigerian children. Trop Doctor 1989;18:106-8.
26. Subrahmanyam M. Topical application of honey in treatment of burns. Br J Surg 1991;78:497-8.
27. Ytterstad B, Sogaard AJ. The Harstad Injury Prevention Study: prevention of burns in small children by a community-based intervention. Burns 1995;21:259-66.
28. Glasheen WP, Attinger EO, Anne A, Haynes BW, Heibert JT, Edlich RF. IdentiÞ cation of the high risk population for serious burn injuries. Burns Incl Therm Inj 1983;9:193-200.
29. Saadat M, Bahaoddini A, Mohabatkar H, Noemani K: High incidence of suicide by burning in Masjid-i-Sulaiman (southwest of Iran), a polluted area with natural sour gas leakage. Burns 2004;30(8):829-832.
30. Ahmadi A: Suicide by self-immolation: Comprehensive overview, experiences and suggestions. J BURN CARE RES 2007;28(1):30-41.
31. Sharma PN, Bang RL, Ghoneim IE, Bang S, Sharma P, Ebrahim MK: Predicting factors influencing the fatal outcome of burns in Kuwait. Burns 2005;31(2):188-192.
32. Panjeshahin MR, Lari AR, Talei A, Shamsnia J, Alaghehbandan R: Epidemiology and mortality of burns in the South West of Iran. Burns 2001;27(3):219-226.
33. Maghsoudi H, Pourzand A, Azarmir G: Etiology and outcome of burns in Tabriz, Iran. An analysis of 2963 cases. Scand J Surg 2005;94(1):77-81.
34. Soltani K, Zand R, Mirghasemi A: Epidemiology and mortality of burns in Tehran, Iran. Burns 1998;24(4):325-328.
35. de Roche R, Luscher NJ, Debrunner HU, Fischer R: Epidemiological data and costs of burn injuries in workers in Switzerland: an argument for immediate treatment in burn centres. Burns 1994;20:58-60.