ORIGINAL ARTICLE

A Study of Burn Mortality in Lahore

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ABSTRACT

A severe burn injury has strong correlation with mortality and morbidity affecting mankind all over the world since antiquity to the present era of modern science.

OBJECTIVE: This study was done to find out the etiology and extent of burn injuries and its mortality in different age and gender groups, manner of death in Lahore and to compare it with other national as well as international studies.

MATERIALS AND METHODS: 65 cases of death due to burn injurers were selected from all medicolegal autopsies conducted in the department of Forensic Medicine KEMU Lahore during Jan2006 to Dec 2008.Findings were tabulated from police papers, hospital records and autopsy reports.

OBSERVATIONS: 65 cases of death due to burn injuries constituted 2.18 % of total autopsies conducted during the study period of 3 years at the department of Forensic Medicine KEMU Lahore. Highest incidence 44.61% was seen in 3rd decade. Females showed higher incidence 53.12% in 3rd decade. Overall males showed higher preponderance50.76% than females 49.23%.Dry flame burns gave higher incidence 69.23% followed by electric burns 23.07% then scalds 4.61% and chemical burns 3.07%.No mortality was seen under 20% total burn surface area. Majority of cases were in the range of 31% to80% TBSA. Suicidal incidence was7.69%. Homicidal incidence 38.46% was superseded by accidental incidence 53.84%.Chest and abdomen involvement was seen in 73.84% and66.15% cases respectively followed by upper limb, neck, head and face showing 55.38%,53.84%,and 46.15% cases respectively. Maximum cases 67.69 % were seen in winter season

RECOMENDATIONS: The mortality and morbidity can be reduced through efforts of the Governonment and NGO's creating awareness and education of the public. The role of media cannot be ignored in this scenario.

KEY WORDS: Burns, Etiology, Total burnt surface area, Manner of death.

INTRODUCTION

A severe burn injury is the most devastating injury a person can sustain and yet hope to survive. Burn injuries occur universally and have affected mankind since antiquity till the present day. It is an extremely stressful experience which the victims as well as their families have to face. The patient's physique, psyche, financial situation and family undergo deterioration profoundly by an extensive burn[1]. Burns are the fourth most common type of trauma worldwide, following traffic accidents, falls, and interpersonal violence.[2]

According to the WHO's International Classification of Diseases version 10 (ICD - 10), burn injuries have been classified according to site of injury and etiology, which is further sub classified as those caused by exposure to smoke, fire and flames , contact with heat and hot substances , exposure to electric current , lightening and exposure to corrosive substances. Therefore burns include scalds as well as injuries caused by heat from electrical heating appliances, electricity, flame, friction, hot air and hot gases, hot objects, lightening and chemical burns (both external and internal corrosions from caustic chemicals). Radiation-related disorders of the skin and subcutaneous t issue and sunburn are not included in this classification of burns[3].

Burns constitute a major cause of mortality and morbidity whatever reason may be, in the world and same is in Pakistan too. According to WHO estimate, there were more than 7.5 million fire affected unintentional burn cases all over the world indicating overall incidence rate of 110 per 100,000 per year. The highest rate was noted in South East Asia which was 243 per 100,000 and lowest in America which was 19 per 100,000. In EMR(East

Mediterranean Region) the incidence was 187 per 100,000[4]

According to WHO data, 310,000 people died in fires in 2004 all over the world in low income and middle income countries in majority showing a global mortality rate of 4.8 per 100,000 per year while 29,000 deaths occurred in the EMR with the mortality rate of 5.6 deaths per 100,000.[5] The incidence of burns in low and moderate income countries (LMIC) is 1.3 per 100,000 population compared with an incidence of 0.14 per 100,000 population in high income countries[2]. About 90% burn injuries occur in low and middle income countries due to lack of necessary infrastructure to combat the incidence and severity of burn[6].The incidence of burn injuries severe enough to require medical care is nearly 20 times higher in the Western Pacific (including China) than in the Americas[2] Infants in Africa have an incidence of fire-related burns that is three times the world average for this age group[7].

In Pakistan no long term epidemiological studies on burn are available however; some data on this subject available indicates the extent of problem.

Objectives

This study was done to find out the nature and extent of burn injuries and its mortality in different age and gender groups and manner of death and compare it with other national as well international studies..

MATERIALS AND METHODS

This study was conducted on the 65 cases of death due to burn at the morgue of Forensic Medicine department of KEMU, Lahore during January, 2006 to December, 2008. All the cases of death due to burns injuries irrespective of age and sex were included in this study. Certain variables regarding age and sex, nature of burns, seasonal variation, total body surface area involved, manner of death, and region of body affected were evaluated. Findings were noted on a Performa. Data was extracted from police inquest reports, hospital charts and autopsy records. The findings were tabulated in various tables to analyze the whole picture.

RESULTS

Table 1: Year – wise incidence of burn injuries.

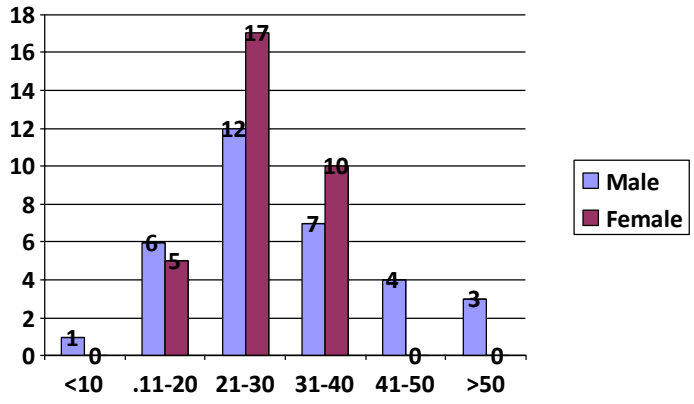
Year	No. of cases	%	Total No. of autopsies	%
2006	22	33.85%	1017	2.16%
2007	22	33.85%	985	2.23%
2008	21	32.31%	977	2.15%
Total	65	100%	2979	2.18%

Table 2: Age – Gender distribution

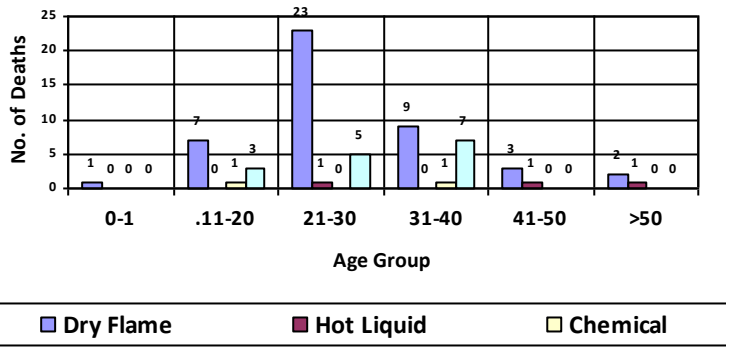
Age in Years	Male (%)	Female (%)	Total	%
<10	1	-	1	1.53
11-20	6	5	11	16.92
21-30	12 (36.6)	17 (53.12)	29	44.61
31-40	7	10	17	26.15
41-50	4	-	4	6.15
>50	3	-	3	4.61
Total	33 (50.76)	32 (49.23)	65	

Table 3: Etiology of burns in different age groups.

Age Group	Dry Flame	Hot Liquid	Chemicals	Electric	Total
0-10	1	-	-	-	1
11-20	7	-	1	3	11
21-30	23 (51.11)	1 (33.33)	-	5	29
31-40	9	-	1	7 (46.66)	17
41-50	3	1	-	-	4
>50	2	1	-	-	3
Total	45	3	2	15	65
%	69.23	4.61	3.07	23.07	



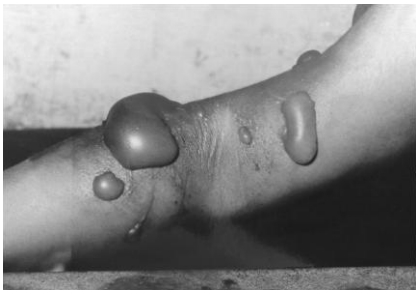
Etiology of burns in different age groups



Arm with third degree burn from high-voltage line.

Chemical Burn

Dry Flame Burn



Scald

Table 4: Body surface area involved in different age groups.

Age Year	< 10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	>100%	Total
0-10	-	-	-	1	-	-	-	-	-	-	1
11-20	-	-	1	3	2	2	-	1	1	1	11
21-30	-	-	3	3	5	2	2	8	4	2	29
31-40	-	-	3	3	2	3	1	2	2	1	17
41-50	-	-	-	-	-	-	2	-	-	2	4
>50	-	-	-	2	-	-	-	-	-	1	3
Total	-	-	7	12	9	7	5	11	7	7	65
%	-	-	10.77	18.46	13.85	10.77	7.69	16.92	10.77	10.77	100

Table 5: Manner of death.

Manner	Male	(%)	Female	(%)	Total	(%)
Suicidal	01	3.03	4	12.5-	5	7.69
Homicidal	08	24.24	17	53.12	25	38.46
Accidental	24	72.72	11	34.37	35	53.84
Total	33	100	32	99.99	65	100

Table 6: Incidence and distribution of burns on the body

Body Regions	Body surface area involved %		Total
	Male	Female	
Head & Face	17	13	30 (46.15%)
Neck	18	17	35 (53.84%)
Chest	24	24	48 (73.84%)
Abdomen	21	22	43(66.15%)
Upper Limb	17	19	36(55.38%)
Lower Limb and Genitalia	9	12	21(32.30%)

Table 7: Seasonal Variation

Seasons	Male	Female	Total
Jan – Mar	7	11	18 (27.69%)
Apr – Jun	7	4	11 (16.92%)
Jul – Sep	6	4	10 (15.38%)
Oct – Dec	13	13	26 (40.00%)
Total	33	32	65

Observations

65 cases of deaths due to burn injuries were subjected to medico legal autopsies which constituted 2.18 % of total autopsies (2979) conducted during this study period of 3 years. The incidence was almost same in each year during the study period. – Table 01. During 3rd decade maximum incidence 44.61% was noted. Females showed high incidence (53.12%) than males (36.36%) in 3rd decade. Overall male showed higher incidence 50.76% than females (49.23%) with MF ratio 1.03:1. Females did not show any case at the extremes of age. Table – 02. Dry flame burns had highest incidence (69.23%) of burns followed by electric burns (23.07%). Chemical burns had lowest incidence (3.07%). Hot liquids had (4.61%) incidence. Dry flame burns occurrence was maximum (51.11%) during 3rd decade followed by electric burns showing incidence of (46.66%) during 4th decade.

Chemicals had equal incidence (50%) during 2nd and 4th decades. Similarly hot liquid had equal incidence (33.33%) during 3rd, 5th and 6th decades. Table – 03. 12 cases involved 31-40% total body surface area followed by 11cases showing 71-80% burnt area.81-90%TBSA was noted in 7 cases followed by >100% TBSA in 7 cases.Table-04.Homicidal cases were 25 (38.46%) out of which 8 were male and 17 females. The accidental incidence was 35 cases (53.84%) There were 24 male and11 female cases of accidental death. The suicidal incidence was (7.69%) with, 1 male and 4 females. Table – 05.Head and face was burnt in 46.15% cases and neck was involved in53.84%. Chest was burnt in 73.84% cases and abdomen in 66.15% cases. Upper limbs were burnt in 55.38% cases and lower limb and genitelia in 32.30% cases. Table – 06. 67.69 % cases were noted during winter season. Table – 07.

DISCUSSION

Burn injuries have been one of the most important causes of morbidity and mortality throughout the world damaging mankind since antiquity to present day. All the societies whether belonging to developed or under developed countries, have to face medical and psychological problems. There are also severe economic and social burdens not only upon the victims but also upon the family and the society (8). In developed countries mortality rate is 2.1% per 100,000 people per year (9). Mortality may be decreased with preventive measures and advances in therapy as well as establishment of specialized burn centers (10).

The mortality rate due to burn injuries in our study is 2.8%.It is much lower than other studies published in Pakistan i.e. 20.96% (10), 29.7%, (11),19%,(12) .It is much higher than 0.96%(13). Other studies have reported the figure as 6.5% in Nigeria(14), 4.3% in Egypt(15).In Iran 12% of all deaths from unintentional injuries have been reported and burns are second most common cause of injury related deaths after road traffic accidents. In U.A.E 14% of child hood injury deaths was due to burn (17).26% mortality has been reported by Ghaffar et al(18).

Analysis of age and sex data in our study has revealed highest incidence of 44.61% in 3rd decade with a female preponderance 53.12% in this decade .It is consistent with other authors, age group 21-30 and female 38.46%(13) , 3rd decade(19). 18-25 years (20), 1st 3 decades (10), 41.5% in13-25 age group (18). Slight male preponderance 50.76% over females 49.23% was in consistence with (13) showing higher male incidence of 20.8% over females 18.6 %(21). This may be because males are usually more active involved in all kind of activities. But the difference is not much significant. This study contrasts other figures, male46.9% female 53.1 %(18), 36%male and 64%female (19) due to engagement of females in kitchen work. Loose fitting clothes may be alleged for easy catching of fire being worn by women and men (22).

High mortality 69.23% was observed due to flame burns as a predisposing factor to higher death rate followed by electrical burn injury 23.07%.Flame burn associated mortality as reported in our study and international literature is due to their extensive involvement and associated inhalational injury. It is comparable with 16.53%(10) ,91.4% (21),69.6%(18),41.4% (11) Narlawar (23) observed that females caught fire 2.04 times more than males due to stove flames.75% of burns were scalds, 16%were due to flames,2%electrical 10% due to contact with hot objects(24). Electrical burn injury is potentially devastating because of multisystem injury carrying high morbidity and mortality. In various studies 2-3% fatality has been reported (25,26,27).Other figures are 0.40%(1).1.8%(21),16.4%(18),5.4%(11). The mortality rate due to electrical burns may be high due to complications.(28).Chemical burns although not common in our society yet the incidence 3.07% in our study is higher than 0.7% as reported from Uganda,Bangladesh,Taiwan,Jamaica and Cambodia (29),(30)and1-4% (20)- Our figure is lower than 5.6%(21) and 9.9% (11).Extensive burns with hot liquid are uncommon especially in domestic setup. Our study revealed an incidence of 4.61% which is higher than 0.9% (21),

Depth of burn and body surface area burnt has a definite and significant correlation with mortality. In our study no mortality was noted below 20% burn and majority of cases of mortality were found in the range of 30-80%TBSA. These findings are in unison with other national studies. Ishtiaq quoted 100% mortality in cases more than 70% body surface area of burn (10). Khan N et al quoted 32% cases having 91-100% TBSA, only 14% cases had less than 50% burn area (11).Memchoubi quoted 100% mortality in patients with 80% burn surface area(13). 32.5% mortality was noted in cases up to 25% TBSA (21) and 46.8% mortality up to 10% TBSA (18). Maximum

deaths due to burns were because of surface area involved in burn injuries ranging from 50% to 100% TBSA (19). It is concluded that it is the percentage of body surface area which decides death due to burns (19).

The homicidal incidence was38.46%, accidental 53.84% and suicidal 7.69%.It is in favor of (1) 84% accidentas,8%homicide 4%suicide.,Aggerwal and Chandra(31) has quoted 88% accident,11%suicide 1%homicide,Ganguli(32) quoted 87.66% accident 4.34% suicide.

In our study chest and abdomen were involved in (73.84%) and(66.15%) cases respectively followed by upper limb, neck, and face almost equally(45% to55%). It was contrary to (19) who mentioned 100% involvement of limbs head and neck 94%, chest and abdomen 92%. Datey et al (33) also showed figures in favor of extremities then head and neck. McIndone (34) found that burns of the trunk and head were more serious to life than burns of extremities.

Our study showed higher incidence (67.69%) during winter season which is in consistence with other studies (13).This may be due to use of fire for warming during winter which is the cold season in the region having no regular and affordable electricity supply or other affordable means for heating. Further children and old people spend their most of the time indoor in cold weather. Othman et al (20) also quoted 28-31% incidence in other international studies.

CONCLUSION

Burn injuries had been a major cause of concern since prehistoric days to to the present era of medicine. In our study majority of cases reported belonged to 2nd to 3rd decade of life in females mostly caused by dry flame burns sustaining more than 20% burn surface area involving chest and abdomen in majority. Most of the cases were accidental and incidence of thermal injuries was maximum in winter season.

RECOMMENDATIONS

Due to the gravity of problem of thermal deaths in our country the government as well other working groups and bodies should come together with sincere efforts and dedications to minimize the burn mortality. The emphasis should be to prevent and reduce the incidence of burn injuries through education to build awareness in general population. School education programs at school level should be initiated. Male concerning risks at work location must be highlighted Family especially housewives and parents must be vigilant Media should be involved for this purpose.

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