
**EPIDEMIOLOGICAL PROFILE OF BURN INJURIES IN
BASRAH****Zuhair F Fathallah**

M.Sc. Lecturer, Dept. of Surgery, University of Basrah, College of Medicine. Consultant Surgeon, Al-Sadir Teaching Hospital, Basrah; IRAQ.

Abstract

This is a retrospective analytic study of the data collected from inpatients admitted to Basrah Teaching hospital during the period 1992 –1998. They were 1726 patients (not include those treated as outpatients) classified as males & females, adults and children (<12 years of age) with an average annual admission of 246.5 patients. The bulk of the cases are adult females and children males. Sex ratio is 1.1: 1 but with variation according to age. Adult to children ratio is 1.4: 1. Seasonality is not that clear but showed some increase in winter months. The flame burn cases formed the bulk of the burn being 52.9% followed by scalds and electric burn. The most common place of burn is home and especially the kitchen and bathroom. Overall mortality is 23.1% with age and sex variation.

Introduction

Burn injuries are a painful experience & tragic accident for both the patients and their families. They are categorized as the most severe trauma the individual can encountering¹. This trauma is sometimes avoidable by simple measures as carefulness and alertness.

Burns represent a major health problem all over the world, with high mortality and morbidity and financial loss. The cause and incidence of burns vary from one community to another and are influenced by age, sex, economic status, local customs and social and environmental circumstances¹.

The effect of sanction on Iraq for more than a decade (during the period of the study), when combined with local social habits, force the people to expose them-

selves to fire hazard by using e.g. kerosene, wood and charcoal stoves and burners or locally made gas oven for backing bread. One of the habits of local females is wearing inflammable nylon garments, which add more to the chance of getting burned.

Local factories and small enterprises again due to sanction & lack of safety measures become more and more lean or even neglect their safety measures to protect the workers. There were few examples, twice in a domestic gas filling plants and one in milling factory, with the result of more than 20 casualties each time.

Burn seems to be a favorable way of committing suicide or homicide, as a result of hardness in socioeconomic situation or psychological stress leading the people to end their lives by this cheap but highly painful way. Those unsuccessful will end with disfigure-

Correspondence to: Zuhair F Fathallah, Dept. of Surgery, University of Basrah, College of Medicine

ment, which need a lot of time, effort and money to become acceptable in shape again. Another causes of burn are electrical. There are two groups of people subjected to such burn those who are unskilled electrical worker, and children playing with unprotected electric wires. Chemical burn is not that common because of limited firms working with chemicals in Basrah area.

Although burn is an accident, but it may consider as endemic disease which flare up in winter. Finally there are some families who are more prone for this accidents.

This study aimed to know in which season of the year or months there is more burn, which group is more exposed to burn, males or females, are children more prone to burn accident than adults, the mortality rate in regard to sex and age.

Material and Methods

This is a retrospective, analytic and epidemiological study of all burn cases admitted to Burn and Plastic unit of Basrah Teaching Hospital between Jan. 1992 and Dec. 1998. This burn unit was closed in early 1999 for financial reasons.

All cases who were admitted during the 7 years (1726 cases) were dealt with by a single team of Specialist, medical and paramedical staff. The cases were either freshly burned or referred cases from other hospitals for special care or surgery. Although the figures in this study represent only cases admitted to BTH, but it reflects the situation regarding burn units in other hospitals in Basrah.

From each patient the following data were collected including age, sex, type, cause and place of burn, mode of injury, extent of burn area affected and finally morbidity and mortality.

In this study the patients were classified into 4 groups according to sex and age, adult, children <12y, males and females.

Results

Regarding the number of patients, there is a good variation in the number of the patients admitted each year. At the beginning of the study in 1992 the number was low but it continue to rise until 1998 were it rise sharply. The bulk of the cases were adult females (539 cases), and male children (454 cases). The overall average of admission/year is 246.6 patients. Adult admission is 58.2% (males=26.9%, and females=31.3%), while children admission is 41.8% (boys=26.8% and girls =15.5%), Table I.

For the seasonal variation, a slight insignificant seasonal variation in the number of burn was noticed. Each of the four groups has its own peak during certain months of the year. In general figures show high number during winter months and low during summer months. The highest admission was during Dec. (average 28.4/month) and Jan. (average 26.7/month). The average admission during summer months (Apr.–Sept.) is 19.2 patients, while in winter months its 22.6 patients, Table II.

Regarding the aetiology, burn with dry heat (flame) form the majority of cases in adults 62.8%, while scald with hot water, liquids or cooking oil form the major cause in children (55.4%). The over all flames burn form 52.9% (913 patients). Scald is the cause in 37% (588 patients). The electric burn comes into third place being 12.1%. In adult it's the spark or the flash burn is the cause in the majority, while in children its direct contact with electric current e.g. touching bare wires or bars of electric heater, Table III.

Age & gender Ratio: The overall male to female's ratio is 1.1:1 that makes it nearly equal. If the figures divided into adult and children, then the result will be, in adult the ratio is 0.86 and in children the ratio is 1.7:1. That shows in adult females are usually more subjected to burn, while in children the boys are more prone to burn accidents, Table IV.

For the site or place of burn, most accident occurs at home (80.3%) mainly in kitchen (48.6%) and bathroom (24.7%). Working place is the site for 12.3% of the cases, and the remaining 7.4% are of other sites as garage or working with electrical switchboard, Table V.

The mean burned surface area of all cases was 28.2%, it is ranged from 10-95% of second and third degree burn.

The mean hospitalization days are 20.8 days, but the range is 5 days to > 1 year. Those who discharge themselves against medical advice are 11.2%.

The overall mortality rate is 23.1% during the years of the study. Adult mortality rate is 26.6% (n=1004), while the figure in children is 18.3% (n=722). The mortality rate each year is variable, it range from 18.8% to 27.2% of the admitted cases. The mortality rate according to age and sex is different, its higher in females (33%) than males (19.1%), but its equal in children (boys= 16.1% and girls= 16%), Table VI.

Discussion

There is a lot of variations in the number of the patients admitted throughout the seven years if we consider males or females, adults or children, but if the overall admission is considered there is a little changes, except in 1998 were the number rise sharply because of the hard ship of the economy that year, which let most of house wives to return to primitive ways of cooking use kerosene stoves and burners or locally made gas oven. The total admission is 1726 with the average of 247 patients/year, these figures if compared with the figures from Bergen/ Norway² reported by Hove et al, who report 361/year, and Sarma et al³ who report 348 patients over a period of 10 years, then these figures are within acceptable range, but to remember that it include only the patients admitted to hospital, those treated as out patients

were excluded from this statistics. The bulk of admitted cases were first the adult females, which are more susceptible to fire hazards during their house hold activities, and next in common are boys because of the kind of games they play. Chapman et al⁴ report about the incidence of paediatric burn in Scotland he found as well that more boys than girls are subjected to burn. Table I

In this series the seasonality is not that clear, the same as Wu-SC⁵ et al who also found in his series from Taiwan that the seasonality is not evident, same for the Saudi series by Ali MH¹. But there is some months with high admission e.g. during winter months. The series from Nigeria⁶ show that they have slight rise during August to October. In this series, adult males show more admission during summer time and that because of young adult having their summer holiday from schools, getting a temporary jobs usually in firms lacking safety measures or precautions. Table II

Burn with dry heat or flame form the majority of cases in adults (62.8%), while scalds with hot water, liquids or even cooking oil is the major cause in children (55.4%). Electric burn comes next, but the aetiology is different. In adult it's caused mainly by spark or flash, and the minority is caused by direct contact with the current. In children the main cause direct touch with the current as by touching bare wires or bars of electric heater. In the series from Nigeria⁶ the flame is also the main cause (57.2%) and scald 40.5% but it is the main cause in children. Ali et al¹ in Al-Baha series report 49.1% due to scalds and 37.5% due to flame, but 60% of their patients are under the age of 10 years.

The overall M: F ratio is 1.1:1, but when this ratio divided according to age, its in adult 0.86, while in children its 1.7:1, which show clearly that boys are more prone to burn accidents. In general males form 53.2 % of the cases, while females form 46.7 % of the cases. Gupta et al⁷ in

his series show that males form 54% and females 46% which is equal. While the series from Harare⁸ (Zimbabwe) report females as 54% and males as 46% which is the reverse to this series. In Al-Baha¹ series M: F ratio is 1.5:1, again the males are more than females. The study from Nigeria⁶ report 63.7% for males and 36.3% for females with ratio of 1.7:1 Table IV.

The safe home proved to be untrue. On the contrary home prove to be the most dangerous place and not the safe heaven as we think. From all of the burn cases admitted 80.3% (1386 pt) had the accident at home, while 12.3% happened at work. Gupta et al⁷ reports 86.2% at home. Sarma et al³ report 85% at home and 12% at work, Ali¹ report 87% are burned at home and 9.4% at work. These figures show that in third world countries the figures are more or less the same. While in developed countries as Norway, Hove et al² report 63% at home and 16% at work which indicate that their homes have a better safety measures than ours. This series also show that kitchen is the most dangerous place were 48.6% of all burn accidents happened, next to it is the bathroom 24.7%. The reason is that in these two places some people from the low socioeconomic strata use kerosene burners and stoves for cooking or heating water for bathing. Table V.

The mean body surface area TBSA in this series is 28.2% of second and third degree burn. Koller et al⁹ in his series from Bratislava report a mean TBSA of 15.7% which is nearly half of this series figures, also in the Saudi¹ series the figure is 15.23%. It is important to know that the mean burned surface area is variable depend on percentage of admitted cases, e.g. patients with parasuicide (Suicidal attempts), which have a higher percentage and may increase the average TBSA.

The mean hospitalization days in this series are 20.8 days while it is 16.7% from Tehran by Lari AR et al¹⁰, and

20.4% from the Saudi series¹. Those who need surgical intervention of some sort once or twice are about 22.4%, the Saudi¹ series gives a figure of 28.1%. Few of the patients (11.2%) took their own discharge only to appear later with sever deformity or they die.

The over all mortality rate over the seven years of the study is 23.1%, compare with Gupta et al⁷ which is 48.3% and that is twice the number, while Lari et al¹⁰ report a mortality rate to be 19.6%. Reig et al¹¹ report a mortality rate of 30.7%. Adult mortality rate is higher than in children, that is 26.6% compare to 18.3% in children. Gupta⁷ report 20.1% children mortality and Kumar¹² from India report 7.4% paediatric mortality. In the Nigerian¹⁴ series the mortality rate is 21.8%, which is nearly the same figures. The mortality rate changed every year and it range from 18.8% to 27.2% of the admitted cases. The mortality rate also differ according to sex, its higher in female adult (M=19.1% and F=33%) while in children its equal (boys=6.1% and girls= 16%). Burn injuries represents a serious epidemiological problem for the patients and their families with high mortality and morbidity. The bulk of the burned patients represent by adult females and young children. This study was done for inpatients only, but if we consider all outpatients cases who are getting treatments in hospitals OPD, the number will some to four times this number, then we can imagine how much this accident is taking from health care budget. These injuries are avoidable, which mean there is a need in our community for an educational program on safety and precautions, which should be targeted at the home to protect and increase the level of awareness of females mostly from these injuries. There should be an enforcement of the available industrial safety laws, and legislating laws against the dangerous mishandling of petroleum products. In conclusion, no season of the year the burn cases get low,

adult female and children males are more prone to be affected, females sustained a

high mortality rate because of extensive injuries they have.

| Year | Adults | | Children | | Total / Year |
|--------------|--------|---------|----------|-------|--------------|
| | Males | Females | Boys | Girls | |
| 1992 | 47 | 46 | 40 | 31 | 164 |
| 1993 | 74 | 49 | 59 | 39 | 221 |
| 1994 | 49 | 67 | 60 | 47 | 223 |
| 1995 | 72 | 67 | 51 | 25 | 215 |
| 1996 | 56 | 73 | 72 | 44 | 241 |
| 1997 | 78 | 87 | 70 | 4 | 239 |
| 1998 | 93 | 150 | 102 | 78 | 423 |
| Total | 465 | 539 | 454 | 268 | 1726 |

Table I: Number of patients admitted / year

| Month | Adults | | Children | | Total |
|-----------|--------|---------|----------|-------|-------|
| | Males | Females | Boys | Girls | |
| January | 5.4 | 6.3 | 9.7 | 5.3 | 26.7 |
| February | 3 | 5.7 | 7 | 4.7 | 20.4 |
| March | 4.1 | 5.7 | 5.9 | 3 | 18.7 |
| April | 3.7 | 5.3 | 5.6 | 2.3 | 16.9 |
| May | 4.4 | 5.4 | 2.7 | 3 | 15.5 |
| June | 7.7 | 6.6 | 4.1 | 2.3 | 20.7 |
| July | 6.4 | 6 | 3.4 | 2.6 | 18.4 |
| August | 5.1 | 8.9 | 4.3 | 2.4 | 20.7 |
| September | 8.4 | 6.4 | 4.4 | 3.6 | 22.8 |
| October | 6.3 | 5.4 | 3.6 | 3.6 | 18.9 |
| November | 5.7 | 6.3 | 5.7 | 4.7 | 22.4 |
| December | 5.6 | 9 | 8.4 | 5.4 | 28.4 |

Table II: Seasonal Variations

| Type of Burn | Adult | | Children | | Total | |
|--------------------|-------|--------|----------|--------|-------|--------|
| | % | number | % | number | % | number |
| Flame | 62.8 | 631 | 39 | 282 | 52.9 | 913 |
| Scald (water, oil) | 18.7 | 188 | 55.4 | 400 | 37 | 588 |
| Electric | 16.8 | 169 | 5.6 | 40 | 12.1 | 209 |
| Chemical | 1.6 | 16 | 0 | 0 | 0.9 | 16 |

Table III: Aetiology of Burn

| | Males | Females | Ratio |
|----------|-------|---------|-------|
| Adult | 465 | 539 | 0.86 |
| Children | 454 | 268 | 1.7 |
| Overall | 919 | 807 | 1.1 |

Table IV: Ratio according to age & Gender

| n = 1726 | | Percentage | Number |
|-----------|----------|------------|--------|
| Home | Total | 80.3 | 1386 |
| | Kitchen | 48.6 | 839 |
| | Bathroom | 24.7 | 426 |
| | Others | 7 | 121 |
| Workplace | | 12.3 | 212 |
| Others | | 7.4 | 128 |

Table V: Place of Burn

| Year | Adults | | Children | | Total / Year | Percentage / Year |
|-------|--------|---------|----------|-------|--------------|-------------------|
| | Males | Females | Boys | Girls | | |
| 1992 | 9 | 10 | 5 | 8 | 32 | 19.5 |
| 1993 | 21 | 14 | 10 | 7 | 52 | 23.5 |
| 1994 | 7 | 19 | 8 | 8 | 42 | 18.8 |
| 1995 | 12 | 17 | 11 | 8 | 48 | 22.3 |
| 1996 | 7 | 24 | 11 | 7 | 49 | 20.3 |
| 1997 | 17 | 34 | 7 | 3 | 61 | 25.5 |
| 1998 | 16 | 60 | 21 | 18 | 115 | 27.2 |
| Total | 89 | 178 | 73 | 59 | 399 | 23.1 |

Table VI: Mortality / year / Sex

References:

- 1-Mustafa HA. Pattern of burn injuries at King Fahad Hospital, Al-Baha: a study of 277 cases. *Annals of Saudi Medicine* 1997;17(1):104-7.
- 2-Hove LM, Lindtjorn B. Epidemiology of burns in Brgen, Norway. *Scand-J-Plast-Reconstr-Surg- Hand-Surg.* 1999 Jun; 33(2):225-9.
- 3-Sarma BP, Sarma N. Epidemiology, morbidity, mortality and treatment of burn injuries – a study in a peripheral industrial hospital. *Burns* 1994 Jun; 20(3):253-5.
- 4-Chapman Jc, Sarhadi NS, Watson AC. Decline incidence of paediatric burns in Scotland: a review of 1114 children with burns treated as inpatients and outpatients in regional centre. *Burn.* 1994 Apr; 20(2): 106– 10.
- 5-WuSC, LinRY. An assessment of patients hospitalized for burn injuries. *J-Formos-med-Assoc.* 1991 Mar; 90(3): 272 – 278.
- 6-Olabanji JK, Oginni FO, Bankole JO, Olasinde AA. A Ten Year Review of Burn Cases Seen in a Nigerian Teaching Hospital. *J.Burns & Surg Wound Care* 2003; 2(1): 1
- 7-Cupta M, Cupta OK, Yaduvaniski RK, Upadhyaya J. Burn epidemiology: the Pink City scene. *Burns.* 1993 Feb; 19(1): 45 – 51.
- 8-Mzezewa S, Jonsson K, Aberg M, Salemark L. A prospective study on the epidemiology of burn patients admitted to the Harare burn unit. *Burns* 1999 Sep; 25(6): 499 – 504.
- 9-Koller J, Orsag M, Ondriasova E, Graffinger I, Bukovcan P. Analysis of 1119 burn injuries treated at the Bratislava Burn Department during a five year period. *Acta-Chir-Plast.* 1994; 36(3): 67 – 70
- 10-Lari AR, Alaghebandan R, Nikui R. Epidemiological study of 3341 burns patients during three years in Tehran, Iran. *Burns.* 2000 Feb; 26(1):49 – 53.
- 11-Reig A, Tejerina C, Baena P, Mirabet V. Massive burns: a study of epidemiology and mortality. *1994 Feb; 20(1): 51 – 54.*
- 12-Kumar P, Chirayil PT, Chittoria R. Ten years epidemiological study of paediatric burns in Manipal, India. *Burns* 2000 May; 26(3):261 – 264.