

## A Retrospective Statistical Analysis of Burnt Patients in the Period between 2002-2006 in the Burn Unit of Mansoura University Hospitals - Egypt

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### ABSTRACT

The objective of this retrospective study was to review the medical records of all 955 burn injured patients admitted during the years 2001-2006 to the Burn Unit of the Plastic and Reconstructive Surgery Department of Mansoura University Hospitals. Data concerning burn patients, depth of burn, extent of burn, degree of burn, causes, risk factors, length of hospital stay (LOS) and overall mortality were analyzed retrospectively. A total of 955 burn injured hospitalized patients with a mean age of  $21.4 \pm 17.3$ , (51.8%) were males and (48.2%) were females, with a male to female ratio of (1.08:1). Flame burns were the commonest type of injury (44.7%) followed by scalds (41.9%), burns due to chemicals were (0.9%), due to electricity were (2.8%) and due to explosions were (9.7%). The overall mortality rate was (21.1%), the female mortality was 28.5% out of 460 female burn patients and the male mortality was 16.2% out of 495 male burn patients, with male to female ratio of (1:1.8). The highest admissions of burn patients were during winter and burn injury in the majority of patients were accidental (88%), attempted suicide by burning was in about 10% of cases with a male to female ratio (2.4:1). Homicide by inflection of burn occurred in 2% of cases, this is probably an underestimated value. The length of hospital stay (LOS) in the present study ranged between 11 hours to 5 months. The most affected body regions were the upper limbs in 71% of cases followed by the head and neck in 64.9% of cases, then the upper trunk in 52% of cases and finally the lower limbs in 47% of cases. About 62% of burn injuries arrived to the hospital within 12 hours and 12% of them arrived within 6 hours. This work provides a comprehensive study of hospitalized burn patients in Mansoura University hospitals burn unit. Prevention is always the rule to be safe from burn but, once they occur, immediate and proper care should be given.

### INTRODUCTION

Burn injuries are among the most devastating injuries seen in the emergency unit ranging from minor to lethal injury. Excluding road traffic injuries, they are the most common cause of death in both developed and developing countries. The past few decades have seen many changes in burn care aimed at decreasing patient morbidity and mortality

[20]. Burn injuries range from minor to severe events and present a major public health concern. Treatment of burns that require specialized personnel and medical technologies is expensive and consumes considerable medical resources [13]. Burns often result in severe deformity, disability and adverse psychological reactions, which affect patients and their families [12]. Risk factors include low socioeconomic and poor living conditions, illiteracy, overcrowding and floor level cooking [11,24].

To date, there is little epidemiologic data on burns in Egypt to direct prevention efforts. In the present study we described the burn injured patient population in Egypt's delta region who were hospitalized during the 2001-2006 in the Burn and Plastic Surgery Department in Mansoura University Hospitals, aiming to identify patients characteristics that make them burn prone.

### SUBJECTS AND METHODS

The burn unit of the Mansoura University Hospitals is the main regional referral center for burn injury in the delta region of Egypt. Besides servicing thousands of population, the unit also receives tertiary referrals from other regional hospitals.

The medical records of 955 burn-injured patients admitted during the years 2001-2006 to the burn unit were reviewed retrospectively. After preparation of the study protocol and data-collecting forms, all files were reviewed and clinical parameters were extracted. Analysis of the data concerning burn patients, extent, degree, causes, complications, risk factors and overall mortality were done retrospectively.

*Statistical analysis:*

Statistical analysis was performed using SPSS software. Results of continuous variables are shown as means  $\pm$  SD. Results of categorical variables are described as frequencies. Chi-square tests were used to analyse statistically significant differences of categorical variables. *t*-tests or one-way ANOVA were used to compare continuous parameters between groups. Logistic regression models were used for multivariate analyses. *p* values  $\leq 0.05$  were considered statistically significant.

**RESULTS**

Nine hundred and fifty-five patients with a mean age of  $21.4 \pm 17.3$  yrs were included in the study. There were 495 male patients (51.8%) and 460 female patients (48.2%) i.e the male to female ratio was (1.08:1).

Fig. (1) shows the detailed age distribution of the patients in which the peak age was in the 3<sup>rd</sup> decade followed by the 2<sup>nd</sup> decade:

Fig. (2) shows that 88% of cases were accidentally inflicted while 10% of them were suicidal attempts, lastly 2% of cases were homicidally inflicted:

Fig. (3) shows that flame was the commonest cause of burn injury in 44.7% of patients, followed by scald in 41.8% of patients, chemicals in 0.9% of patients, electricity in 2.8% of patients and explosion in 9.7% of patients.

Fig. (4) shows the time interval between burn injury and admission in which twelve percent of the patients were admitted within 6 hours post-burn, nearly half of the patients were admitted within 6-12 hours post-burn, twenty eight percent after 12-24 hours post-burn and ten percent were admitted after 24 post-burn.

Table (1) shows that the majority of the patients had involvement of the upper limbs (71%), head and neck were involved in 64.9% of patients, the trunk was involved in 52% of patients and the lower limbs were involved in 47% of patients.

Figs. (5) shows that burns requiring hospitalization were commonest in winter (from December till February).

Table (2) shows age and extent (TBSA) of burns.

Fig. (6) shows sex death crosstab in which mortality was higher in females related to males.

Fig. (7) shows age death crosstab in which mortality was higher among extremes of age groups.

Fig. (8) shows cause of death grouping crosstab in which 57.30% were accidentally inflicted, 41.70% were suicidally inflicted and 0.90% were homicidally inflicted.

Fig. (9) shows year death grouping crosstab in which mortality was higher in 2001 & 2002 and least in 2006.

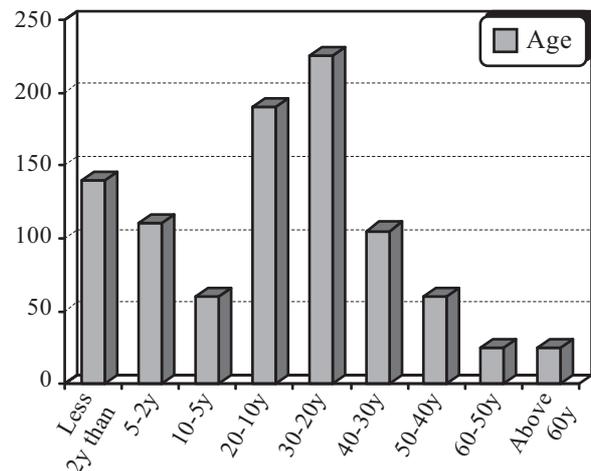


Fig. (1): Age distribution of 955 patients hospitalized for burns.

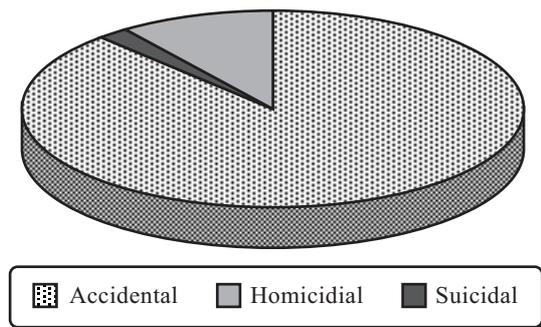


Fig. (2): Medicolegal background of the injuries.

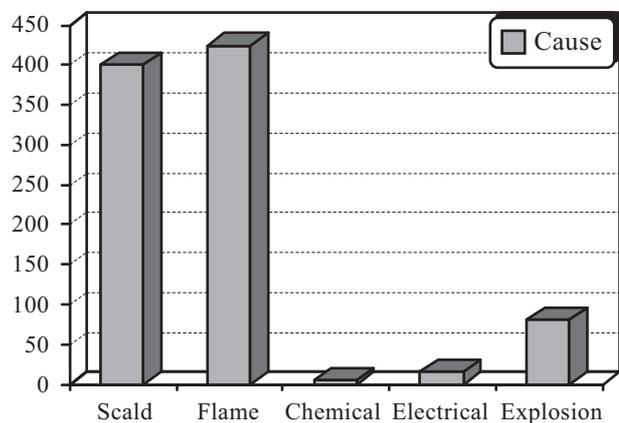


Fig. (3): Cause of the burns in 955 patients hospitalized for burns.

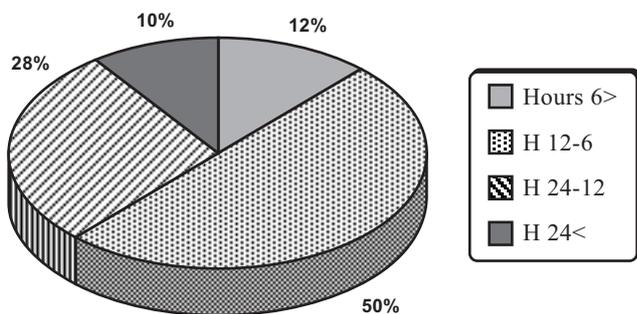


Fig. (4): Time interval between injury and admission.

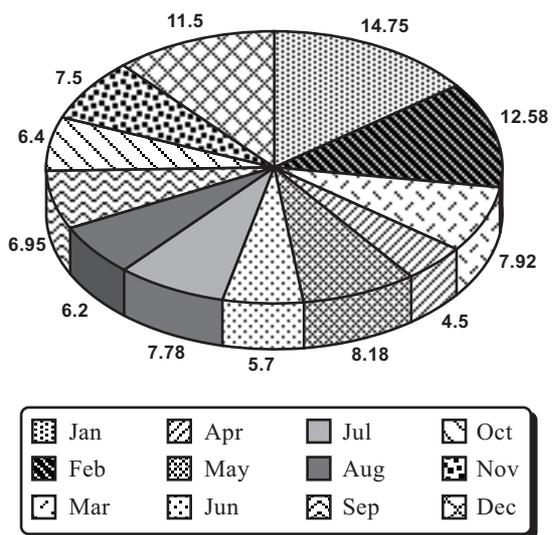


Fig. (5): Seasonal variation.

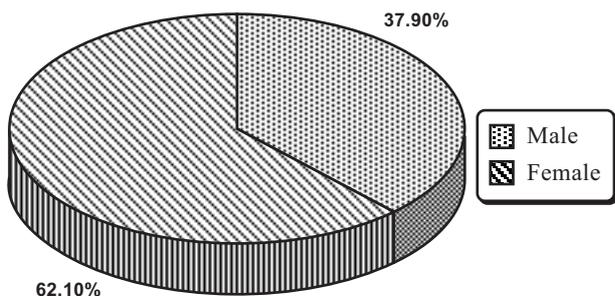


Fig. (6): Sex death grouping crosstab.

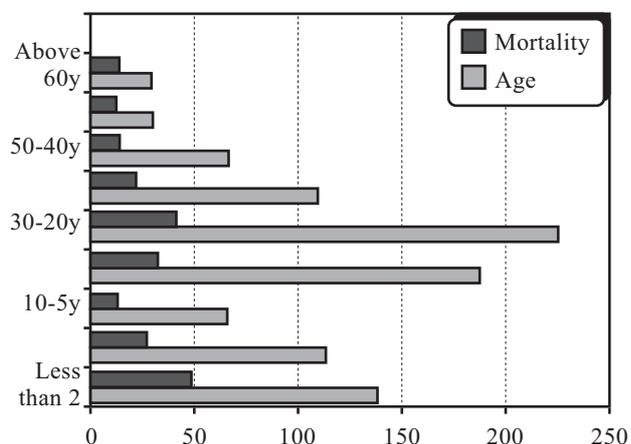


Fig. (7): Sex death grouping crosstab.

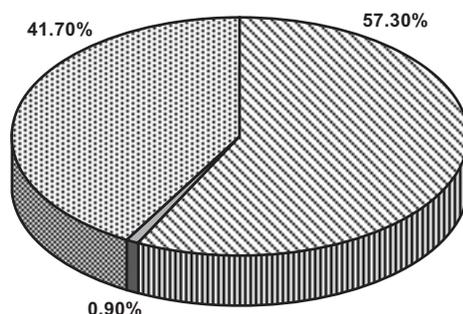


Fig. (8): Cause death grouping crosstab.

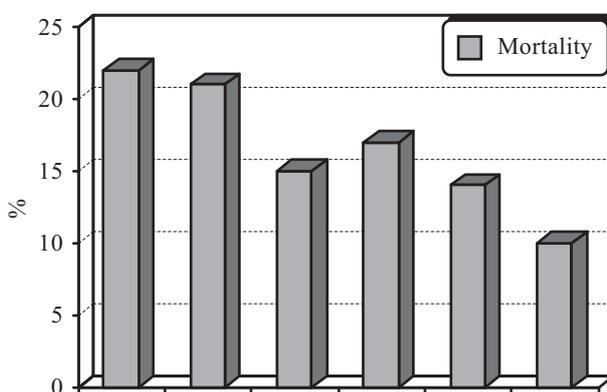


Fig. (9): Year death grouping crosstab.

Table (1)

Area	Percentage
Head Neck	64.9
Trunk	52
Perineum	7
Upper limbs	71
Lower limbs	47

Table (2)

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
<i>Age:</i>					
Between Groups	8033.583	39	205.989	.533	.989
Within Groups	66124.116	171	386.691		
Total	74157.699	210			
<i>Total %:</i>					
Between Groups	16729.968	39	428.974	1.526	.036
Within Groups	48080.790	171	281.174		
Total	64810.758	210			

p.<0.05 = Sig.

## DISCUSSION AND CONCLUSION

Burn injuries are among the most devastating injuries seen in the emergency departments. As in other low income countries, burn in Egypt is considered a major health problem that is associated with high morbidity and mortality [4,7]. The care of burn patients is a complex team endeavour consuming substantial medical human resources. Severe burns may be fatal and survivors frequently suffer from severe sequelae (e.g. Disabling scars and psychological consequences). Data pertaining to burn patients admitted to the burn unit in Mansoura University Hospitals during the period from 2001-2006 were studied retrospectively in terms of admission, demographics, extent of burn (TBSA), degree of burn, causes of burn, length of hospital stay and mortality.

A total of 955 burn injured hospitalized patients with a mean age  $21.4 \pm 17.3$  years, among them 51.8 % were males and 48.2% were females. It is commonly thought that females are more affected in burn injuries [6,7]. In contrast, many other studies including our study have identified a higher male to female ratio indicating that males are at a greater risk [1,2,10,14,16]. It is understandable that age and sex are important epidemiological determinants for burn injuries as young males are adventurous and the bread winner for the family, whereas females in the 2<sup>nd</sup> and 3<sup>rd</sup> decades of life are more involved in house work and cooking.

In the present study, flame burns were the commonest type of injury (44.7% of cases) followed by scalds (41.9% of cases), these are typical home related accidents as reported elsewhere [5,9,21]. Gas and kerosene are most commonly involved as they are widely used as domestic fuel in Egypt especially in rural areas. Accidents frequently occur in these areas from explosion of gas cylinders lacking any safety measures. Accidental scald burns in small children who come in contact with hot foods and liquid are common, reflecting overcrowding and playing in the floor in the vicinity of the cooking area and cooked food. The use of hot water in cooking and the lifestyle based on sitting and placing cooked foods on the floor are widespread in rural areas. Khan et al. [8] stated that scalds are the most common cause of burn injury and most commonly occur in the kitchen. This fact has been recognized and programs focused on the prevention of scald related injuries and safety in kitchens are well established [3,23].

In the present work, the overall mortality was 22.1%, the mortality among the 460 female patients

was 28.5% and the mortality among the 495 male patients was 16.2% with male to female ratio of (1:1.8). Ahmad et al. [2] reported an overall mortality of 34% in a study between January 2002 to December 2003. The mortality rate described in the literature may reflect the level of clinical care, burn severity and possibly some population characteristics that influence their general health condition. A multivariate analysis demonstrate that mortality rate predicting factors are the age of the patient and the percentage of body surface area involved. The increased mortality rate among Egyptian patients observed in the present study is attributed to the large percentage of total burned area. We found that age, TBSA of burn, depth of burn and inhalation injury were significant predictive factors for mortality. Similar predictors were also reported by other authors and inhalation injury was the unanimous factor among all those studies [15,17,18,22]. The highest admissions of burn patients in the present study occurred during winter as gas and kerosene were used for heating and as a fuel. In the majority of patients (88%) the burns occurred accidentally, and patients having doubtful history were also included in the accidental group. Attempted suicide by burning accounted for 10% of the patients in our study, with female: male ratio of (2.4:1). This percent may account for the higher mortality of females from burns due to household flames. Homicide by inflection of a burn injury is another issue that has received little attention in the literature in the past. In the present study 2% were affected and this probably an underestimate of the true figure due to reluctance to report the real reason for the injury.

The length of hospital stay (LOS) in the present study ranged between 11 hours to 5 months and it was significantly related to the extent of burns, reflecting the high cost of care in case of burn injuries. It should be noted that burns affecting 60% TBSA, hospitalization length was shorter, probably owing to the higher mortality rate. The most commonly injured body regions in our study were the upper limbs (71%) followed by head and neck (64.9%) then the trunk (52%) and lower limbs (47%).

### *Conclusion:*

The results of the present study provide compelling evidence for performing population-based studies to identify risk factors that are susceptible to modification in each age group. They also confirmed the occurrence of burn injuries as a significant health problem in Egypt as in many other countries. Prevention should focus on the establishment of burn support groups, health education,

improved funding and provision of modern care facilities for burns would improve the overall outcome. The adage that "Prevention is better than cure" rings particularly true in the case of patients who have sustained burns, the majority of which are accidental in nature.

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