Epidemiology of hospitalized female burns patients in a burn centre in Shiraz

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وبائيات مريضات الحروق داخل المستشفيات في مركز للحروق بشيراز

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الخلاصة: خلال المدة من عام 2000 حتى عام 2001، تم دراسة كل النساء اللاتي يعانين من حروق، وأدخلن مركز حروق « قُطْب الدين » في شيراز وذلك لتحديد الخصائص الوبائية، ونتائج حروق هؤلاء المرضى. وقد بلغ إجمالي معدل الوفيات 64٪. ووجد أن أعلى معدل للحروق (53.3٪) يقع بين من تتراوح أعمارهن بين 16 و25 عاماً. وكان اللهب من أكثر أسباب الحروق شيوعاً (98.2٪). وكان وسطيُّ مدة المكوث في المستشفى 13 يوماً. ووسطي إجمالي مساحة سطح الجسم المحروق لدى جميع المريضات 56٪؛ وبين الناجيات 29٪ وبين المتوفَّيات 72٪. وقد ثبت وجود علاقة قوية من الناحية الإحصائية بين مساحة سطح الجسم المحروق وبين معدَّل الوفيات.

ABSTRACT During 2000 to 2001, all 170 female burn patients admitted to the Ghotbeddin burn centre in Shiraz were studied to determine the epidemiological characteristics and outcome of burn for these patients. The overall mortality rate was 64%. The highest frequency of burns (53.5%) occurred among 16–25-year-olds. The commonest cause of burn was flame (98.2%). The mean (SD) length of hospital stay was 13 (14.3) days. Mean (SD) of total body surface area (TBSA) burned among all patients was 56% (28.5%); among those who survived it was 29% (13.4%) and among those who died it was 72% (21.7%). The relation between TBSA and mortality was statistically significant.

Épidemiologie des cas de femmes hospitalisées dans un Centre des Grands Brûlés à Chiraz

RÉSUMÉ De 2000 à 2001, les 170 femmes admises dans le Service des Grands Brûlés de l'hôpital Ghotbeddin à Chiraz ont été étudiées afin de déterminer les caractéristiques épidémiologiques et l'issue de leurs brûlures. La mortalité globale s'est élevée à 64 %. La tranche d'âge enregistrant la plus grande fréquence de brûlures (53,5 %) se situait entre 16 et 25 ans, le type de brûlure le plus fréquent étant la brûlure par flamme (98,2 %). La durée moyenne (E.T.) d'hospitalisation a été de 13 (14,3) jours. L'étendue moyenne (E.T.) de la brûlure couvrait 56 % (28,5 %) de la surface corporelle totale (SCT) pour l'ensemble des patientes, 29 % (13,4 %) pour les survivantes et 72 % (21,7 %) pour celles n'y ayant pas survécu. Le rapport entre la SCT et la mortalité est apparu statistiquement significatif.

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Introduction

Burns account for 5% or more of the total hospital inpatients at any time [*1*]. Burn injuries cause significant morbidity and mortality, both in developing and developed countries [*2*] and have considerable physical, psychological and economic effects on the patients, their families and society [*3*]. Of major injuries, burns account for over 1% of the global burden of the disease [*4*].

Several large studies have been performed on burn injury in the Islamic Republic of Iran [*5–8*]. These studies reported an overall incidence rate of mortality ranging from 2.0 to 5.6 per 100 000 person years. These studies have shown that most burn injuries are caused by handling kerosene and occurred at home. A major public health issue raised by these studies is suicide attempt by self-inflicted burning in females and children, accounting for up to 37% of burn accidents in this population.

Based on these findings, the main objective of this study was to assess the epidemiological characteristics and outcome of burn patients in Fars province in order to assess the reasons for such injuries and possible strategies to reduce them. Ghotbeddin hospital is the only burn centre for female patients in Fars province, which has a population of 4 million inhabitants.

Methods

This was an 11-month study from 21 December 2000 to 21 November 2001 and included all burn patients admitted to Ghotbeddin burn centre in that period. Data were collected using a questionnaire, including age, date of admission, length of hospitalization, percentage of burn (total body surface area, TBSA), cause of the burn accident and outcome of treatment. Data were obtained from medical records and interviews with doctors, patients and relatives. TBSA was estimated by the "rule of nines" [*9*]. Patients were divided into 3 groups based on TBSA%: group 1 with TBSA% < 40%, group 2 with TBSA% between 41% and 60% and group 3 with TBSA% > 60%.

Statistical analysis was performed using *SPSS*, version10. The chi-squared test, *t*-test, ANOVA, survival analysis (Kaplan–Meier) were computed and survival difference between the 3 groups compared with log rank test. A *P*-value < 0.05 was considered statistically significant.

Results

During the study period, 170 burn patients were admitted to Ghotbeddin burn centre. Their mean age and standard deviation (SD) was 28 (14) years (range: 14–90 years). The age distribution and data related to the injury and outcome are shown in Table 1. Of the 170 patients, 108 died giving a death rate of 63.5%. Mean (SD) and median of TBSA were 56% (28.5%) and 57% respectively (range: 10%–100%) (Table 1). The mean (SD) and median of TBSA among the patients who survived were 29% (13.4%) and 27% respectively; among those who died these values were 72% (21.8%) and 77% respectively ($P < 0.0001$). The relation between the extent of TBSA and mortality was statistically significant (*t*-test, $P < 0.0001$) (Table 2). Patients with TBSA less than 40% had a greater survival rate and the survival difference in the 3 groups was significant ($P < 0.0001$) (Figure 1).

Flame was the commonest cause of burn (98.2%), followed by scalds (boiling water) (1.8%) (Table 3). Of the 167 patients with flame injuries, 130 (77.8%) were caused

Table 1 Mortality and extent of burn injury in the female patients by age group

Age group (years)	Patients	Deaths		TBSA (%)	Hospital stay (days)
	No. (%)	No. (% by age group)	No. (% of all patients)	Mean (SD)	Mean (SD)
< 5	0	0	0	0	0
6–15	8 (4.7)	5 (62.5)	5 (2.9)	51 (25.5)	8 (5.3)
16–25	91 (53.5)	53 (58.2)	53 (31.2)	57 (28.8)	14 (14.8)
26–40	43 (25.3)	31 (72.1)	31 (18.2)	57 (29.5)	13 (14.9)
41–60	21 (12.4)	13 (61.9)	13 (7.6)	58 (26.9)	13 (15.2)
> 60	7 (4.1)	6 (85.7)	6 (3.5)	40 (32.2)	4 (4.1)
Total	170 (100.0)	108 (63.5)	108 (63.5)	56 (28.5)	13 (14.3)

TBSA = total body surface area.
SD = standard deviation.

by oil and gasoline, 28 (16.8%) by gas explosion and 9 (5.4%) by clothing catching fire. Among the age groups 16–25 years and 26–40 years, there were 61 (45.5%) cases of self-inflicted burn injury (suicide attempts).

The mean length of hospital stay of the patients was 13 (SD 14.3) days (range: 1 to 65 days). There was a significant difference between mean length of hospitalization and TBSA (ANOVA, $P < 0.0001$).

Table 2 Mortality and length of hospitalization in the female patients by total body surface area (TBSA) burnt

% TBSA	Patients (n = 170) No. (%)	Deaths[a] No. (% by % TBSA)	Hospital stay (days) Mean (SD)[b]
< 20	20 (11.8)	4 (20.0)	9 (10.5)
21–40	42 (24.7)	5 (11.9)	23 (15.2)
41–60	31 (18.2)	24 (77.4)	20 (18.3)
61–80	34 (20.0)	32 (94.0)	9 (7.6)
> 80	43 (25.3)	43 (100.0)	4 (3.5)

[a]P < 0.0001 (t-test).
[b]P < 0.0001 (ANOVA).
TBSA = total body surface area.
SD = standard deviation.

The total mortality rate was 64% (108/170) and 51 patients (30%) died within the first 48 hours of admission. Most of the patients were admitted in the winter months (31.8%), followed by spring (28.2%), summer (23.5%) and autumn (16.5%) ($P = 0.046$).

Discussion

Burns are one of the most significant health problems throughout the world, leading to prolonged hospitalization and hence increased expense for the patients, their families and society. In this study, the majority of patients (58%) were younger than 26 years, which indicates greater exposure to burn agents in these age groups than in any other age group, a finding that has also been observed by others [*3,10–13*]. In our study, 46% of burn injuries were self-inflicted, which is similar to the result of the studies of Panjeshahin and Saadat [*6,14*]. These were suicide attempts due to family disturbances, marriage problems, etc. and most of them used oil and gasoline because of their ready availability at home and the cultural climate. This information was obtained by

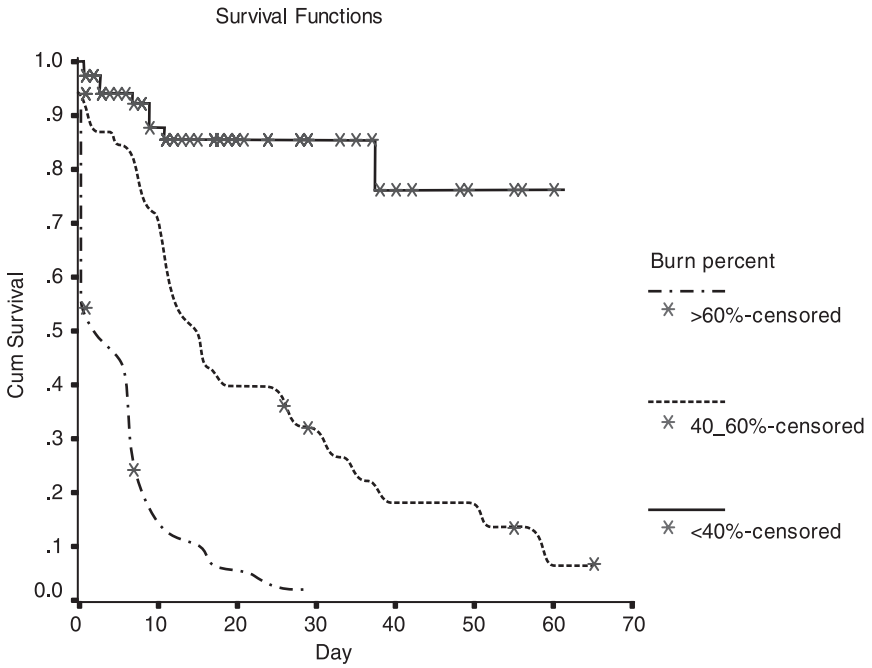

Figure 1 Survival diagram related to burn patients admitted to Ghotbedin burn centre

interviewing the patients; there were no data recorded in their files. Also in a cohort of 152 burned wives in India, 47 (31%) were homicidal burns and most of them were 16–25 years of age (77%) [*15*].

In our study, similar to other reports [*3,10,16–19*], the majority of burns were caused by flame, with oil or gasoline being the flammable liquids most frequently involved. This is probably due to their wide availability and common use as domestic fuels in different parts of Fars.

We had a death rate of 64%. In a study conducted in Tehran, the death rate was reported to be 51% in males and 69% in females [*3*]. A death rate of 19.6% was reported in the Tohid burn centre in Tehran [*17*] and 4.61% in a Singapore burn centre [*20*]. The reason for the high mortality in our hospital as compared to similar studies [*3,12,14,17,21,22*] might be the fact that the mean TBSA was higher in our patients (56%) compared to 30.6% in the Tohid burn centre [*17*] or 30.7% in a study conducted by Wurtz et al. [*23*]. This was because the most common cause of burn in our study was flame and this type of burn

Table 3 Causes of burn injuries and length of hospital stay in the female patients

Variable	No. (n = 170)	%
Type of burn		
Flame	167	98.2
Scald	3	1.8
Hospital stay (days)		
< 10	98	57.6
11–20	37	21.7
21–30	17	10.0
31–40	8	4.7
> 40	10	6.0

is deeper and associated with more severe destruction of tissue than other causes of burn. It is also accompanied by considerable immunosuppression, which makes the patient vulnerable to infection [*24*]. This is supported by the observation of a significant correlation between TBSA and mortality ($P < 0.001$). Furthermore, there was a significant difference between the mean length of hospitalization and TBSA ($P < 0.0001$) indicating that with an increase in TBSA, the total length of hospitalization was reduced because of early death. This concurs with observations from the Tohid burn centre [*17*] as does our survival data whereby patients with TBSA less than 40% had greater survival than those who had TBSA more than 40%.

Of course, one major reason for the high mortality in our patients is the lack of a burns intensive care unit (BICU) since 51 patients (30%) died within the first 48 hours of admission. The lack of a BICU leads to a delay in early excision of the burn wound and skin grafting, procedures that are essential for the optimal care for a burn patient [*25,26*].

As found in other studies the most frequent admissions occurred in winter [*14,17,27*] due to greater use of heating devices.

Conclusion

The high mortality rate among our patients suggests there is an urgent need to address the reasons for this in order to reduce the death rate from burn injury in our centre. The establishment of a BICU would be a positive step that could have a favourable impact on our burn injury treatment and death rate.

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