

CLINICAL STUDY

Epidemiology of hospitalized burn patients in Taleghani hospital during 2003–2007

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Abstract: *Aim:* The objective of this study was to describe the epidemiology of burn injuries referred to Taleghani Burn hospital, Ahwaz and to provide information necessary for planning and implementing an effective prevention program.

Material and methods: The medical records of 6082 consecutive admissions for burn injury treated at Taleghani burn hospital over a five-year period (August 2003 to August 2007) were reviewed.

Results: Our results shows that hospital stay in female was significantly longer than in male ($p < 0.05$). A positive significant correlation was observed between duration of hospital stay and %TBSA (χ^2 , $p < 0.05$).

Of the 6082 patients, 486 deaths were recorded. The overall mortality rate of hospitalized burns patients was 8 %. Mortality rate in female was higher than in male ($p < 0.05$).

Our data showed *E. coli* in urine culture and *Pseudomonas aeruginosa* in blood and wound culture was the predominant isolated bacteria.

Conclusion: This study provides an inclusive overview of hospitalized burn patients at Taleghani burn hospital. Prevention programs for reducing the risk of burns are needed. Furthermore, high %TBSA and mortality and the presence of multi-drugs resistant bacteria are major worrying problems in our hospital (Tab. 5, Fig. 2, Ref. 27). Full Text in free PDF www.bmj.sk.

Key words: burn injuries, hospital stay, multi-drug resistant bacteria, risk of burns.

Infection is one of the most common causes of complication in the burn patient. A severe burn injury is not only a life-threatening problem for the burned patients, but it also may have a serious financial effects on the patient and society. Almost two million people in United State suffer from burns annually (1). Patient factors such as age, extent of injury, and depth of burn in combination with microbial factors such as type and number of organisms, enzyme and toxin production, and motility determine the likelihood of invasive burn infection. Mortality increases with the severity of the burn injury and with increasing age of the patient (2).

An epidemiological study can provide a highly representative picture of the epidemiology of burns patients such as various objectives information on burning agents and on the setting in which burns are most likely to occur. Although previous studies from different parts of Iran based mainly on either single hospital data (3–4) or specific group sampling, such as of women or children (5–6), but only very limited epidemiological infor-

mation concerning burns patients and the circumstances in which injuries were received at Taleghani burns hospital, Ahwaz was reported (7–8).

Taleghani hospital is located in the South of Iran, Ahwaz. Although our hospital is situated in the south of Iran, patients are referred to us from the Western and Eastern region of our province, which means our hospital provides care for an extensive geographical region. Taleghani hospital has five wards with 160 beds.

The aim of this study was to analyze a five years Taleghani Burns hospital experience in Ahwaz, Iran.

Material and methods

The medical records of 6082 consecutive admissions for burn injury treated at Taleghani burn hospital over a five-year period (August 2003 to August 2007) were reviewed. The statistical package for social sciences (SPSS-PC version 13.0) was used for data management, analysis and graphical presentational of results.

Results

Age and gender

A total number of 6082 burn patients were treated at the Taleghani burn hospital during the years 2003–2007. Among the 6082 patients 2693 (44.3 %) were female and 3389 (55.7 %) were male.

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Tab. 1. Frequency of patients according to age and sex.

Sex	Age groups (%)					Total
	<10 y	10–20 y	21–30 y	31–40 y	>40 y	
Male	1037 (62.1)	697 (49.8)	799 (54.4)	386 (54.4)	470 (56)	3389 (55.7)
Female	632 (37.9)	700 (50.2)	668 (45.6)	323 (45.6)	370 (44)	2693 (44.3)
Total	1669 (27.4)	1397 (22.9)	1467 (24.1)	709 (11.6)	838 (13.7)	6082

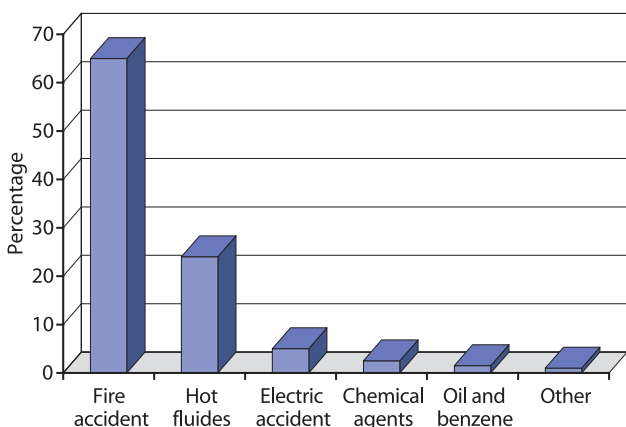


Fig. 1. Cause of burns.

were male, giving on overall male to female ratio of 1.25. The mean age of patients was 22.4±16.9 years. As shown in Table 1, we categorized all the patients in five age groups, the highest incidence rate was observed in the age group less than 10 years (27.4%), followed by 21–30 years (24.1%). The mean age difference between two sexes was statistically significant (Female: 23.3 and Male: 21.7) (t test, p<0.05) and the mean age distribution in both sexes was not equal (X² test p < 0.05).

Season admission

Burns were more common during winter, with 2048 patients (33.6% of cases), followed by 1558 in autumn (25.6%), spring (21%) and summer (19.6%). The highest number of admissions in the course of the year occurred during the Baham and Esfand which is equal to December-February. Our data showed a significant association between seasonal variation and burn (p<0.001).

Causes of burns

Figure 1 reveals that fire accident was the most common cause in all age groups (66.1%) except age group less than ten years, followed by hot fluids (25.8%), electric accident (5.9%), and other cause of burn (2.2%), such as chemical agent. However in the age group less than ten years hot fluid (71.5%) was the main cause of burn (79.7%) compared with other causes of burns in other groups (p<0.05). Our study showed that there is no significant association between gender and cause of burn (p>0.05) (Tab. 2).

Tab. 2. Association between cause of burn and sex.

Cause of burn	Sex		
	Male	Female	Total
Hot fluids	945 (%27.9)	671 (%24.9)	1616
Electric accident	333 (%9.8)	22 (0.8)	356
Fire accident	1996 (%58.9)	1976 (73.4)	3972
Oil and benzene	34 (%1)	20 (.007)	36
Chemical agents	52 (%1.5)	15 (0.5)	67
Other & unknown	30 (%0.7)	05 (0.1)	35

TBSA

The percent TBSA for burned patients ranged from 1% to 100% with a mean of 38.7±29.8%. About one second patients, 3249 / 6082 (53%) had between 10 and 30% TBSA (Tab. 3). We found a significant association between the mean of TBSA in both of sexes (male: 31.71, female: 47.53) (p<0.001) on the other hand women had more TBSA as compared with men

A significant association between duration of hospital stay and %TBSA was shown, high proportion of patients, (52%) with TBSA 30–60% had a longer duration of hospital stay of 1 months (p<0.001).

A significant association between mortality and %TBSA was also found, 18.8% of the patients with TBSA 60% and more died (p < 0.05). There was a correlation between %TBSA and age (Spearman test, r = 0.18%).

Hospital stay

The mean and median duration of hospital stay was 14 and 9 days with a range of 1–311 days. The most frequently hospital stay occurred in the age group four (31–40 years). There was a significant association between fire accident and hospital stay (p < 0.001). Eighty two percent of burned patients with more than 30 days hospital stay were burned by fire accident. The mean duration of hospital stay in both sexes, female and male were 14.8 and 13.8 days, respectively. Our results show that hospital stay in female was significantly longer than in male (p < 0.05). A positive significant correlation was observed between duration of hospital stay and %TBSA (χ², p < 0.05) (Tab. 4).

Mortality and outcome

Of the 6082 patients, 486 deaths were recorded (Fig. 2). The overall mortality rate of hospitalized burn patients was 8%. The

Tab. 3. %TBSA according to sex and age groups.

%TBSA	No. of patients (%)		Age groups				
	Male	Female	<10 y	10–20 y	21–30 y	31–40 y	>40 y
<10	666 (19.6)	252 (9.3)	325 (19.4)	154 (11)	171 (11.6)	92 (12.9)	156 (18.5)
10–30	1470 (43.3)	839 (31.1)	970 (58.1)	404 (28.9)	437 (29.7)	244 (34)	296 (35.2)
31–60	738 (21.7)	645 (23.9)	309 (18.5)	346 (24.7)	362 (24.6)	185 (26)	195 (23.2)
>60	515 (15.1)	957 (35.5)	65 (3.8)	493 (35.2)	497 (33.8)	196 (27)	193 (22.9)
Total	3389 (55.7)	2693 (44.3)	1669	1397	1467	709	840

Tab. 4. Length of hospital stays according to sex and %TBSA.

Days	No. of patients (%)		%TBSA (%)			
	Male	Female	<10	10-30	21-60	>60
<7	1066 (31.4)	875 (32.4)	429 (48.3)	535 (22.6)	176 (12.8)	745 (51.5)
7-14	1297 (38.2)	867 (32.1)	332 (37.3)	1187 (50.2)	380 (27.7)	325 (22)
15-30	671 (19.7)	563 (20.9)	105 (11.8)	464 (19.6)	455 (33.2)	212 (14.4)
>30	355 (10.4)	388 (14.4)	22 (2.4)	174 (7.3)	359 (26.2)	182 (12.4)
Total	3389	2693	888	2360	1370	1464

Tab. 5. Frequency of bacterial agents in urine, blood and wound samples (%).

Clinical samples	Type of microorganism					
	<i>Staphylococcus spp.</i>	<i>Pseudomonas aeruginosa</i>	<i>Enterobacter aerogene</i>	<i>E.coli</i>	<i>Proteus spp.</i>	<i>Acinetobacter baumannii</i>
Urine	7.7	4.4	7.7	7.8	1.4	1.8
Blood	7.9	10.8	3.3	3.7.63	0.3	0.9
Wound	20.7	45.8	11.3	0.0	1.4	2.1

highest mortality incidence was among 10–20 years with a significant association ($p < 0.05$).

Mortality rate in men and women was 161/6082 (2.66 %) and 325/6082 (5.34 %), respectively. Mortality rate in female was significantly higher than in male ($p < 0.05$).

Frequency of bacterial agents in clinical samples (urine, blood, wound)

Based on data *E.coli* in urine culture and *Pseudomonas aeruginosa* in blood and wound culture were the predominant isolated bacteria (Tab. 5).

Discussion

Burn injuries constitute a major health concern with respect to morbidity and mortality, as well as cost of management, particularly in developing countries.

The present study shows an overall male-to-female ratio of 1.25 and male predominance was in agreement with other findings (9–11). This reflects the preponderance of males in risk-taking activities at work and leisure but some studies reported the opposite (12–13).

Burn injuries occur in all age groups, of our study population, 27.4 % were less than 10 years old. This is more than Song and Chua's study and less than Ansari-Lari study where children made up 17.6 % and 41.5% of the patient population (10, 14).

The mean TBSA of the patients was 38.7 (± 29.8 %). This is higher than another report from Iran (10) and other parts of the world (15–16). Based on our data, one second (53 %) of the patients had 10–29 %TBSA.

We found the double peak age distribution implies different types of burns for children and adults. Fire accident was the predominant type of burn in adults and accounted for 66 % of the burn cases. This was followed by hot fluids and electric accident accounting for 25 % and 5.9 %, respectively. This data is consistent with many other studies (17–18). But in the children group (less than 10 years) scalds was the main cause of burn (75 %) compared with other causes. The etiology of pediatric burn in our center was similar to some studies (19–20).

As many reported (21–22), in our study the most common season when burns occurred was winter followed by autumn. In Ahvaz, there is no wide seasonal variation in climate; however another study reported that summer was the most common season (22).

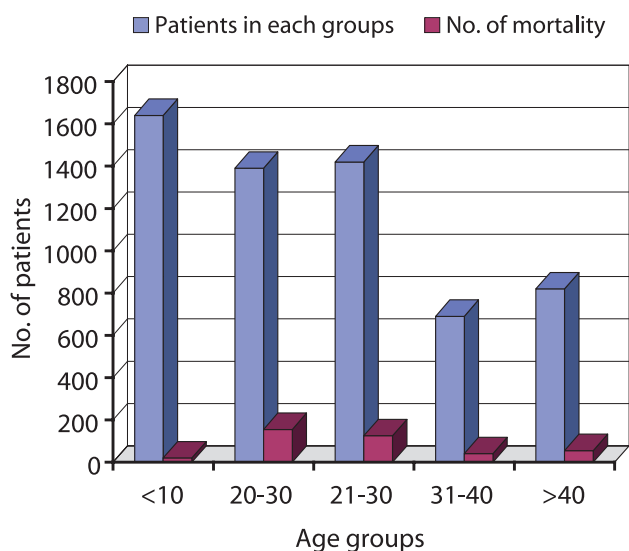


Fig. 2. Mortality according to age groups.

In the present study, the overall mortality rate among hospitalized burn patients was 8 % which was higher than in other reports from different parts of Iran (10, 18) and other countries particularly in South-East that was reported by WHO (23). The highest rate of mortality was seen in 10-20 years age group compared with other age groups. An explanation could be considered for this finding, the highest rate of mortality is depended on the highest %TBSA.

We found burn injuries were more common in females than males. So females are more in danger, because the mean of %TBSA in female (47.5) is higher than in men (31.7). The highest mortality incidence was among 10-20 years old which had the highest %TBSA.

The median and mean hospital stays were 14 and 9 days, which are longer than in other reports (18, 25).

The spectrum of infective agents varies with time and is unique for different hospitals. In previous study we have not found either *Pseudomonas aeruginosa* or *Staphylococcus aureus* as the predominant organism (8). But now, Multi-drug resistant *Acinetobacter baumannii* are rapidly emerging as important pathogens in our center especially in intensive care units. However this organism was reported by some studies (26-27). *Acinetobacter* were the most common bacteria grown from wound cultures. The presence of *Acinetobacter* spp. as normal skin flora, its easy transmissibility and ability to remain viable in a hospital environment due to its multi-drug resistant status and several other factors have been implicated in the increased incidence of nosocomial infections due to this organism (28).

Conclusion

This study provides an inclusive overview of hospitalized burn patients at Taleghani burn hospital. Children less than 10

years of age and adults 10–20 years of age are two groups identified to be at high-risk of receiving burn injuries. The most common season where such injuries occur is winter and autumn. Hot substances such as boiling water, hot soup, etc. are the most common agents linked to scald injuries.

Prevention programs for reducing the risk of burns are needed, especially for parents with young children. Furthermore, high %TBSA and mortality and the presence of multi-drugs resistance bacteria are the major worrying problems in our hospital.

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