

Epidemiological and Clinical Characteristics of Burn Injuries among Hospitalized Patients in Babylon Province

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Abstract

Background: Burns form the fourth most common cause of injury after road traffic injuries, falls, and interpersonal conflicts and are usually correlated with devastating physical, mental, social, and financial harms, particularly in low and middle-income countries like Iraq. **Objectives:** To investigate the epidemiological and clinical characteristics of burn injury patients, to measure the mortality rate (case fatality rate) for burns, and to explain the main determinants of deaths among hospitalized burn injury patients. **Patients and Methods:** This was an observational descriptive cross-sectional study conducted on all acute burn injury cases who were admitted to the biggest teaching hospital in Babylon Province, Iraq. Data were collected from patients themselves or their companions and from patients' hospital records using a pretested questionnaire designed for collecting the requested information that included demographic data, burn characteristics, burn determinants, and burn outcomes. **Results:** A sample of 120 patients with burn injuries were investigated. The mean age $\pm$ standard deviation was 18.9 ± 17.9 years. The mean age of burn death victims was 24.5 ± 17.66 years. The young age group (15–24 years) represented the highest proportion. Male to female ratio was 1:1.4. Most of the patients had low educational and income levels. The case fatality rate was 26.6% (32/120). The majority of cases were from rural areas; 67% of suicidal burn deaths had more than 50% of total body surface area. Intentional burn death victims had significantly severe burns (third-degree burn and high body surface area) as compared to accidental burn death victims. There was a statistically significant difference as regards the mode of burns between the intentional and accidental burn deaths; all intentional death victims were burnt with flame. **Conclusions:** The case fatality rate of burn injuries was high, females outnumbered males, the majority of the victims had low educational and income levels, and suicidal burn deaths were significantly associated with severe burn as compared to the accidental ones.

Keywords: Babylon—Iraq, burn fatality rate, epidemiological characteristics, hospitalized patients

INTRODUCTION

Although there is a high burden of burn injuries in the developing countries including Iraq, accurate and sufficient data about the epidemiological information of burns in these countries are limited and scattered.^[1] Burns form the fourth most common cause of injury after road traffic injuries, falls, and interpersonal conflicts.^[2]

Every year, burns affect about^[1] one million persons worldwide, which constitutes more than acquired immune deficiency syndrome and tuberculosis.^[3] Burns are not specific to any given population, age, gender, occupation, or ethnic group; every individual is at risk of any type of burns and in any location.^[4] Although it is estimated that

only a low percentage of burn injuries are fatal, this type of trauma is one of the significant devastating injuries, which besides mortality leads to severe disability, disfigurement, and psychological disturbances, especially in low- and middle-income societies.^[5–7] Severe burn injuries also lead to financial and social impacts on the injured persons and their families.^[8,9]

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Morbid anxiety, depression, posttraumatic stress disorder, concern about post burn disfigurement, and social isolation are the most common serious psychological disorders faced by severely injured burn patients.^[8,10-13]

The vast majority of burn injuries occur in low- to middle-income countries where there are weak health systems and poor infrastructures that are inefficient to prevent or reduce the severity of burns.^[14] This also attributed partly to overcrowding, unhealthy houses, and unsafe cooking practices.^[15] Burns are representing an important leading cause of death in developing countries.^[16] According to the World Health Organization, fire burns were responsible for more than 300,000 deaths annually.^[17]

Recently, high-income countries have made good progress in lowering burn-related mortality and morbidity, including self-inflicted burn, by raising public awareness, prevention, improving secondary and tertiary health care, and support programs,^[3,18] but self-directed burn is still a priority public health problem in developing countries, including Iraq.^[19]

Many complications of burns can be prevented; resolving of these complications is often associated with an improvement in the quality of life of the affected people.^[20,21] The epidemiology of burns varies from one country to another and even in the same society over time.^[22]

In Iraq, burns are the second cause for visiting emergency department according to the Iraq Injury Surveillance System, but still there were limited local studies dealing with the epidemiology of burns.^[23,24]

The current study was carried out to investigate the epidemiological and clinical characteristics of burn patients, to measure the mortality rate for burns, and to explain the main determinants of death among burn injury patients who were admitted to Al-Sadiq Teaching Hospital.

PATIENTS AND METHODS

This is an observational, cross-sectional, descriptive study conducted on all burn injury cases (all burn injury patients) who were admitted to Al-Sadiq Teaching Hospital, Babylon Province, Iraq. This hospital is the biggest general teaching hospital in Babylon Province; the burn unit includes two wards for males and females. This hospital serves the population of Babylon Province, which is located in the south central region of Iraq and populates about two million inhabitants. The period of study started from January 1, 2020, to the end of June 2020. Data were collected from patients themselves or their companions and from patients' hospital records using a pretested questionnaire designed for data collection. Data included sociodemographic data (age, gender, level of education), types of burn, and etiology of burn. The inpatient records were thoroughly studied to

estimate the severity of burns, types of treatment, results of investigations, and outcomes of the injuries.

In this study, burns were classified into partial thickness burns (second degree), which extend through the epidermis and into the dermis, or full-thickness burns (third degree), which extend through the subcutaneous fat or deeper.^[25,26] When estimating the degree of burn in this study, only partial thickness and full thickness burns were considered. The extent of burn injury was determined by the total body surface area (TBSA), which was estimated according to the rule of nines.^[27]

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. Informed verbal consents were obtained from patients and patients' companions or their families. The confidentiality was ensured by keeping all records anonymous. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee. Data were entered and managed by using Statistical Package for the Social Sciences V 0.25 for windows. Descriptive statistics (frequency distribution and percentage with tables and figures) and inferential statistics (chi-square test, contingency coefficient, logistic regression, and Mann-Whitney *U* test) were used. *P*-value of <0.05 was considered statistically significant.

Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document number 22 (including the number and the date in 26/11/2019) to get this approval.

RESULTS

A sample of 120 cases with burn injuries were included in this study. The mean age $\pm$ standard deviation (SD)

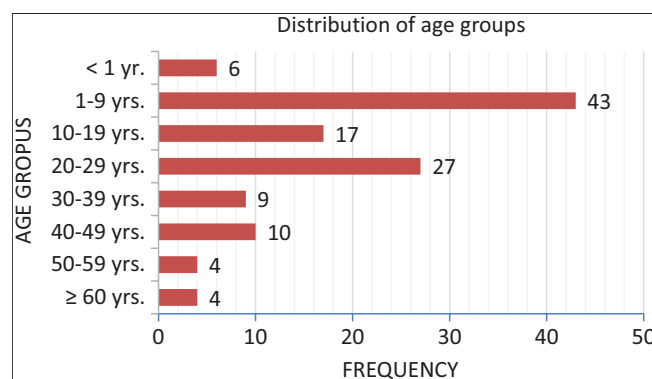


Figure 1: Frequency distribution of the sample according to age groups (*n* = 120)

was 18.9 ± 17.9 years. The subjects age ranged 1 month–83 years. Children of age 1–9 years constituted 35.8% of burning people. The adolescents and children aged ≤ 19 years accounted 55% of participants; the distribution of age groups is shown in Figure 1. The female to male ratio was 1:1.4 [Figure 2]. Two-third of them resided in

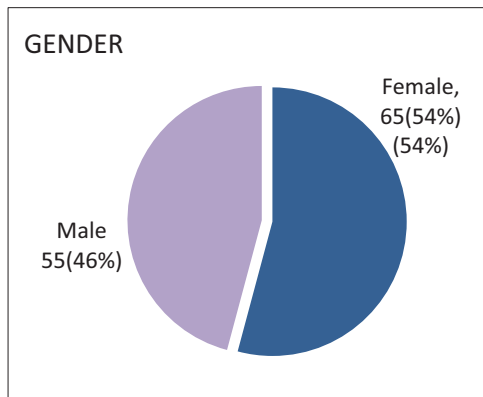


Figure 2: Gender distribution ($n = 120$)

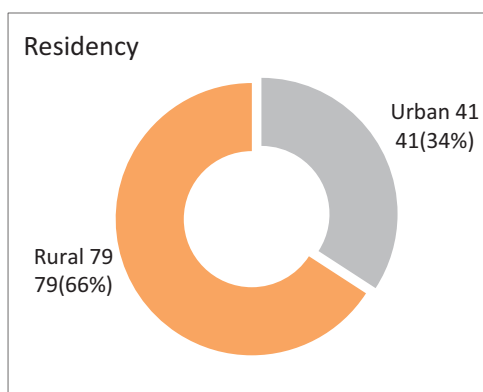


Figure 3: Urban–rural distribution ($n = 120$)

the rural area [Figure 3]. The accidents occurred during the day hours, night time, and morning time in 44%, 28%, and 28% of the sample, respectively.

The occurrence of burn accidents in February was 27 cases, followed by March, May, and April with 25, 24, and 23 cases, respectively. About one-fifth (26 cases) of accidents happened in Friday, followed by Monday and Saturday [Figure 4].

Concerning the marital status, children aged <15 years formed 45.8% of patients, those married formed 40% of patients, and 10.8% were single. One-half of the patients had intermediate school achievement or less, and 56% of them told that they have not enough monthly income. Only 13 (11%) of the patients presented with past medical history, and one case (1%) presented with history of mental illness. In all, 17 cases (14%) reported tobacco smoking [Table 1].

The mean duration of admission to the hospital was 7 days $\pm$ 8.1 SD. The findings indicated that 55.8%, 26.7%, and 6.7% of patients hospitalized for 1–5 days, 6–10 days, and 11–15 days, respectively [Figure 5]. The outcome of accidents was 64% of patients cured and were discharged, 9% were discharged on family responsibility, and 27% were dead [Figure 6]. Twenty-two patients were treated conservatively and 98 patients were treated with the standard intervention wound excision and skin graft [Figure 7]. Suicidal burn deaths were associated with the severity of the burn [Figure 8].

DISCUSSION

The current study is undertaken to describe the epidemiologic characteristics of hospitalized burn patients. Acute burn injuries in this study affected all ages,

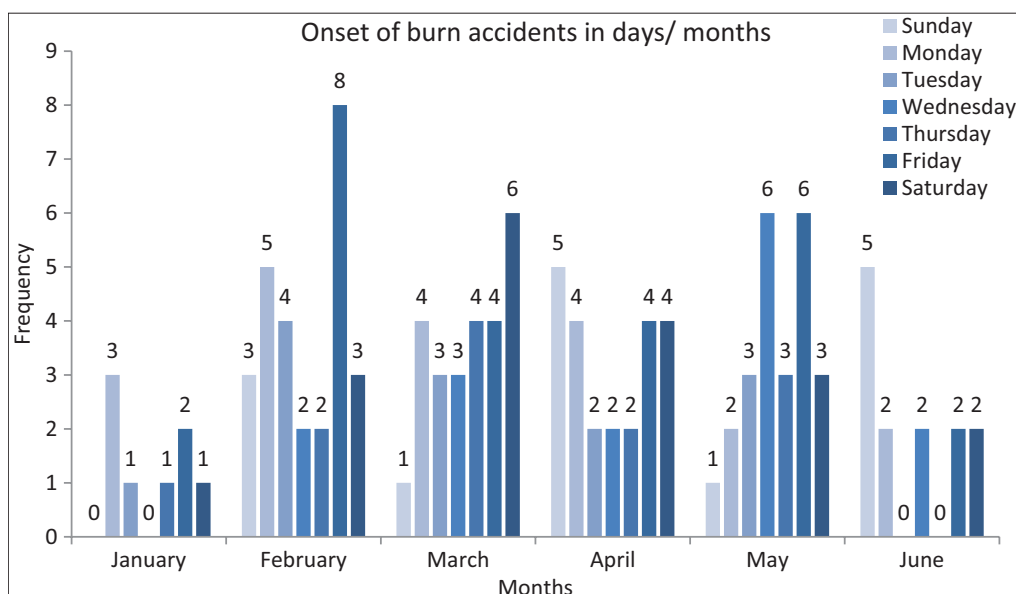
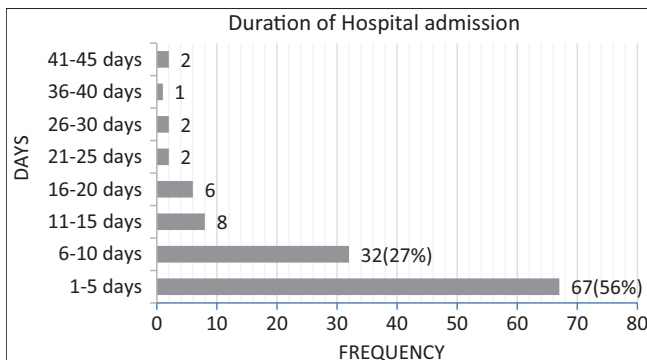


Figure 4: Frequency distribution of the sample according to the day of onset in 6 months ($n = 120$)

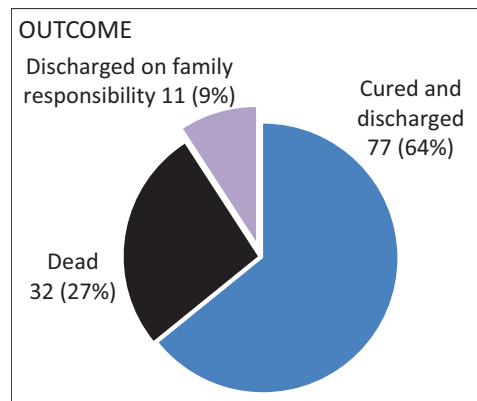
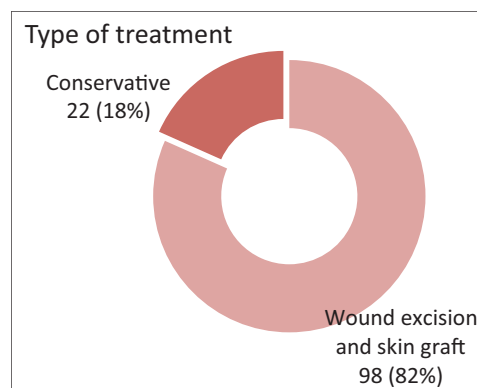
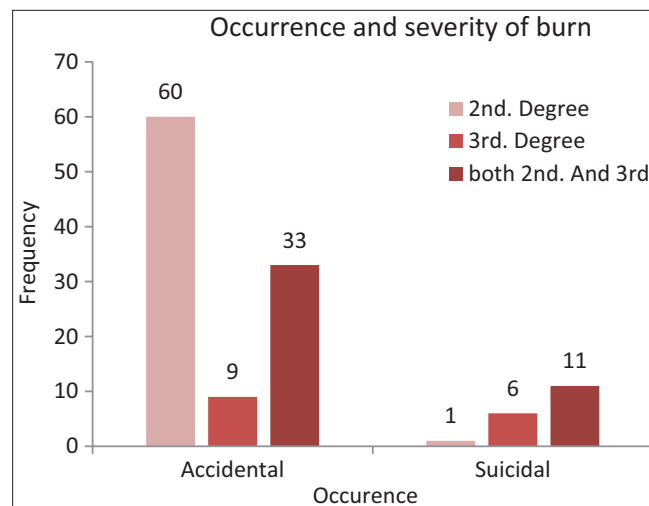
Table 1: Description of socioeconomic characteristics, past medical/mental illness history, and risky behavior of the burning people

Variables	Frequency	%
Marital status		
Child <15 years	55	45.8
Single	13	10.8
Married	48	40
Divorced	2	1.7
Widowed	2	1.7
Educational level		
Preschool	44	37
Illiterate	15	12
Primary	32	27
Intermediate	12	10
Secondary	10	8
College	7	6
Income adequacy		
Enough	47	39
Not enough	67	56
Enough and more	6	5
Past medical history		
Present	13	11
Absent	107	89
History of mental illness		
Present	1	1
Absent	119	99
Smoking		
Smoker	17	14
Non smoker	103	86

**Figure 5:** Frequency distribution of the sample according to the duration of hospital admission (n = 120)

mainly the young age group and children; this finding goes in line with the findings of other local and international studies.^[23,24]

The case fatality rate in this study is relatively high as compared to the results reported by other local studies conducted in different Iraqi provinces.^[23,28-31] The fatality rate in this study is higher than the rate reported by Kandeel (13.3%) and El Mehrat *et al.* in the Menoufia University Hospital, Egypt^[32,33] and that reported in Jordan.^[34] However, it is very much higher than that reported by

**Figure 6:** Outcome of accident (n = 120)**Figure 7:** Distribution of cases based on the type of treatment (n = 120)**Figure 8:** Relationship between occurrence and degree of burn (n = 120)

Krishnan *et al.* in the United Kingdom^[35] who noted that the fatality rate of burn injuries was 1.9%. These intercountry differences may be due to the nature of these societies as they have better healthcare services with a higher level of public awareness, whereas the intracountry differences may be attributed to the demographic characteristics such as poverty and educational levels; this comparison of death rates should bring the attention of health care planners in

Babylon governorate and in Iraq to develop much better preventive measures and quality of healthcare facilities to address this high priority health problem.

In the current study, females outnumbered males; this finding goes in line with the findings of other studies^[31,36,37] but disagrees with the findings of other study conducted in Baghdad Medical City Teaching Hospital, which revealed male predominance among hospitalized burn patients; this difference may be due to the presence of high number of military personnel affected by acute burns due to war injuries^[23] or due to the difference of the sample sizes. In a qualitative study carried out by Gatea *et al.* in Baghdad on 30 women who committed suicide using burns, especially fire, they have four problems leading to these burn deaths; these included personal, social, economic, and family situation of the victims. Among these, the main identified factors are family pressure, unstable families, and poor mental health.^[38] Females at home may find fire as a weapon to end their lives by burn instead of suffering in a male-dominated poor society.^[36] In our study, most of the victims had a low level of education; this finding is similar to that reported by other researchers; Gadge *et al.* concluded that most of self-inflicted burn victims had middle school level of education,^[39] whereas Gupta *et al.* showed that the majority of victims had primary school level of education.^[40]

Most of the victims belonged to low socioeconomic class; this finding is consistent with the finding of Vaghela *et al.* who reported that most of cases were in low socio economic status.^[41] The majority of victims in this study had more than 50% burnt total body surface area. The risk of death usually increases with increasing total body surface area as this indicates the incompatibility with life.^[42]

Suicidal burn death patients have severe burns (third and mixed degree of burns), whereas most of accidental burn death patients have less severe degree of burns, and the majority of cases were mainly from rural areas. These findings are consistent with the findings of other studies.^[32,43]

Suicidal manner was observed in half of the deaths; this finding disagrees with that reported in a study conducted in Egypt, which revealed that the majority of cases were accidental burn deaths,^[32] but agrees with the report of Nath *et al.* in India, which revealed that the majority of deaths were suicidal in nature and the least were accidental. These differences may be due to different religions, beliefs, and cultures. The Islamic law considers suicide to be a crime act onto the self. Thus, the number of suicidal burn deaths may not be reported for fear of legal responsibility and the socioreligious rejections of this act.^[44-46]

This high rate of suicidal deaths mainly among women with acutely burn injuries may show the tip of iceberg

(underestimated) due to the abovementioned reasons and the social stigma; this denotes a real presence of high-priority psychological, social, and economic problem.

The mean duration of hospital stay was 7 days $\pm$ 8.1 SD; this finding is similar to what was reported by others.^[24] The outcome of accidents was 64% of patients cured and were discharged and 9% were discharged on family responsibility; this finding goes with the finding of other local studies.^[23,24] Twenty-two patients were treated conservatively and 98 patients were treated with the standard intervention wound excision and skin graft; this finding is supported by the finding of other studies.^[24] The result shows that the main proportion of burn was related to fire; this finding is similar to the finding of other Iranian and local studies.^[23,47]

CONCLUSIONS

Burn injuries mainly affected younger age group and children, the case fatality rate of burn injuries was high, females outnumbered males, and suicidal burn deaths were significantly associated with a high severity as compared to the accidental ones.

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Conflicts of interest

There are no conflicts of interest.

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