

# Aspects of Fatal Burn Injury Cases Admitted to Al–Sadiq Teaching Hospital, Babylon Province/Iraq During 2020

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## Abstract

**Background:** Burns death both intentional and non-intentional considered among the most disastrous outcome of burn injuries.

**Objectives:** To measure the case fatality rate in hospitalized burn patients and to investigate in-hospital mortality among burn injury cases who were admitted to Al–Sadiq Teaching Hospital burn center from the first of January to the end of June, 2020.

**Methodology:** This is an observational descriptive case series study conducted on all cases who died from burn injury among patients 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 collection the requested information.

**Results:** The mean age  $\pm$  SD (Standard Deviation) of burn death victims were 24.5 $\pm$ 17.66 years. Young age group (15-24 years) represents the highest proportion (50%). Male to female ratio was 1:2.25. 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 burnt total body surface area. Intentional burn deaths victims had significantly severe burns (third degree burn and high-burnt surface area) as compared to accidental burn deaths. There was a statistically significant difference as regards the mode of burns between the intentional and accidental burn deaths, all intentional deaths were burnt with flame.

**Conclusions:** The case fatality rate of burn injuries was high, females outnumbered males, and suicidal burn deaths were significantly associated with severe burn as compared to the accidental ones.

**Keywords:** *Intentional burn injury deaths, accidental burn deaths, Babylon, Iraq.*

## Introduction

According to World health Organization, fire burns were responsible for more than 300,000 deaths annually<sup>(1)</sup>. Burns still represent one of the leading cause of death in developing countries<sup>(2)</sup>.

Recently, developed countries have made good progress in lowering burn-related mortality including Self Inflicted Burn (SIB) by raising awareness, prevention, improving secondary and tertiary health care and support programs for SIB cases<sup>(3)</sup> but SIB is still a priority public health problem in developing countries, including Iraq<sup>(4)</sup>.

Self-burn is high in Asian countries and the lowest in the United States<sup>(5,6)</sup>. This may be associated with the instability of the region, due to insecurity and the continuous arm conflicts. The rates of SIB associated burn deaths were very high 85% in Pakistan<sup>(7)</sup>, 79.6% in Iran<sup>(8)</sup>, and high 60% in Nepal<sup>(9)</sup> while the rates of

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deaths are low in Brazil 40%<sup>(10)</sup> and Sri Lanka 27%<sup>(11)</sup>. SIB is generally more common among females than among males<sup>(12)</sup>.

The majority of burn death cases were accidental, while suicidal manner was mainly observed in females<sup>(13-21)</sup>.

The burden of burn in Baghdad is quite high<sup>(22)</sup>. The objectives of this study are to measure the case fatality rate in hospitalized burn patients and to investigate in-hospital mortality among burn injury cases.

### Methodology

This is an observational descriptive case series study conducted on all cases who died from burn injury among patients who were admitted to Al Sadiq Teaching Hospital–Babylon Province–Iraq, this hospital is 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 located in the south central region of Iraq and populated about two million inhabitants. The period of study started from the first of January 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. Acceptance from the University of Babylon Ethical Committee, College of Medicine and the director

of Babylon Health Directorate were taken. Informed verbal consents were obtained from the patients’ companions or their families, the confidentiality was ensured by keeping all records anonymous. Data include socio-demographic data (age, gender, level of education) types of burn and etiology of burn.

Burns can be; partial thickness burns (second degree) extend through the epidermis and into the dermis or full-thickness burns (third degree) extend through the subcutaneous fat or deeper<sup>(23,24)</sup>. When estimating the degree of burn in this study, only partial thickness and full thickness burns are considered, and superficial burns are excluded. The extent of burn injury determined by the total body surface area (TBSA) in which estimated according to the rule of nine <sup>(25)</sup>.

### Results

A (32) dead cases included in this study out of 120 burn injured patients. The case fatality rate was (26.6%). Burn mortality higher in females than in males, OR with 95% CI (2.78; 1.16-6.72) P 0.019. Death doubled in those aged >18 years old than in children aged ≤ 18 years, OR with 95% CI (3.03; 1.30-7.06) P 0.009. Half of patients with 3<sup>rd</sup> degree burn injuries and mixed burn were dead, while 97% of those with 2<sup>nd</sup>. degree were cured, OR with 95% CI (30.5 6.81-136.6) P 0.0001, table [1].

**Table 1: Association between demographic characteristics and burn degree with the outcome of burn injuries (N=120).**

Variables		Outcome (N=120)		OR (95% CI)	Sig.*
		Cured (n=88)	Dead (n=32)		
Gender	Male	46 (84%)	9 (16%)	2.78 (1.16-6.72)	0.019
	Female	42 (65%)	23 (35%)		
Age groups (years)	≤ 18	54 (83%)	11 (17%)	3.03 (1.30-7.06)	0.009
	> 18	34 (62%)	21 (38%)		
Burn degree	2 <sup>nd</sup>	59 (97%)	2 (3%)	30.5 (6.81-136.6)	0.0001
	3 <sup>rd</sup> and mixed	29 (49%)	30 (51%)		

\* Chi-Square Test

The mean age ± SD (standard deviation) of burn death victims are 24.5±17.66 years, ranged (1.5 – 83 years). Young age group (15-24 years) represents 50%

of burning deaths, as shown in figure [1]. Male to female ratio 1:2.25 (P 0.013), figure [2].

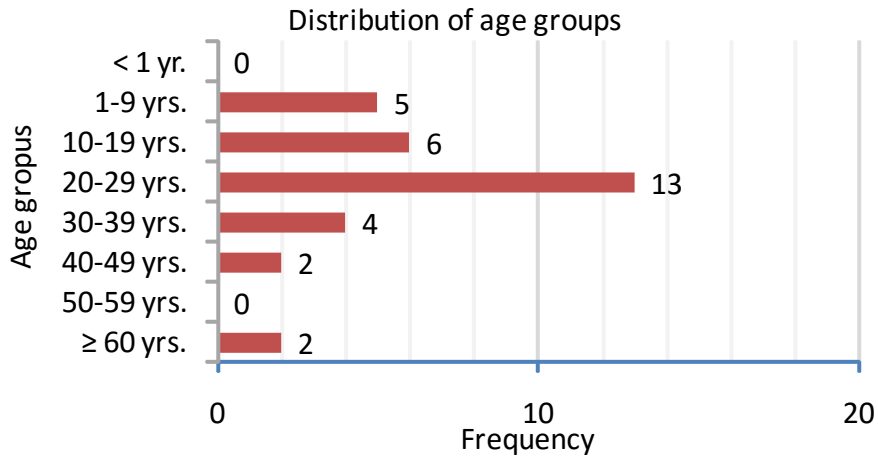


Figure 1: Frequency distribution of sample according to age groups (N=32).

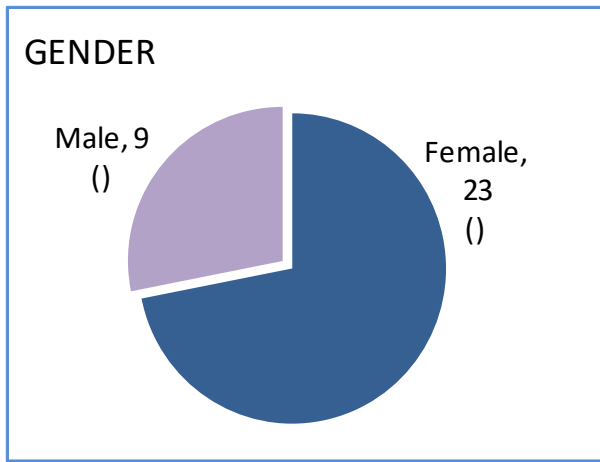


Figure 2: Gender distribution (N=32)

Concerning the marital status, 59% of them and 15.6% are single. The majority (87%) of victims have

intermediate school achievement or less, and 62% of them have not enough monthly income. Only three (9%) of victims present with past medical history, and one case (3%) present with history of mental illness. Five cases (16%) reported tobacco smoking, table [2].

The mean duration of admission to hospital was four days±2.79 SD. Findings indicated that 25%, 44% and 31% of victims hospitalized for 1 day, 2-5 days and > 5 days respectively.

One-half of deaths occurred intentionally by suicide. Suicidal burn deaths patients have severe burns (3<sup>rd</sup>. and mixed degree of burn i.e. third and second degree) while most of accidental burn deaths have less severe (mixed degree patients), two of them occurred in patients with 2<sup>nd</sup> degree (P 0.051), figure [3].

Table 2: Description of socio-economic characteristics, past medical/mental illness history and risky behavior of the burning death (N=32).

Variables		Frequency	%
Marital status	Child <15 yrs.	5	45.8
	Single	5	10.8
	Married	19	40
	Divorced	2	1.7
	Widowed	1	1.7

Variables		Frequency	%
Educational level	Preschool	5	15.6
	Illiterate	9	28.1
	Primary	8	25
	Intermediate	6	18.8
	Secondary	4	12.5
	College	0	0.0
Income adequacy	Enough	11	34
	Not enough	20	63
	Enough and more	1	3
Past medical history	Present	3	9
	Absent	29	91
History of mental illness	Present	1	3
	Absent	31	97
Smoking	Smoker	5	16
	Non smoker	27	84

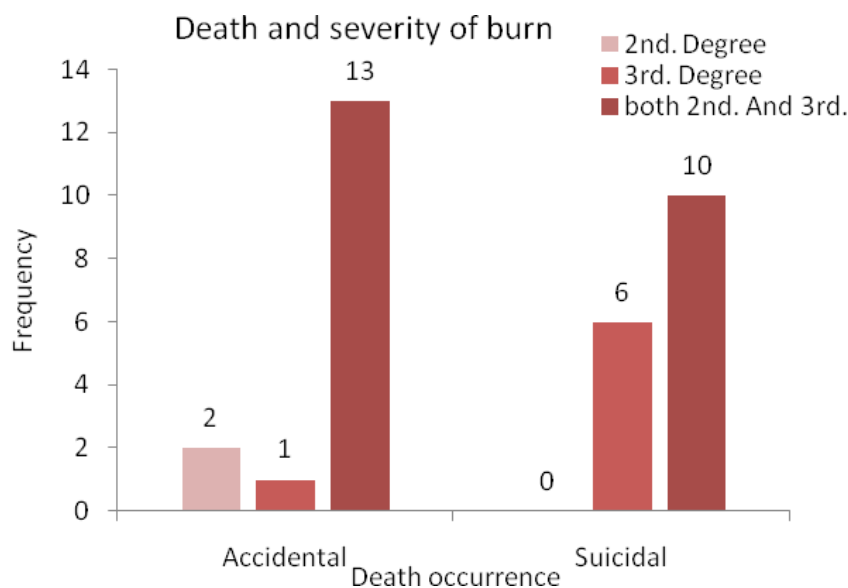


Figure 3: Relationship between suicidal burn deaths and degree of burn (N=32).

The mean total body surface area was  $59.72 \pm 23.8$  SD ranged (24-100%). More than two-third of patients present with TBSA  $\geq 50\%$ . However, suicidal death present with 67.8% mean TBSA while, accidental death present with 51.5% mean TBSA (P 0.05). The causes of burn was flame in 81% of death and 19 by hot liquids, table [2]. All intentional burn deaths occurred by using flame while, two-third of accidental death occurred with flame and one-third by hot liquids (P 0.018).

Table 3: Frequency distribution of total body surface area of burn and the etiology of burn (N=32)

Variables	Frequency	%
TBSA		
<10%	-	-
10-20%	-	-
21-30%	3	9
31-40%	6	19

Variables	Frequency	%
41-50%	4	12
51-60%	7	22
> 60%	12	38
Etiology		
Flame	26	81
Hot liquid	6	19

Findings indicated that 63% of patients were uninvestigated for microbial infections, *Pseudomonas* detected in 16% of patients, negative microorganisms detected in 9% of the sample and *Staphylococcus aureus* detected in 6% of them.

## Discussion

The current study is undertaken to describe the characteristics of hospitalized burn deaths. The case fatality rate in this study is relatively high as compared to the results reported by other national studies conducted in Diqar, Basrah, Musol, Baghdad and Babylon governorates<sup>(12-14,22;26-28)</sup>. The fatality rate in this study is higher than rate reported by Kandeel FS (13.3%) and El Mehrat et al in Menoufia University Hospital, Egypt<sup>(19,20)</sup> and that reported in Jordan<sup>(29)</sup>. But it was very much higher than that reported by Krishnan et al. from the United Kingdom<sup>(30)</sup> who noted mortality rate 1.9%. These differences may be due to the nature of these societies as they have better health care services with higher level of public awareness, this comparison should bring the attention of health care planner in Babylon governorate to develop much better health care facilities.

Females are outnumbered among self-inflict burn victims in this study at their young age, this finding goes in line with the findings of other studies<sup>(26,31,32)</sup>. In a qualitative study carried out by Gatea et al in Baghdad on thirty SIB women in their reproductive age they found that females who committed suicide using burn specially fire have four problems leading to this burn deaths these included; personal, social, economic and family situation of the victims. Among these, the main identified factors, family pressure, unstable families, and poor mental health<sup>(33)</sup>. Females at home may find a fire as weapon to end their lives by burn instead of suffering in male dominated poor societies<sup>(31)</sup>. In our study most of the victims had 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<sup>(34)</sup> while Gupta et al. showed that the majority of victims had primary school level<sup>(35)</sup>.

Most of the victims belong to low socioeconomic class this finding consistent with the finding of Vaghela et al. who reported that most of cases were in low socio economic status<sup>(36)</sup>. The majority of victims in this study had more than 50% burnt total body surface area. The risk of death usually increased burnt surface areas as this indicates the incompatibility with life<sup>(37)</sup>.

Suicidal burn deaths patients have severe burns (3<sup>rd</sup>. and mixed degree of burns) while most of accidental burn deaths have less severe degree of burns and the majority of cases were mainly from rural areas. These findings are consistent with the finding of other studies<sup>(19, 38)</sup>.

Suicidal manner was observed in half of the victims this percentage is much higher than that reported by similar study conducted in Egypt which revealed that the majority of cases were accidental burn deaths<sup>(19)</sup> but, our finding agrees with the finding of Nath et al. (2015) in India, which revealed that the majority of deaths were suicidal in nature followed by homicidal and the least were accidental. These differences may be due to different religions, believes and cultures. The Islamic law considers suicide to be a crime act onto the self. Thus, the number of SIB may be not reported for fear of legal responsibility and social and religion rejections of this act<sup>(16-18)</sup>.

This high rate of suicidal deaths mainly among women may show the tip of iceberg (underestimated) due to the above mentioned reasons and the social stigma, this denotes a real presence of high priority health and social problem of suicidal burn deaths.

## Conclusions

The case fatality rate of burn injuries was high, females outnumbered males, and suicidal burn deaths were significantly associated with high severity as compared to the accidental.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** None

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