Original Article

Sociodemographic Characteristics and Fate of Hospitalized Burned Patients in Al-Hilla City

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Abstract

Background: A burn is defined as a damage to the tissues due to high temperatures or heat, cold, electrical, chemical, friction, or irradiation. In developing countries such as Iraq, burn injuries are widespread, particularly in low-income and rural regions. Burns are considered the fourth most prevalent type of injuries worldwide. **Objectives:** The aim of this study is to assess the sociodemographic characteristics of hospitalized burned patients, as well as patients' fate and related risk factors. **Materials and Methods:** This was a cross-sectional study. The data were collected by interviewing patients who admitted in the burns ward center of Al-Imam Al-Sadiq Teaching Hospital or their companions, for a 3-month period from February 1, 2022 to May 1, 2022. Statistical analysis was done by SPSS version 27. **Results:** We collected data from 73 burned patients, which showed that most of them were males 53.4%, the mean age ± standard deviation was 18.76 ± 16.81 years, 65.8% living in rural areas, most patients had scald burn 43.9%, with second degree of burns and total body surface area (TBSA) <50%. About the outcome, 38.3% died. We found a significant (*P*-value >0.05) association between the fate of burned patients and the age, gender, place of burn, degree of burns, TBSA involved, and the presence of inhalational injury. **Conclusion:** The majority of the burned patients were male children, with scald burns, second-degree burns, and TBSA more than 50%. The mean age was 18.67 ± 16.81 years. The mortality rate was 38.3% and increased with age, female gender, flame burn, TBSA more than 50%, and with inhalation injuries.

Keywords: Burns, fate, scalds

Introduction

A burn is defined as an injury to the tissues due to high temperatures or heat, cold, electrical, chemical, friction, or irradiation; however the majority of burn injuries are caused by heat from hot water, solids, or flame.[1,2] One-third of burn casualties are youngsters under the age of five.[3] The high prevalence of burn injuries in preschool children has been related to their developmental lack of motor coordination and high level of physical activity.[3] The burn's outcome is determined by characteristics such as the degree of burn, time of exposure, surface area involved, location, age, and gender.[4] According to the WHO, 11 million burn injuries of all types occur worldwide each year, and 180,000 of those are fatal.[5] Because of the impairment of host defense mechanisms and the extreme post-injury inflammatory reaction, burns are a leading source of illness and mortality all around the world.[6] Burns are a common type of domestic trauma.[7] Burn injuries are among the most serious health issues that result in prolonged hospital stay and thus risen costs for patients, their families, and community.[8] In developing countries such as Iraq, burn injuries are widespread, particularly in low-income and rural regions.[7] According to the Global Burden of Diseases, in 2017, the number of burn injuries worldwide was extremely high,[9] and accidental burn damage is the third leading cause of death in the USA.[10] Burn injuries have serious physical, psychological, and economic consequences for patients, their families, and community.[11] Following traffic accidents, falls, and physical violence, burns are the fourth most prevalent

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type of injuries worldwide.[12] Nowadays, burn-related mortality has dropped by much more than half in recent years, and patients with burns affecting up to 90% of their body can live with proper management.[13] Although these advancements bring to light the advantages of burn care innovation, there are still aimed at improving healing and clinical outcomes, as well as reducing patients' length of stay in hospitals and the additional expenses of burn injuries.[14,15] Burns are classified according to the depth of the wound into the following: superficial burn (first degree) causes redness, which includes the epidermal layer and is accompanied by redness, minor pain, and swelling[16]; partial thickness, superficial burn (second degree), in which the epidermis and dermis are both damaged[17] and classified as mosaic types, which include (II A) the epidermal and dermal superficial layers are eroded[15] and (IIB) at various depths, the epidermal and dermal layers are eroded[17]; full thickness deep burn (third degree): in this type, the entire layers are eroded,[17] and full thickness including deeper burn (fourth degree): this type of burn invades from the epidermis to the subcutaneous tissue.[16,17] Even with technological and medical advancements, burns are still severe issues that endanger lives; thus the simplest and most efficient strategy is to prevent burns by taking precautions prior to the event.[18] *Objective of the study*: This study goal is to assess the sociodemographic characteristics of hospitalized burned patients and also to assess the fate of the patients and related risk factors.

Materials and Methods

Study design

This study is conducted to assess the sociodemographic characteristics of hospitalized burned patients also to assess the fate of the patients and related risk factors.

Study location: This study was carried at a burn unit in Al-Imam Al-Sadiq Teaching Hospital, Babylon Governorate, Iraq.

Data collection tool and scoring system

After obtaining verbal permission, data were collected by interviewing patients admitted to the burn unit or their companions. The research questionnaire was prepared by reviewing multiple articles regarding the same subject in Iraq and other countries and by multiple opinions of several experts. Pilot study was done for assessment of questionnaire as well as assessment of the time needed to complete it, also multiple changes was done on the forma before starting of collection of the patients. In this study, the inclusion criteria included all hospitalized burned patients in Al-Imam Al-Sadiq Teaching Hospital Burn Center, whereas exclusion criteria included patients who refused to participate in the study and patients who admitted and discharged on his/her family responsibility on the same day. The limitation of the study was that the time of the study was short.

Pilot study

A pilot study was done before starting the data collection for 1 week from 1st of February to 7th of February at Al-Imam Al-Sadiq Teac hing Hospital to identify any modification required to the questionnaire and time need for data collection and for protocol assessment while is realistic and workable. The sample of the pilot study was 10 burned patients and were excluded from the sample of the study and there are no modifications after this study.

Data analysis

SPSS version 27 was used for statistical analysis. Numbers and percentages were used to represent categorical variables. Means±standard deviation was used to represent continuous variables. The analysis of variance test was used to compare the means of three groups. To predict the association between categorical variables, Pearson's χ^2 and Fisher's exact test were used. A *P*-value of ≤ 0.05 was deemed 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 the 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 62 (including the number and the date in 11/5/2022) to get this approval. This study was approved by the Scientific Committee of Family and Community Medicine Department, College of Medicine, Babylon University. Verbal consent was taken from every patient before data collection.

Results

The following result involves the data of 73 admitted burned patients collected in 2022 (from February 1, 2022 to May 1, 2022). Table 1 shows that the range of age was 1–85 and the mean age was (18.67±16.81) gender 39 ((53.4%) were male and 34 (46.6%) were female), residence (48 (65.8%) were rural while 25 (34.2%) were urban).

Figure 1 shows 32 patients with scald burn at 43.9%, followed by flame burn at 34.2%, chemicals burn 20.5%, and electrical burn 1.4%. Table 2 shows patients with a second degree of burn of 41 with 56.2%, patients with second to third degree of burn of 30 with 41.1%, and patients with third degree of burn with 2.7%. Patients with total body surface area (TBSA) <50% were 19(26%), and patients with total body surface area (TBSA) 11-20% were 18 (24.6%). There were 15 (27.4%) patients with inhalational injury. Figure 2 shows the distribution of patients according to outcomes: 30 patients (41.1%) were discharged well, 28 patients (38.3%) died, 8 patients (11%) were discharged on responsibility of patient or family, and 7 patients (9.6%) were referred to another department or hospital. Table 3

Table 1: The distribution of patients according to sociodemographic characteristics (n = 73)

Sociodemographic characteristics		
Age (years)	(18.76 ± 16.81)	(1–85)
Gender		
Male	39	53.4%
Female	34	46.6%
Total	73	100.0%
Residence		
Urban	25	34.2%
Rural	48	65.8%
Total	73	100.0%
Occupation		
Employee	8	11.0%
Housewife	20	27.4%
Free work	9	12.3%
No work	1	1.4%
Student	10	13.7%
Child	25	34.2%
Total	73	100.0%
Marital status		
Married	30	41.1%
Single	41	56.2%
Widow	2	2.7%
Divorce	0	0.0%
Total	73	100.0%
Educational level		
Pre-school	25	34.2%
Illiterate	4	5.5%
Primary	33	45.2%
Secondary	8	11.0%
Higher education	3	4.1%
Total	73	100.0%
Pregnancy		
Yes	1	4.2%
No	23	95.8%
Total	24	100%
Income		
< 500,000 ID	42	57.5%
500,000–1,000,000 ID	28	38.4%
>1,000,000 ID	3	4.1%
Total	73	100.0%

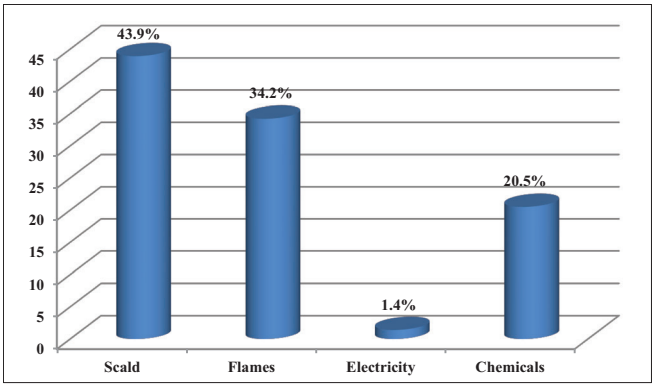

Figure 1: The distribution of patients according to mechanism of burns (n = 73)

Table 2: The distribution of patients according to characteristics of burns (n = 73)

Characteristics of burn	Number	%
Place of burn		
Household	68	93.1
Industrial	4	5.5
Road traffic accident	1	1.4
Total	73	100.0
Degree of burn		
2nd degree	41	56.2
2nd to 3rd degree	30	41.1
3rd degree	2	2.7
Total	73	100.0
Site of burn		
Upper limbs	3	4.1
Lower limbs	2	2.7
Trunk	2	2.7
Multiple sites	66	90.5
Total	73	100.0
TBSA		
<10 %	8	11.0
11–20%	18	24.6
21–30%	11	15.1
31–40%	10	13.7
41–50%	7	9.6
>50%	19	26.0
Total	73	100.0
Inhalation injury		
Yes	20	27.4
No	53	72.6
Total	73	100.0

shows 20 females died (71.4%). Table 4 shows that dead patients who had second- and third-degree burns were 20 (71.4%). The burning mechanism for 11 (39.3%) dead patients was the flame, followed by death due to chemical burns [10 (35.7%)]. The majority 16 (57.1%) of the dead patients were with TBSA more than 50%, 6 (21.4%) with TBSA 41–50%, and 5 (17.9%) with 31–40% TBSA. Fifteen patients (53.6%) died due to inhalational injury.

Discussion

Regarding the total (73) number of burned patients for a 3-month period (from February 1, 2022 to May 1, 2022), we found that the mean age was 18.7 ± 16.81; this distribution of age matches the research.[19,20] Regarding the gender, we found that burn injuries are more common in males (53.4%) than in females (46.6%), and this result is in agreement with other studies.[21-23] Most of the cases in our research were of low economic status (57.5%) and living in rural areas (65.8%), similar to the result in studies,[20,24] in Jordanian research, the majority of

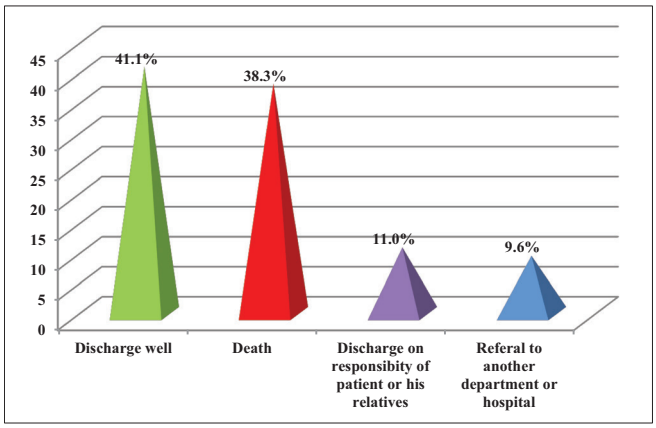

Figure 2: The distribution of patients according to outcome (n = 73)

burned patients (79.7%) were living in urban areas.[25] The majority of patients were from rural areas, which might be attributed to the poorly educated, low socio-economic level, and a lack of access to cooking safety precautions. Most of the burned patients were children (34.2%), and this result is also shown in many other researches but at higher percent (46%).[21,26] This might be explained by the fact that our study included more male children. Children are particularly vulnerable to unintentional accidents because they are typically unaware of basic household risks such as flames, hot liquids, and electrical currents. Most patients (45.2%) had only completed primary school, and this result is in line with a local study's findings.[27] The most common mechanism of burn in our research were scalds (43.9%), followed by flames (34.2%). These results

Table 3: Association between sociodemographic characteristics and fate of patients (n = 73)

Study variables	Fate of patients			Total	*P*-value
	Death	Discharge well	Other**		
Gender					0.002*
Male	8 (28.6)	22 (73.3)	9 (60.0)	39 (53.4)	
Female	20 (71.4)	8 (26.7)	6 (40.0)	34 (46.6)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Residence					0.522
Urban	11 (39.3)	8 (26.7)	6 (40.0)	25 (34.2)	
Rural	17 (60.7)	22 (73.3)	9 (60.0)	48 (65.8)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Marital status					0.106 f
Married	16 (57.1)	8 (26.7)	6 (40.0)	30 (41.1)	
Single	11 (39.3)	21 (70.0)	9 (60.0)	41 (56.2)	
Widow	1 (3.6)	1 (3.3)	0 (0.0)	2 (2.7)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Occupation					
Employee	2 (7.1)	3 (10.0)	3 (20.0)	8 (11.0)	
Housewife	14 (50.0)	4 (13.3)	2 (13.3)	20 (27.4)	
Free work	4 (14.3)	3 (10.0)	2 (13.3)	9 (12.3)	
No work	0 (0.0)	1 (3.3)	0 (0.0)	1 (1.4)	
Student	2 (7.1)	5 (16.7)	3 (20.0)	10 (13.7)	
Child	6 (21.4)	14 (46.7)	5 (33.3)	25 (34.2)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Educational level					0.469 f
Pre-school	6 (21.4)	14 (46.7)	5 (33.3)	25 (34.2)	
Illiterate	1 (3.6)	2 (6.7)	1 (6.7)	4 (5.5)	
Primary	15 (53.6)	12 (40.0)	6 (40.0)	33 (45.2)	
Secondary	4 (14.3)	2 (6.7)	2 (13.3)	8 (11.0)	
Higher education	2 (7.1)	0 (0.0)	1 (6.7)	3 (4.1)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Income					0.11 f
< 500,000 ID	21 (75.0)	14 (46.7)	7 (46.7)	42 (57.5)	
500,000–1,000,000 ID	7 (25.0)	14 (46.7)	7 (46.7)	28 (38.4)	
>1,000,000 ID	0 (0.0)	2 (6.7)	1 (6.7)	3 (4.1)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	

f = Fisher's exact test

**P*-value ≤ 0.05 was significant

Table 4: Association between burn characteristics and fate of patients (n = 73)

Study variables	Fate of patients			Total	*P*-value
	Death	Discharge well	Other**		
Place of burn					0.035* f
Household	28 (100.0)	26 (86.7)	14 (93.3)	68 (93.2)	
Industrial	0 (0.0)	4 (13.3)	0 (0.0)	4 (5.5)	
RTAs	0 (0.0)	0 (0.0)	1 (6.7)	1 (1.4)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Degree of burns					<0.001*
2nd degree	7 (25.0)	24 (80.0)	10 (66.7)	41 (56.2)	
2nd and 3rd degree	20 (71.4)	6 (20.0)	4 (26.7)	30 (41.1)	
3rd degree	1 (3.6)	0 (0.0)	1 (6.7)	2 (2.7)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Site of burn					0.015 * f
Upper limbs	0 (0.0)	3 (10.0)	0 (0.0)	3 (4.1)	
Lower limbs	0 (0.0)	0 (0.0)	2 (13.3)	2 (2.7)	
Trunk	0 (0.0)	2 (6.7)	0 (0.0)	2 (2.7)	
Multiple	28 (100.0)	25 (83.3)	13 (86.7)	66 (90.5)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Burn mechanism					0.023*
Chemicals	10 (35.7)	3 (10.0)	2 (13.3)	15 (20.5)	
Electricity	0 (0.0)	1 (3.3)	0 (0.0)	1 (1.4)	
Flames	11 (39.3)	7 (23.3)	7 (46.7)	25 (34.2)	
Scald	7 (25.0)	19 (63.3)	6 (40.0)	32 (43.8)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
TBSA					<0.001* f
<10 %	0 (0.0)	6 (20.0)	2 (13.3)	8 (11.0)	
11–20%	0 (0.0)	13 (43.3)	5 (33.3)	18 (24.7)	
21–30%	1 (3.6)	7 (23.3)	3 (20.0)	11 (15.1)	
31–40%	5 (17.9)	3 (10.0)	2 (13.3)	10 (13.7)	
41–50%	6 (21.4)	0 (0.0)	1 (6.7)	7 (9.6)	
>50%	16 (57.1)	1 (3.3)	2 (13.3)	19 (26.0)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	
Inhalation injury					<0.001*
Yes	15 (53.6)	3 (10.0)	2 (13.3)	20 (27.4)	
No	13 (46.4)	27 (90.0)	13 (86.7)	53 (72.6)	
Total	28 (100.0)	30 (100.0)	15 (100.0)	73 (100.0)	

f: Fisher's exact test

*P-value ≤ 0.05 was significantle

are similar to the Saudi research,[22] while research[21] found the flame is the most common, followed by scalds. In comparison to adults, children were more frequently afflicted by scalds. They are made largely of hot water and hot tea, and they are typical during meals cooking. This can be explained by a lack of awareness or knowledge of risky situations in children, as well as poor parental consent. The majority of the burn injuries 93.1% in this research happened at home. This result is in accordance with previous researches.[23,28,29] Most of the patients in our study (56.2%) had second-degree burn injuries. Several researches conducted in developing countries have also shown similar findings.[24,25] This could be linked to the fact that scald burns were the most prevalent causes of burn injuries in this research, which impacted the epidermisand a portion of the dermisand exposing the body to infections, of which *Pseudomonas aeruginosa* was the most common bacterium found in burned patients.[30] Regarding TBSA, we found 26% of patients with more than 50% burned surface area, and this percentage is almost close to the researches of Pakistan and India.[31,32] Our data revealed that the most often impacted anatomical areas in burn patients were multiple areas (90.5%); this was similar to the finding of Alipour *et al.*[33] in their study. This explains the inclusion of more than one area of the body in the burn, where the TBSA is large. In our study, we found that the death frequency among burned patients was 38.3%. This result is lower than the death rate (84.95%) in the research of Pakistan[31] and more than the rate (9%) of research in Kenya.[28] This is determined by the extent of the body's reaction to therapy, as well as the degree of burning and problems that occur as a result

of the burn, and these variances may be attributed to the character of these communities. In our study, we found significant correlation (*P*-value 0.029) between mean age and the fate of burned patients, in which the mortality rate increased with age; the mean age of the dead patients was 25.14 ± 19.25. This was similar to the findings in Vagholkar *et al*.,[34] Obaid *et al*.,[35] and Tan Chor Lip *et al*.[36] Ages patients become more likely to suffer from problems and have a greater incidence of elevated body surface area, partly owing to a decline in immunological function and physiological skin thinning. They also have more difficulty in defending themselves during an accident, contributing to worse outcomes.[34] There was a significant association (*P*-value 0.002) between gender and fate of patients, as the number of females [20 (71.4%)] exceeded the number of males [8 (28.6%)] among the deceased patients. There are multiple studies whose results are consistent with us.[23,33,35] About 71.4% of the dead patients had second- and third-degree burns, and there was a significant association ($P < 0.001$) between the degree of burns and the fate of the patients, and similar results are found in studies.[35,37] The mortality rate of burned patients with <50% TBSA was high (57.1%). There was a significant association between TBSA that affected and mortality ($P < 0.001$), and our finding was in agreement with the recent research in Ankara[38] and research in Nasiriyah.[39] As for the site of burning, it is also considered significant ($P = 0.015$), where all dead patients had multiple sites involvement. This means that patients with burns with a large surface area, multiple parts of the body, and with a second- and third-degree burn together are with a high mortality rate. Many (39.3%) patients burnt by flames died, and flame burns were responsible for the bulk of deaths, followed by chemical burns (35.7%) and scald burns (25%). A study in Cameroon showed burns with flame caused the majority of death.[40] This can be explained by the fact that most of the deaths are females, as most of their burns are due to the flame first, because they spend most of the time in the kitchen and approach the flame while cooking without good protection, as well as sometimes they wear quick-burning clothes, as well as females committing suicide using flames and chemicals. In this study, patients with inhalation injury had a mortality rate of about 53.6%, and other studies[22,36,41] agreed with us. Inhaling smoke damages the upper airways, and generalized massive edema can cause respiratory tract obstruction. Besides, hypoxia may necessitate endotracheal intubation or mechanical ventilation.

Conclusion

Our study in the current year (2022), which was applied in the burn center at Imam Al-Sadiq Teaching Hospital in Al-Hilla city, found that the majority of burned patients were male, children, mean age was 18.67 ± 16.81 years, with low level of education and low economic state, living in rural areas, scald was the most common mechanism of burns, most of them were with second-degree burns with multiple body sites involvement and TBSA more than 50%. The mortality rate in our study was 38.3%, and we found that the mortality rate increased with age, high in female gender, high in flame burn, elevated when the place of burn was in the home, when multiple body sites were involved with TBSA more than 50%. The mortality increased in the presence of inhalation injuries.

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Conflicts of interest

There are no conflicts of interest.

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