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Epidemiological study of burn patients admitted to the burn unit in Baqubah teaching hospital in Diyala Governorate

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Abstract

Background: Burn injuries are still a major global public health concern in terms of morbidity, death, and long-term impairment. Health officials in Iraq worry about burn injuries since there are little public data and extensive investigations and the problem's prevalence is unknown. The aim of study is to examine the epidemiology of burn patients, their conditions, models, and hospital morbidity and mortality.

Method: This study evaluated 439 burn patients at Baqubah Teaching Hospital, leveraging detailed questionnaires to understand epidemiological traits, treatment outcomes, and seasonal trends of burn incidents from 2014 to 2015. Utilizing the Rule of Nine for assessing the extent of burns, the research provided a comprehensive overview of patient demographics, burn severity, and recovery patterns, aiming to enhance future prevention and treatment strategies.

Results: This study analyzed 439 burn patients admitted to Baqubah Teaching Hospital, revealing a high incidence of burns in children under 5 years (44.19%) and a predominance of injuries to the upper extremities (55.8%). The majority of burns were of the 2nd & 3rd degree (96.12%), primarily caused by fire (77.22%), and occurred mostly at home (85.42%). Seasonal patterns showed a higher occurrence in winter (29.61%), and significant outcomes included a notable rate of patients being discharged on their responsibility (28.92%).

Conclusion: Burn injuries in Iraq notably affect young children and housewives, primarily due to accidental exposure to traditional cooking sources, emphasizing the critical need for enhanced safety education and preventive measures within households.

Keywords: Epidemiological, Burn, Baqubah Teaching Hospital, Diyala Governorate

Introduction

Burn injuries represent a significant public health issue globally, with a particularly high impact on low- to middle-income countries where the necessary infrastructure to mitigate the incidence and severity of burns is often lacking. Burns are classified as injuries to the skin or other organic tissues caused by thermal trauma, including exposure to hot liquids (scalds), hot solids (contact burns), flames, or through radiation, electricity, friction, or chemical contact ^[1]. They are recognized as one of the most severe forms of trauma, carrying a heavy burden not only in terms of mortality but also in the profound long-term physical and psychological effects on survivors. This includes disabilities, disfigurements, stigma, and social rejection ^[2]. Globally, burns are the fourth most common type of trauma, trailing behind traffic accidents, falls, and interpersonal violence ^[3]. Approximately 90% of burn incidents occur in lower-income regions, contributing significantly to morbidity and mortality rates, especially among children who are disproportionately affected due to factors such as poverty, ignorance, and disease ^[4]. The home environment, often due to cooking practices, the presence of flammable materials, and certain social factors, is identified as a primary location for burn occurrences ^[5]. The consequences of burns extend beyond fatalities; for every death, numerous individuals face lifelong disabilities and disfigurements. This results in substantial financial and manpower strains on healthcare systems, highlighting the necessity for intensified research, preventive strategies, better treatment modalities, and training for health professionals ^[6]. A study in Uganda underscored the devastation of household burn injuries, accounting for 11% of all childhood injuries ^[7]. The prognosis for burn victims largely depends on the total body surface area (TBSA) affected

and the age of the patient, with the "Rule of Nine" serving as an effective method for estimating TBSA [8]. In 2004, WHO estimated that burns led to 310,000 deaths globally, predominantly in low- and middle-income countries, illustrating a significant public health challenge [9]. An analysis by the Italian Red Cross Hospital in Baghdad, Iraq (from 3rd April to 19th May 2004), treated 49 patients for burns without discrimination regarding age or sex. This study highlighted differences in risk distribution among various population segments and identified six typical injury patterns: child scalding, domestic accidents, unsafe working conditions, suicide attempts, injuries among children in role-play, and war-related injuries. Notably, the incidence of burn injuries was higher among women and children, with a marked gender disparity in adulthood (age 15 and up) and a higher mortality rate observed in females. Most incidents occurred at home, underscoring the domestic sphere as a critical area for burn prevention efforts [10]. This study aims to explore the epidemiological characteristics of burn patients admitted to the burn unit at Baqubah Teaching Hospital and assess the impact of burns on morbidity and mortality rates within the hospital.

Method

This retrospective epidemiological study scrutinized the medical records of 439 burn patients admitted to the Baqubah Teaching Hospital's burn unit from January 1, 2014, to December 31, 2015, aiming to illuminate the epidemiological characteristics of these patients and the impact of burns on morbidity and mortality. The comprehensive analysis included patients of all ages and genders. Five patient records were excluded due to incomplete information, leaving a total of 439 patients in the study. Data were meticulously gathered using a specially designed questionnaire sheet, which extracted information from the patients' files stored in the hospital's archive. This questionnaire covered a range of information, including registration data (such as name, age, sex, residency, date of burn occurrence, occupation, and educational status), circumstances of the burn (time and place, causative agent, first aid measures, and any traditional treatment used), clinical assessment (affected site and the percentage of total body surface area (TBSA) affected, estimated using the Rule of Nine), patient outcomes (improvement and discharge status, death, or referral to another hospital), and duration of hospital stay and re-admission rates. The Rule of Nine, a method used to estimate TBSA affected by burns, divides the body into sections, each representing multiples of 9% of the total body surface, with adjustments made for infants and children due to their proportionately larger head sizes. This study also took into consideration the seasonal distribution of burn incidents, categorized into winter (December to February), spring (March to May), summer (June to August), and autumn (September to November). Statistical analysis was conducted using computer software, presenting the results in frequencies, percentages, and proportions to provide a clear understanding of the burn patterns, including the prevalence of burns across different times of the year, demographic data, and the outcomes for those affected. The meticulous collection and analysis of data aimed to shed light on the epidemiological aspects of burn injuries within the specified period and setting, offering insights into the severity and outcomes of such

injuries, which could inform future prevention and treatment strategies.

Results

The total number of patients admitted to burn unit during the study period was (439). One hundred ninety-four (44.19%) patients were below 5 years old, age from 6-10 years were 11.61% (51), 11-20 years were 13.89% (61), 21-30 years were 16.40% (72), 31-40 years were 6.83% (30), 41-50 years were 2.96% (13), 51-60 years were 2.5% (11), and 1.59% (7) were >60 years. As in table 1.

Table 1: Age Distribution of Burn Patients

Age (years)	No.	%
≤5	194	44.19
6-10	51	11.61
11-20	61	13.89
21-30	72	16.40
31-40	30	6.83
41-50	13	2.96
51-60	11	2.50
≥60	7	1.59

55.8% (245) patients were the most commonly affected in their upper extremities. Then 21.18% (93) in their head, neck was 9.11% (40), chest was 46.69% (205), abdomen was 36.67% (161), lower extremities were 46.46% (204) as in table (2). Distribution was recorded according to frequency of each area alone then the mixed areas (more than one area).

Table 2: Anatomical Site Distribution of Burn Injuries

Anatomical Site	No.	%
Head	93	21.18
Neck	40	9.11
Chest	205	46.69
Abdomen	161	36.67
Upper extremities	245	55.80
Lower extremities	204	46.46

Second and third degree burns were the most commonly record in this study 422 (96.12%) as shown in table (3).

Table 3: Degree of Burns among Patients

Degree of Burn	No.	%
1st Degree	33	7.51
2nd & 3rd Degree	422	96.12

Which include home, outdoor like in work places or other places like expulsions, majority was recorded at home 375 patients (85.42%) while in work place and other places were 5.69% (25) & 8.88% (39) respectively. As in table 4.

Table 4: Place of Occurrence of Burns

Place of Burn	No.	%
Home	375	85.42
Work place	25	5.69
Others	39	8.88

Which include fire (kerosene or gas cylindrical), scalding (hot water or oil) and electricity. The majority was caused by fire 77.2% (339) While by Scalding were 21.18% (93) and by electricity were 1.6% (7) as shown in table (5).

Table 5: Cause of Burns

Cause of Burn	No.	%
Fire	339	77.22
Scalding	93	21.18
Electrical	7	1.60

Burns was commonly seen in winter season with the highest percentage in January 12.52% (55) then December 10.47% (46), October 9.33% (41), March 8.65% (38), April 8.65% (38), May 7.28% (32), June 8.2% (36), July 7.74% (34), Aug. 7.51% (33), Nov. 7% (31), Feb. 6.6% (29), and Sept. 5.92% (26). As shown in table (6).

Table 6: Seasonal Distribution of Burn Incidents

Season	No.	%
Winter	130	29.61
Spring	108	24.60
Summer	103	23.46
Autumn	98	22.32

Most of the patient discharge on their responsibility, they were 28.92% (127). Patients discharged by doctor were 28.92% (127), dead were 15% (66) and the referred was 12.52% (55). From those patients who discharge on their responsibility 12 patients were re-admission, table (13.1) will show the second admission and the outcome? One was referred to plastic surgery, five were dead, five improved and one discharge on his responsibility. Out of those 12 patients, 7 (5 females, 2 males) were children 4 of them were died, two young age female (one dead), and three were males. As shown in table (7).

Table 7: Outcome of Patients

Outcome	No.	%
Improved and Discharged by Doctor	127	28.92
Discharged on Patient's Responsibility	191	43.5
Dead	66	15
Referred to Another Hospital	55	12.52

Table (8) show that from 439 patients were included in the study female were 54.8% (241), male was 45% (198).

Table 8: Gender Distribution of Burn Patients

Gender	Number of Patients	Percentage (%)
Female	241	54.8
Male	198	45.0

Discussion

The comprehensive analysis of burn injuries at Baqubah Teaching Hospital unveils critical insights into the epidemiology of burns, echoing findings from both regional and global studies. The prevalence of burn injuries among children under 5 years, as observed in our study, aligns with research by Amal Kalf (2013) [11] in Baghdad and Forjough SN. (2006) [12] in the United States. This demographic vulnerability, also discussed by Okoro (2009) [13], underscores the inherent risk associated with the explorative nature of early childhood, highlighting an urgent need for targeted preventive strategies and parental education on potential household hazards. In contrast, Lafta R. et al. (2014) [14] noted a higher incidence rate among older

individuals in Baghdad, attributed to the unique risks of bombings and explosions, underscoring the influence of socio-political factors on burn injury patterns. This variance points to the necessity of a holistic approach in public health strategies, encompassing not only individual and household safety measures but also broader societal and environmental interventions. The study also revealed a higher incidence of burns among females, a finding consistent with local studies in Diyala by Salih Sahib A. (2005) [15] and international research by Henry James (2011) [16]. This gender disparity may reflect traditional roles and activities, particularly in domestic environments where exposure to cooking and heating sources is more common. The data suggest the need for gender-specific educational campaigns focused on safe cooking and heating practices, alongside the promotion of safer kitchen and household designs. Seasonal variations in burn incidence, with a peak during the colder months, particularly from October to January, resonate with findings by Judith Aloyo (2011) [17]. This pattern emphasizes the impact of environmental conditions on burn risks, as individuals seek warmth through potentially unsafe methods. It presents a critical opportunity for public health initiatives to educate on safe heating practices and provide safer alternatives to vulnerable populations during these peak risk periods.

The predominance of fire as the leading cause of burns in our study, supported by findings from Brusselaers N (2010) [18] in Europe, highlights the widespread use of open flames and flammable materials. This calls for stricter safety regulations and the development of safer heating and cooking technologies, as well as public education on fire safety and emergency response. Furthermore, the significant proportion of second and third-degree burns indicates the severity of injuries that patients face, necessitating not only immediate medical intervention but also comprehensive rehabilitative support. This severity aligns with observations by Amaal Khalf (2013) [11] in Baghdad and Denis Arony (2011) [19] in Uganda, underscoring the long-term physical and psychological impact of burn injuries on survivors. The anatomical site distribution, with a higher prevalence of upper extremity injuries, as corroborated by Parno A. 2017 [20] in Iran, reflects common interaction points with burn sources. This underscores the importance of protective gear and cautionary measures in high-risk activities. The study's mortality rate, while significant, highlights the challenges in patient follow-up and data completeness, similar to issues noted by Shankar G. 2010 [21]. This underscores the need for improved patient tracking and post-discharge support to enhance our understanding of treatment outcomes and long-term recovery processes.

Conclusion

The study highlights burn injuries as a significant public health challenge in Iraq, notably affecting young children under 2 years and predominantly female adults within household settings. The majority of incidents occur at home, stemming from accidental exposure to traditional cooking methods, underscoring the urgent need for targeted prevention and education strategies, especially among those of lower socio-economic status. Addressing the trend of self-discharge and treatment neglect is crucial for improving outcomes and reducing the long-term impact of burn injuries.

Conflict of Interest

Not available

Financial Support

Not available

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