

# Burns Care, Epidemiology and Aetiology in Newly Established Burns Unit: Atbuth

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## Abstract

**Context:** Burns has remained one of the severest forms of trauma a man suffers. All ages and sexes are affected however, different studies have shown predilection for certain age groups and sexes due to activities and environments such individuals are exposed to. These injuries are best managed in a dedicated burn centres or units. There is a paucity of data on such emanating centres in the North-eastern Nigeria. **Materials and Methods:** The study is a retrospective one looking at the pattern of burn injury among patients seen and treated in Abubakar Tafawa Balewa University Teaching Hospital, Bauchi (ATBUTH). Folders of burns patients seen and managed with major acute burns between January 2018 and December 2021 in the institution were collected and data was obtained using a proforma. Statistical package for social sciences version 25 was used to analyse the data and the result depicted in tables and charts. **Result:** A total of 77 patients were studied among which 68.8% were less or equal to 10 years of age, 64.9% were males, and scald was responsible for 57.1% of injury followed by flame (32.5%). Seventy-four point zero percent sustained superficial partial thickness injury and the most commonly affected body part is the back followed by the right upper limb seen in 57% and 50% of cases respectively. The majority, (72.1%), were managed with wound dressing only while 1.3% had skin grafting. A mortality rate of 9.1% was recorded. Trimodal peak was seen in the months of February/March, July and October. **Conclusion:** The paediatric age group was the most affected by scald burns which was largely due to domestic accidents. This shows that adults need to do more in order to protect these youngsters from the danger of burns.

**Keywords:** burns; epidemiology; aetiology; care; new burns unit

## Introduction

Trauma is currently regarded as a disease of public health importance [1-3]. Burns has remained one of the most common and severe forms of trauma that man suffers [2]. Burns affects all age groups, though more common among children. The epidemiology of burns varies due to age, geographic location, human development index, literacy and cultural differences [3, 4]. Nigeria as well as other low and medium-income countries (LMIC) record the worst morbidity and mortality due to burns as a result of varying contributing factors like illiteracy, economic status, cultural tenets, access to specialist burn care and legislation targeted at burn prevention [5]. Comprehensive burn prevention has remained the most effective control measure.

Flame burn has been implicated as the most common cause of burn in Eastern and Western Nigeria [5, 6]. Another important aetiological agent in burns is moist heat as in scald, this is especially important among preschool and school-age children. Other aetiological agents of burn injury are chemicals, electricity, and friction. Chemical injuries represented 6.3% and 5% in Ibadan and Enugu respectively while electricity as an aetiology was the least of the causative factors in most series [7].

Research that produces Epidemiologic data will provide information for developing a prevention program aimed at reducing the incidence of burn injury and for designing an effective burn care protocol for a hospital, city or a country at large [8]. It will also serve to encourage advocacy for burn care and stimulate policy formation for burn prevention, care, and rehabilitation of burn injury.

There is a paucity of data demonstrating the pattern of burn injury in North-east Nigeria just like any other region in Nigeria [5, 6], We set out to present our experience in managing burn injuries in a newly established burn unit in our centre.

## Methodology

### *Location of Study*

Abubakar Tafawa Balewa University Teaching Hospital is a tertiary health care institution located in Bauchi the capital of Bauchi State North-Eastern Nigeria. The hospital receives patients from Bauchi and neighboring states.

### *Methodology*

This is a retrospective study that reviewed the patients that were managed in our new burns unit over a four-year period from January 2018 to December 2021. All patients with acute major burns injury within the period were recruited for the study excluding those presenting only with minor burns not requiring admission or burns sequela. A total of 77 cases were found and studied. The information that were retrieved from their case notes include age, sex, aetiological agent, time between injury and presentation, initial care, total body area affected, anatomical region affected, depth of injury, nature of wound, treatment received, complications and outcome.

### *Ethical Approval*

Ethical clearance was obtained from the institution's ethical committee in keeping with global best practices. The ethical approval reference number is 0027/2022 dated 7th June 2022.

### *Statistical Analysis*

Statistical Package for Social Sciences, SPSS version 25 was used to analyze the data where descriptive statistics was used in analysing the mean, standard deviation as well as the frequencies of the data and the result is reported as below.

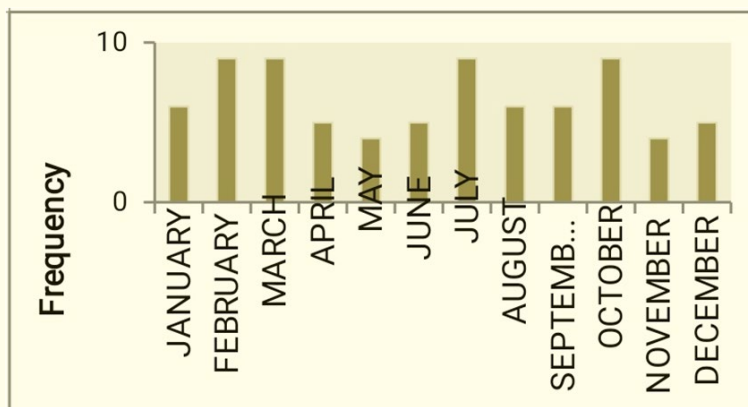
## Result

A total of 77 patients were managed during the period under review. Their age ranged from 4 months to 62 years with a mean of 10.9. There were 50 males and 27 females giving a M:F ratio of 2:1. The majority were paediatric patients less than 10 years of age (68.8%). Scald injury accounts for 57.1% of the cases followed by flame burns 32.5% as shown on Table 1.

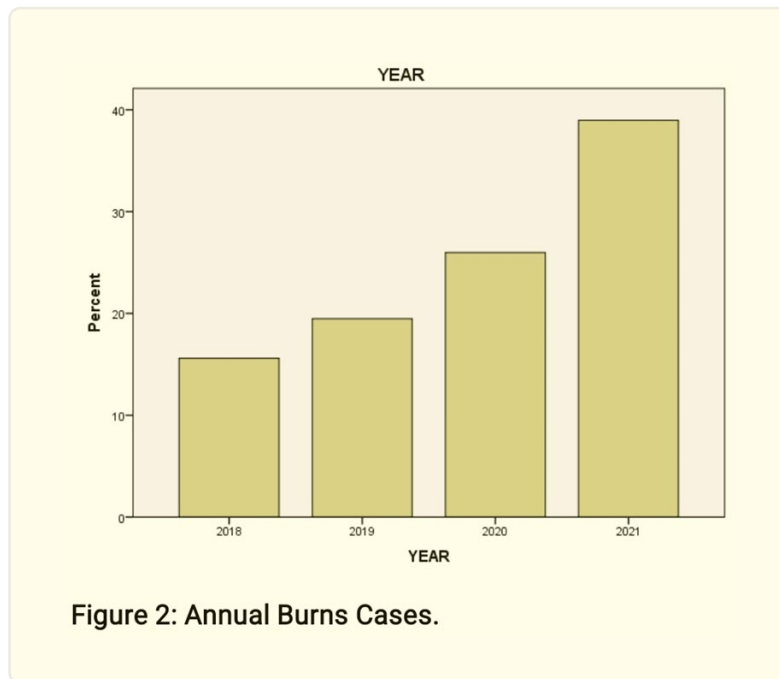
**Table 1. Biodata and Aetiologic Distribution**

AGE	FREQUENCY	PERCENTAGE (%)
≤ 10 YRS	53	68.8%
11-20 YRS	9	11.7%
21-30 YRS	8	10.4%
31-40 YRS	5	6.5%
41-50 YRS	1	1.3%
51 YRS- ABOVE	1	1.3%
TOTAL	77	100%
SEX		
MALE	50	64.9%
FEMALE	27	35.1%
TOTAL	77	100%
AGENT		
SCALD	44	57.1%
FLAME	25	32.5%
ELECTRICAL	4	5.2%
FRICTIONAL	2	2.6%
CHEMICAL	2	2.6%
TOTAL	77	100%

The distribution of burns injury in this study showed three peaks; the first in February and March, the second in July and the third in October as shown in, Figure 1. There was a steady increase in the number of cases per year in the period under review as shown in Figure 2.



**Figure 1: Monthly Burns Cases.**



At presentation, the majority (87%) of the wounds were not infected while 9.1% were infected with clinical evidence of purulent discharge whereas the remaining 3.9% had their wounds contaminated by applying different concoctions, egg yolk, oil, gutter water and so on. The most commonly affected anatomical region was the back (57%) closely followed by the right upper limb (50%) as shown on Table 2. Sixty (77.9%) of the patients had injuries that were less than 50% of the total body surface area (TBSA) while the remaining had greater than 50% TBSA. The majority (74%) of injury was superficial partial thickness injury as shown on Table 2.

**Table 2. Wound Assessment.**

WOUND PRESENTATION	AT	FREQUENCY	PERCENTAGE (%)
INFECTED		7	9.1%
CLEAN (NOT INFECTED)		67	87.5%
CONTAMINATED		3	3.9%
TOTAL		77	100%
<b>ANATOMICAL REGION</b>			
HEAD		20	26%
FACE		9	11%
NECK		8	10%
CHEST		7	9%
ABDOMEN		12	15%
BACK		44	57%
RIGHT UPPER LIMB		39	50%
LEFT UPPER LIMB		6	7.8%
PERINEUM		35	45.5%
RIGHTLOWERLIMB		33	42%
LEFTLOWERLIMB		12	15.6%
TOTAL		77	100%
<b>DEPTH</b>			
SUPERFICIAL PARTIAL THICKNESS		57	74.5%
FULL THICKNESS		1	1.3%
MIXED THICKNESS		19	24.7%
TOTAL		77	100%

Sixty three (81.8%) of the patients had their initial care at ATBUTH, seven (9.1%) started with traditional care while six (7.8%) had theirs in other hospitals before presenting to ATBUTH. The majority (72.7%) of patients were managed in ATBUTH with wound dressing only, 1.3% had debridement and another 1.3% had skin graft as shown on Table 3.

**Table 3. Patient Care and Outcome**

INITIAL PLACE OF CARE	FREQUENCY	PERCENTAGE (%)
ATBUTH	63	81.8
HOME	1	1.3
TRADITIONAL	7	9.1
OTHER HOSPITAL	6	7.8
CARE IN ATBUTH		
DEBRIDEMENT	1	1.3
DRESSING	56	72.7
STSG	1	1.3
NOT SPECIFIED	19	24.7
TOTAL		100.0
OUTCOME		
DISCHARGED WITH RESIDUAL WOUND	47	61.%
DISCHARGED COMPLETELY HEALED	10	13.%
DIED	7	9.1%
LAMA	7	9.1%
REFERRED	6	7.8%
TOTAL	77	100%

**LAMA - left against medical advice.**

**STSG – split thickness skin graft**

We recorded a mortality of 9.1% (7), while 61% (47) were discharged with residual wounds, 13% (10) were discharged with completely healed wounds and another 9.1% (7) left against medical advice (LAMA) as shown in Table 3. The length of stay (LOS) in the burn unit was from 1 to 60 days with a mean of 15.1 days.

## Discussion

Burn injuries continue to be a major source of mortality and morbidity in many parts of the world particularly in developing countries like ours. Epidemiological studies in each environment is a prerequisite for the planning of management and preventive programs to minimize the devastating effects of burns in all age groups. In view of this, every community is encouraged to study the epidemiology of burns since this important problem varies from community to community [3].

Studies by Dongo et al [6] and Esen et al [4] demonstrated male preponderance which is in keeping with our finding in this study. But this is in contrast with the findings by Dogo et al [9], Datubo-Brown et al [10] and Mabogunje and his colleagues [11] who showed that there was equal male-to-female distribution of burns injury in Maiduguri (Northeastern Nigeria), Port Harcourt (Southern Nigeria) and Zaria (Northwestern Nigeria) respectively. On the other hand, Oladele and his colleagues [12] in a review of burns in Ibadan (Southwestern Nigeria) showed a female preponderance of 2:1. Our finding may not be unconnected with the adventurous nature of Boys compared to Girls. Generally, boys tend to be more aggressive and more playful.

Majority (68.8%) of the patients are less than or equal to 10 years of age in keeping with the finding by Esan et al in Turkey [4]. Scald burns were found to be common (57.1%), which is similar to the report of Esan et al [4] and Banerjee et al [13] which shows scald to be the most common aetiology for burns followed by flame. There are however other studies that showed flame to be leading aetiological agent [6, 7, 12]. These studies however are those that have a predominant adult population.

The peak incidence of burns injury found in this study was trimodal, observed to peak in February/March, then in July and lastly in October as against the bimodal peak observed by Isiguzo et al [5] which showed peak incidence in January to March and the second peak in October to November while Dongo et al [6] in Southern Nigeria and Jiburum et al [7] in Southeastern Nigeria observed single peak incidence from November to January and December to January respectively. February and March are part of the Harmatan season in Northeastern Nigeria which usually starts in December. It is in this period that mothers warm water for bathing the children which when the children accidentally topple into the hot water, may lead to scald burns. July is the mid of the rainy season in the region and the weather tends to be cold necessitating the use of warm water for bathing which, like in the Harmatan, predisposes to accidental burns injuries.

Flame burns constituted 32.5% of the patients affecting mostly the adult population. The adults are involved in work that has to do with the risk of fire. Illegal sale of petroleum products during scarcity and frequent power outages necessitating use of generators is common in our environment. Storage and transportation of these petroleum products as well as the bad handling practices such as refuelling a running generator have led to countless explosions and fire incidents. The low electricity supply from the National grid contributes to this high incidence of flame burns because of the constant need for alternative sources of power. Esen et al [4] also identified flame burn to be the second most common agent but the study by Oladele et al [12] did not corroborate this.

Electric, chemical and frictional burns contributed just a single digit in the percentage of burns injuries in this study (Table 3). This is similar to the findings by Dongo et al [6] whereas Esan [4] and Isiguzo [5] reported 18.4% and 31.0% respectively being due to electric burns. In our region most electric injuries are due to attempts at vandalizing electricity products by young adults, carpenters working too close to electric installations and the roofing sheet they are holding coming in contact with it leading to injury or use of substandard materials leading to accidental human exposure. Chemical burns was seen in 2.6% in our review. This has the potential to be life-threatening with serious aesthetic and functional consequences, and is caused by corrosive agents (acids and alkali) from assault leading to extensive tissue damage [14].

The majority of patients presented early and received their initial care in ATBUTH (81%). This is in keeping with the finding by Isiguzo et al [5] where the majority of patients presented early and over 90% were treated with wound dressing only and 3.1% had skin grafting. In this study 72.7% were treated with only wound dressing and 1.3% had debridement and skin grafting. Treating deep dermal or full-thickness burns requires the toxic eschar to be removed early, usually in the first 24 to 72 hours [15]. Removal of necrotic tissue reduces mortality and complications in patients with these kind of burns. This is typically achieved through burns wound excision and split thickness auto grafts from healthy skin available or cultured autologous keratinocytes cover of the resultant defect [16]. In our study most of the burns injury were from scald burns which usually results in superficial partial thickness injuries that heals within 10 to 14 days with good outcome. The challenge we faced with patients presenting with deep dermal and or full thickness injury requiring wound excision and grafting is financial constraint as burns are quite costly to treat. These patients pay out of pocket because of inadequate health insurance coverage in Nigeria and the majority of them are indigent persons that we often manage to get them source for items required for proper dressing.

Mortality rate of 9.1% seen in this study is similar to that by Dongo et al [6] who reported mortality of 9.7% but Isiguzo et al [5] reported a slightly higher mortality rate, 14.3%. Most of the mortalities are seen in those that presented beyond 8hours with dehydration and wound infection as well as those with large body surface area involvement.

This underscores the importance of public awareness and the need for people to present burn wounds immediately. This study also showed that the majority of burn injuries are superficial partial-thickness injuries that when appropriately managed, heal within 2 weeks. Only a few had injuries greater than 50% TBSA (22.1%) and deep dermal injuries were also few. The cost of burns management increases with increasing TBSA and depth of injury hence with a political will, these unlucky, indigent persons can be helped via insurance policies with very rewarding outcomes without putting so much burden on the government or insurance companies. For those that left against medical advice, reasons are likely to be due to financial constraint and cultural beliefs among other factors.

## Conclusion

Burns has remained one of the most common and severe forms of trauma that affects humans with significant morbidity and mortality especially in developing countries. This study showed that the males are the most commonly affected in a ratio of 2:1, M:F, scald injuries are the commonest cause in children younger than 10 years, the majority of burn victims sustained superficial partial-thickness injury less than 50% TBSA and early presentation predominated. The outcome of care was good with only 9.1% mortality. Health education may significantly reduce the incidence of this preventable public health problem. The study also showed that health insurance covering burns is likely to yield the desired result with less burden on providers.

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## Declaration

There is nothing to declare.

## Financing

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