

## Childhood Burns: Prevalence, Aetiology and Associated Factors in a Mission Hospital, Southeast Nigeria

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### Abstract

**Background:** Childhood burns is a major health concern worldwide, particularly in developing countries. The epidemiology varies from place to place, and comprehensive care is largely unavailable.

**Aim:** To determine the prevalence and associated factors of childhood burns in Aba, Southeast Nigeria.

**Materials and Methods:** This was a retrospective study conducted over a 6-year period (January 2013 to December 2018) at Living Word Hospital, Aba. Data was obtained from case files of children aged 1 month to 16 years with diagnosis of burns. Information extracted included age, gender of patient, agent of burn, place and mechanism of injury, month of presentation and severity of burns.

**Results:** The prevalence rate was 2.4%. There were 39 males and 31 females with a male: female ratio of 1.3:1. Majority, 35 (50%), of patients were aged 5 years or less. Eight (11.4%) aged 6 to < 11 years while 27 (38.6%) aged 11 - 16 years. Flame 43 (61.4%) was the commonest cause of burns followed by hot water (34.2%) and electricity (4.2%). Majority, 54 (77.1%) were 2nd degree burns; while 12 (17.7%) and 4 (5.7%) were 3rd and 1st degree burns respectively. The greatest frequency of burns occurred in October. Accidental contact with hot water 24 (34.3%) was the most frequent mechanism of burns while kerosene explosion 18 (25.7%) and spread from lighted lantern 14 (20%) were the second and third respectively. Most of the burns, 60 (95.2%) occurred in residential apartments.

**Conclusion:** The prevalence of burns is high, affecting mostly children ≤ 5 years in residential apartments. Efforts should be geared towards regular education of the citizenry on the need for adequate supervision of young children and keeping them from reaching objects likely to result in burns; legislation and enforcement of laws against adulteration of kerosene should be rigorously pursued to stem the high prevalence.

**Keywords:** Childhood; Burn; Prevalence; Aetiology; Southeast Nigeria

### Introduction

Burn remains a major health concern worldwide, particularly in resource poor countries due to the fact that prevalence is high [1]. Strategies for prevention and management are not easily implementable for reasons of ignorance, financial constraints, lack of burns care facilities/personnel and government support [2]. Burns often results in severe physical and psychological trauma on the patient [3], as well as stretching the economy of the patient, family and the society/nation at large [4].

Epidemiology of burns varies from country to country and from region to region, in the same country for reasons of climatic conditions, cultural practices/beliefs, educational level of the citizenry and other socioeconomic factors [5].

Childhood burns becomes a special concern due to the vulnerability of this age group. Their vulnerability is because of maturity related ignorance and lack of ability for self-defense and supervision [6]. In Nigeria, the most populous country in Africa, burns are the fourth commonest cause of childhood trauma after road traffic accidents, accidental falls and bites [7,8].

Studies from various parts of the country reveal varying prevalence, types and aetiology of burns [9-12]. This study was conducted to determine the prevalence, aetiology and associated factors of childhood burns at Living Word Hospital, Aba, Southeast Nigeria. It is hoped that the findings would provide an insight into the magnitude of the problem and be a veritable tool in fashioning preventive measures and effective management strategies for burns. Again, outcome of this study can serve for advocacy on the government for financial support and resources for provision of burns care facilities and regular education of the populace on burns prevention.

### Materials and Methods

Living Word Mission Hospital (LWMH) Aba is a Christian Mission Hospital founded in 1996 by The Living Word Ministries International. It caters for both adults and children. Scope of care includes both medical and surgical cases. The department of Paediatrics of this hospital started in 2002 and is manned by 4 medical officers, one part time senior registrar and a visiting consultant paediatrician. The consultant paediatrician consults once a week, does ward round once every week and is also available during calls or when the junior doctors have difficulty in managing any patient. It is the biggest private hospital in Aba. Its location at the centre of the town attract a reasonable patient load to the hospital. It attends to approximately 1000 paediatric patients per year [13].

This was a retrospective study of all children who sustained burns injury from January 2013 to December 2018. The study was conducted in the Accident and Emergency Department and the Paediatric Surgical ward of Living Word Hospital, Aba.

Case notes of the patients who sustained burns injury during the study period were retrieved from the Medical Records Department. Information extracted included the age of patients, agent of burns, place and mechanism of injury, month of presentation and severity of burns. Severity of burns was classified by the degree due to available record.

**Inclusion criteria:** Patients aged 1 month to 16 years admitted for burns within the study period.

**Exclusion criteria:** Patients aged less than 1 month and more than 16 years and those with inadequate data.

### Data analysis

Data was analyzed by prose, frequency tables and descriptive statistics using SPSS Version 22. Statistical significance was set at p value  $\leq 0.05$ .

Consent was obtained from the Medical Director of the hospital prior to commencement of the study.

**Results**

There were 3,480 admissions during the study period with 83 burns injuries giving a prevalence rate of 2.4%. Thirteen of the burns injuries had inadequate data and were therefore excluded from further analysis while 70 were subsequently analyzed.

There were 39 (55.7%) males and 31 (44.3%) females with a male: female ratio of 1.3:1.

Majority, 35 (50%), of the patients were aged ≤ 5 years while only 8 (11.4%) were aged 6 to 11 years (Table 1).

Age group (years)	Frequency	Percentage (%)
≤ 5	35	50
6 - 11	8	11.4
12 - 16	27	38.6

**Table 1:** Distribution of cases by age group.

Majority of the injuries, 43 (61.4%), were flame burns while electric injury 3 (4.2%) constituted the least (Table 2).

Type of Burn	Number	Percentage (%)
Flame	43	61.4
Scald	24	34.3
Electric	3	4.3
Total	70	100.0

**Table 2:** Distribution of different types of burns.

Scald 19 (27.1%) occurred more frequently than flame injury 6 (8.6%) in patients aged ≤ 5 years while flame burn 11 (15.7%) occurred more than scald 3 (4.3%) in the 12 - 16 years age group. Other details are in table 3.

Age (years)	Scald (%)	Flame (%)	Electricity
≤ 5	19 (27.1)	6 (8.6%)	0 (0.0)
6 - 11	9 (12.9)	9 (12.9)	3 (4.3)
12 - 16	3 (4.3)	11 (15.7)	0 (0.0)

**Table 3:** Distribution of types of burn in the age groups.

Among the ≤ 5 years age group, 19 (76%) had scald burns while 6 (24%) had flame burns. Then, in the 12 - 16 years age group, 11 (78.6%) had flame burns while 3 (21.4%) had scalds. However, the difference is not significant (p = 0.85)

The vast majority of the injuries, 54 (77.1%), were second degree burns while 12 (17.2%) and 4 (5.7%) were third and first degree burns respectively.

Greatest frequency of burns (20%) was in the month of October while there were no cases in the months of January, April, and September (Table 4).

Month	No	%
January	0	0.0
February	10	14.3
March	1	1.4
April	0	0.0
May	7	10.0
June	10	14.3
July	8	11.4
August	3	4.3
September	0	0.0
October	14	20.0
November	10	14.3
December	7	10.0

Table 4: Distribution of burn injuries by months.

Accidental contact with hot water (34.3%) was the most frequent mechanism of burns, followed by kerosene explosion (24%), spread of fire from lighted lantern 14 (20%) and electric shock (4.3%) (Table 5).

Mechanism of Burns	Frequency	Percentage (%)
Accidental contact with hot water	24	34.3
Kerosene explosion	18	25.7
Spread of fire from lantern to room	14	20
Gas cylinder explosion	7	10
Fuel explosion	4	5.7
Electric shock	3	4.3

Table 5: Distribution of mechanism of burn.

Majority (95.2%) of the cases occurred within residential apartments while 3 (4.8%) occurred away from homes.

### Discussion

Our study showed a prevalence rate of 2.4%. This is lower than 6.1% reported in Ghana [14] but higher than 16.1/10000 reported in UK [15]. A higher prevalence was reported in Ghana probably because that study was conducted by burn scar survey in the  $\leq 5$  years age group in the community. In such community settings, burns prevalence is expected to be higher than in the overall paediatrics admissions in a hospital setting. Our study was conducted in the later setting. Our value, however, was higher than that reported in UK, most probably because of their higher socioeconomic status and better and effective burn preventive measures compared to developing nations like Nigeria [16].

Our result showed that more males were affected than females. This corroborates with the reports from other previous studies [9-12]. Males are generally more active and exploratory as infants/toddlers and tends to become more adventurous as older children than females [16]. This makes them more vulnerable to burns injury leading to higher prevalence.

Majority of the burn injuries occurred in children aged  $\leq 5$  years. Similar finding was also reported in previous studies [9,12,14]. This could be explained by the relatively immature perceptive and cognitive development in these younger children [18] as well as often poor caregiver supervision over them [19].

The most frequent burns injury type in our study was flame injury. This contrasts with report in some studies in which scald injury was the most frequent injury reported [9,12]. The more frequent occurrence of flame injury reported in our study could be explained by the frequent recording of kerosene explosions during the study period. The greedy attitude of petroleum product marketers adulterating kerosene with other petroleum products for inordinate gain is the main reason for kerosene explosions. Over the study period, frequent kerosene explosions occurred during lighting of kerosene lanterns or cooking stoves.

Scald injury occurred more in children aged  $\leq 5$  years in our study than in other age groups although the difference is not significant. However, previous studies have reported scald as occurring more significantly in young children [20,21].

Our study revealed that a greater percentage of burns were second degree. This also corroborates with report from Saudi Arabia where second degree burns also occurred most frequently [22]. Second degree burns being the most frequent in both studies could be explained by the aetiology of burns in both studies. These were frequent kerosene explosions and frequent scald injury in our study and that of Saudi Arabia respectively. Both of these causes of burns are known for their high propensity to produce second degree burn injury.

Our study also revealed that the greatest frequency of burns occurred in the month of October. This contrasts with previous reports stating that burn injuries in North western and south eastern Nigeria occurred most frequently during the harmattan seasons, ie December to January [23]. Our different finding could be explained by a large proportion of the mechanism of burns injury in our study being due to kerosene explosion. Kerosene explosions from kerosene adulteration can occur at any time and not determined by seasonal climatic nor weather conditions. This is contrary to the reports from northwest and southeast Nigeria which ascribed the peaks of burn injury to cold and dryness of harmattan season, occurring in the months of December to January.

Our report noted that overwhelming majority of the burns injuries occurred at home. This corroborates with reports from previous studies [9,12,14]. That most of the burn injuries occurred at home could be explained by the fact that the study population were children aged  $\leq 16$  years, a vulnerable age group who are usually left at home unsupervised [24].

### Conclusion

The prevalence of burns injury was high occurring mostly in children aged  $\leq 5$  years. Most of the injuries were flame burns and scalds from kerosene explosions and contact with hot water respectively, in residential apartments.

### Recommendation

To prevent childhood burn injuries, the following should be done:

1. The government to intensify efforts geared towards educating the populace on the need for regular supervision of young children and keeping them from having access to fire and hot fluids.
2. Regular appropriate placement of objects like kerosene, fuel and hot water containers within homes in safe places.
3. The need for adults to pretest small quantity (5mls) of kerosene sample in a container by lighting it for explosion prior to filling appliances in the home should be intensified.
4. Government should enforce legislation against adulteration of kerosene.
5. Advocacy should also be mounted on the government for the establishment of burns care centres in locations that can be easily accessed by the citizens

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