

# Prevalence And Outcome of Paediatric Domestic Accidents in A Tertiary Health Facility in Rivers State, Nigeria

## ABSTRACT

### Background

Unintentional injuries occurring in or within the vicinity of the home resulting in temporary or permanent health impairment are largely preventable. However, they are contributors to childhood morbidity and could lead to mortality in severe cases.

### Objectives

This study was undertaken to determine the prevalence, pattern and outcome of domestic injuries among children admitted into the Children's Emergency Room (CHER) in Rivers State University Teaching Hospital (RSUTH).

### Methods

This was a 5-year retrospective study of 179 children with domestic injuries admitted into the children's emergency unit from January 2017 to December 2021. Data on socio-demographic characteristics, cause, type and outcome of domestic injuries were collected from their medical records and analyzed with SPSS version 23.

### Results

A total of 3987 children aged < 18 years were admitted into CHER. Out of these, 179 (4.48%) children had injuries from domestic accidents. Majority of them 89 (46.9%) were under-fives and males 108 (60.3%). Three commonest causes of home accidents were falls 52 (29.1%), burns 44 (24.6%) and mechanical trauma 32 (17.8%). Common domestic injuries observed in the study were burns (24.6%), head injuries (20.7%), ingestion of poisonous substances (13.4%) and lacerations (11.7%). Burns injuries were significantly more prevalent among females and poisoning among males. Incidents of poisoning was significantly more prevalent among under-fives (21.4%) and animal bites (13.7%) among older children, ( $p$  value < 0.05). The mean duration of admission in the emergency room was  $1.27 \pm 1.90$  days. Three children (1.7%) died in the emergency room and all mortalities occurred within 48 hours of admission.

### Conclusion

Although the prevalence of domestic injuries among children in this study was low, parents, caregivers and the government can institute measures to further curb its incidence.

**Keywords: Domestic accidents, Outcome, Pattern, Prevalence, Tertiary Health Facility, Nigeria.**

## **1. INTRODUCTION**

Domestic accidents are unintentional sudden accidents that occur in the home or within the vicinity of the home. It excludes intentional injuries and injuries from traffic accidents.<sup>1</sup> The home environment is meant to be a safe environment for children, however, in the presence of physical, chemical and mechanical hazards, children are in danger of injuries at home.<sup>2</sup> These hazards include slippery floors, poor lightening at home, sharp objects, medications, chemicals kept within the reach of children and the presence of animals within the vicinity of the home that cause injuries to humans through their bites.<sup>3-5</sup> Common injuries associated with domestic accidents include lacerations, burns, head injuries, intoxication from ingestion of chemicals, drowning and near drowning, fractures, dislocations and animal bites among others.<sup>4,6,7</sup> These injuries are subject to prevailing sociocultural and socioeconomic environment of the victims.

Although domestic injuries occur in all age groups, it is commoner among children because of their avid interest in exploring their environment, their curiosity, impulsiveness and interest in taking risks, without understanding the dangers associated with taking such risks and also lack the ability to protect themselves.<sup>8</sup> Domestic injuries among children are major contributors to childhood morbidity, hospitalization, disabilities and in severe cases unnecessary and preventable childhood mortalities.<sup>9</sup>

In the United State of America, home accidents were responsible for about 13 million outpatient visits, 4 million emergency visits, and 2,800 deaths among children annually.<sup>6</sup> In Italy,<sup>10</sup> the cumulative incidence of hospitalization from domestic accidents increased from 409.2/1000 children in 2019 to 534.5 per 1000 children in 2020. The annual incidence in Iran in 2016 was 16%.<sup>11</sup> In Benin Republic<sup>8</sup> and Congo,<sup>12</sup> it was responsible for 8.4% and 9.2% of paediatric emergency room visits respectively. In Nigeria, there is paucity of data on the burden of domestic accidents especially among older children. Abubakar et al in Kano reported that 13.7% of admissions into children's emergency rooms in their health facilities in 2018, was on account of domestic accidents. While the study just addressed the pattern of injuries sustained from home accidents, it did not address the outcome of such injuries in terms of mortality and length of hospital stay.<sup>13</sup>

This study was aimed at determining the prevalence, pattern and outcome of domestic injuries among children admitted into the CHER in Rivers State University Teaching Hospital, Port Harcourt, Nigeria.

## **2. MATERIAL AND METHODS**

### **2.1 Study Design**

A 5-year retrospective study was carried out in the Children Emergency Room, Rivers State University Teaching Hospital, Port Harcourt, Nigeria. The study was from January 2017 to December 2021.

### **2.2 Study site**

The hospital is located in the metropolitan capital of Rivers State, in the southern part of Nigeria. The CHER is a 15 bedded ward that is responsible for caring for all emergencies among children aged 0-17 years. It is manned by consultants, residents, house officers, nurses of different cadres in addition to non-medical personnel. The facility attends to emergencies round the clock with the medical personnel working in shifts. The Paediatricians are the first on call but send consults to surgeons for evaluation and management of patients with surgical emergencies. Children seen in the emergency room are evaluated, resuscitated and treated by the doctors on duty. Those requiring further in-patient treatment after stabilization are admitted into the paediatric ward, transferred to other

wards in the hospital or referred to other tertiary hospital if needed. Those who do not require further in-patient treatment are discharged from the emergency room.

### 2.3 Study population

The study included all children aged 0-17 years admitted into the children emergency room of the Rivers State University Teaching Hospital between January 2017 to December 2021.

### 2.4 Sampling Method

All children identified from the admission and discharge records with diagnosis of domestic accidents

### 2.5 Inclusion and exclusion criteria

Children aged 0-17 years with complete records of sustaining unintentional injuries at home or within the vicinity of the home were included in data collection.

Children with documented injuries sustained outside the home or from road traffic accidents were excluded from the study. Children with incomplete documentation of injuries such as the location and cause of injuries were also excluded.

### 2.6 Methods

A research assistant was trained to extract relevant information from the admissions and discharge register of the children emergency room, using a proforma designed from the study. Information obtained included socio-demographic characteristics, date and year of admission, cause and type of domestic injury, diagnosis made and outcome of the hospital visit. The outcome included duration of stay in emergency room, time of discharge, referral, transfer to other wards, discharge against medical advice (DAMA) and death.

### 2.7 Data analysis

Data obtained were entered into an excel spreadsheet and analyzed using IBM statistical package for social sciences app version 23. Tests of association between categorical variables was done with Chi Square and Fisher's exact tests. Statistical significance was set at p-value < 0.05 at 95% confidence interval.

## 3. RESULTS

A total of 3987 children were admitted in CHER. Out of these, 179 children were admitted with injuries from domestic accidents, giving a prevalence of 4.48%.

The children were aged 6 months - 16 years and the mean age was  $5.88 \pm 4.48$  years. Majority of them were under-fives (46.9%), males (60.3%) and mostly presented in 2019 (35.2%), table 1.

**Table 1: Sociodemographic profile of children in the study population**

Demographic data	Frequency (n=179)	Percent
<b>Age group (Years)</b>		
0-4	84	46.9
5-9	46	25.7
≥ 10	49	26.4
<b>Gender</b>		
Male	108	60.3
Female	71	39.7
<b>Year of admission</b>		
2017	10	5.6
2018	51	28.5
2019	63	35.2
2020	18	10.1
2021	37	20.7

### Causes of domestic injuries

The commonest cause of domestic accidents was falls 52 (29.1%), followed by burns 44 (24.6%) and mechanical trauma 32 (17.8%), table 2.

**Table 2: Causes of domestic accidents**

Causes of domestic accidents	Frequency	Percent
Falls	52	29.1
Burns	44	24.6
Mechanical trauma	32	17.8
Poisoning	24	13.4
Animal bite	15	8.4
Sharp objects	11	6.1
Electrocution	1	0.6
<b>Total</b>	<b>179</b>	<b>100.0</b>

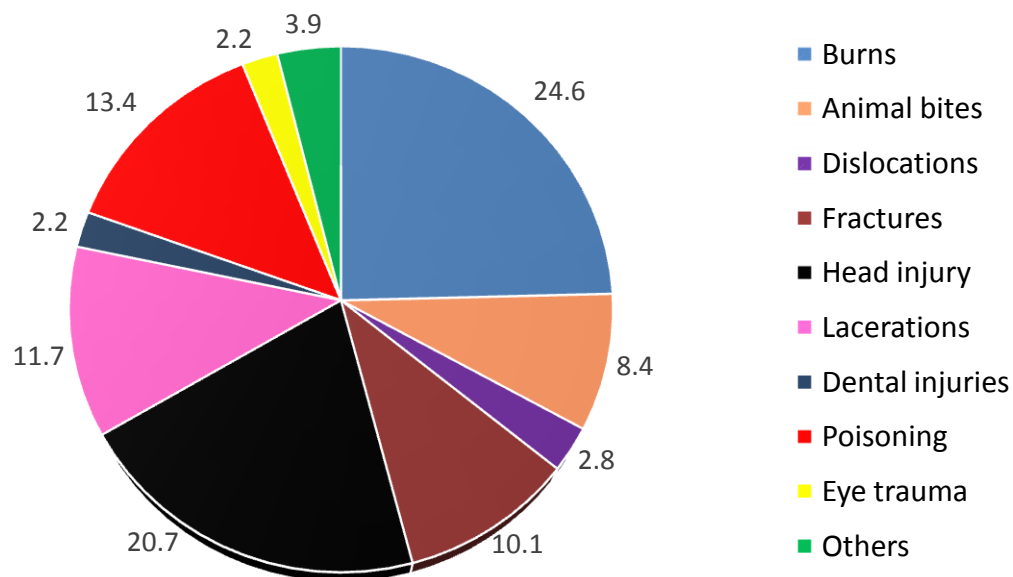
#### Anatomical sites for domestic injuries

Most of the injuries sustained were located in the musculoskeletal system, 113 (63.1%), 37 (20.7%) had head injuries, and 13.4% had injuries from inhalation or ingestion of poisonous substances. The others were ophthalmic and dental injuries.

#### Types of domestic injuries

Burns (24.6%), head injuries (20.7%) and ingestion of poisonous substances (13.4%) were the three commonest types of domestic injuries encountered by children in this study. For the 24 children who ingested harmful substances, 4 (16.7%) ingested caustic soda, 2 (8.3%) ingested medications, 3 (12.5%) kerosene, 3 (12.5%) insecticides, 3 (12.5%) carbon monoxide fumes from generators, 4 (16.7%) chemicals and 5 (20.8%) pesticides and other hydrocarbons, figure 1. Injuries included under others (3.9%) were 2 bruises, 3 hematomas, 1 indurations and 1 ankle sprain.

**Distribution of Domestic Injuries Among Study Population**



**Figure 1: Distribution of Domestic Injuries Among Study Population**

Burns injury was significantly more prevalent among females 24 (33.8%) while poisoning was more prevalent among the males (17.6%), *P* value =0.016 and 0.033 respectively, table 3.

Incidents of poisoning was significantly more prevalent among under-fives (21.4%) and animal bites (13.7%) among older children, *P* value = 0.003 and 0.005 respectively, table 4.

**Table 3: Distribution of domestic accidents by sex in the population**

Domestic injury	Gender		Total (n = 179) N (%)	<i>P</i> value
	Female (n=71) N (%)	Male (n=108) N (%)		
Burns	24 (33.8)	20 (18.5)	44 (24.6)	<b>0.016</b>
Head injury	14 (19.7)	23 (21.3)	37 (20.7)	0.477
Poisoning	5 (7.0)	19 (17.6)	24 (13.4)	<b>0.033</b>
Fractures	5 (7.0)	13 (12.0)	18 (10.1)	0.204
Lacerations	10 (14.1)	11 (10.2)	21 (11.7)	0.287
Dislocations	3 (4.2)	2 (1.9)	5 (2.8)	0.310*
Animal bites	5 (7.0)	10 (9.3)	15 (8.4)	0.409
Teeth avulsion	2 (2.8)	2 (1.9)	4 (2.2)	0.520*
Eye trauma	1 (1.4)	3 (2.8)	4 (2.2)	0.480*

\*Fisher's exact

**Table 4: Distribution of domestic accidents among under-fives and older children.**

Domestic injury	Age		Total (n=179) N (%)	<i>P</i> value
	< 5 (n=84) N (%)	≥ 5 (n=95) N (%)		
Burns	23 (27.4)	21 (22.1)	44 (24.6)	0.260
Head injury	12 (17.9)	22 (23.2)	37 (20.7)	0.246
Poisoning	18 (21.4)	6 (6.3)	24 (13.4)	<b>0.003</b>
Fractures	7 (8.3)	11 (11.6)	18 (10.1)	0.320
Lacerations	9 (10.7)	12 (12.6)	21 (11.7)	0.436
Dislocations	3 (3.6)	2 (2.1)	5 (2.8)	0.442
Animal bites	2 (2.4)	13 (13.7)	15 (8.4)	<b>0.005</b>
Teeth avulsion	3 (3.6)	1 (1.1)	4 (2.2)	0.266*
Eye trauma	1 (1.2)	3 (3.2)	4 (2.2)	0.358*

\*Fisher's exact

There was a progressive increase in the prevalence of animal bites, burns, head injuries and poisoning from 2017, peaking in 2019 and a marked decline in the prevalence of these injuries in 2020, figure 2.

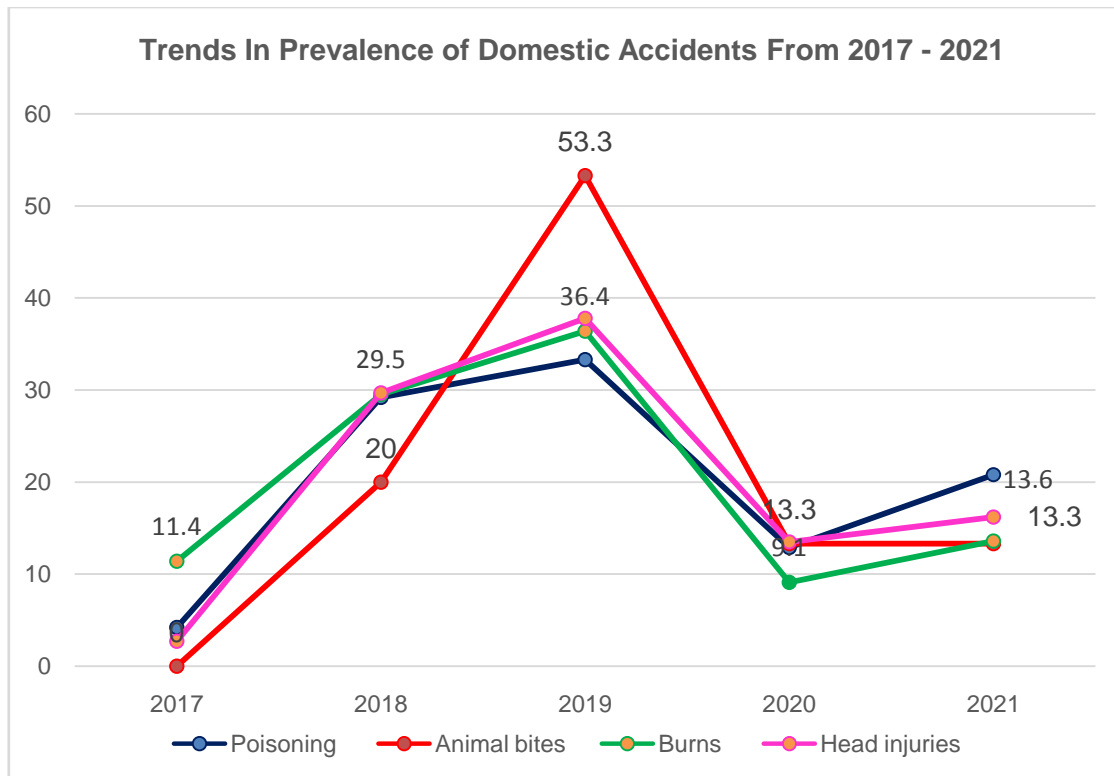


Figure 2: Trends in the prevalence of domestic injuries over a 5-year period

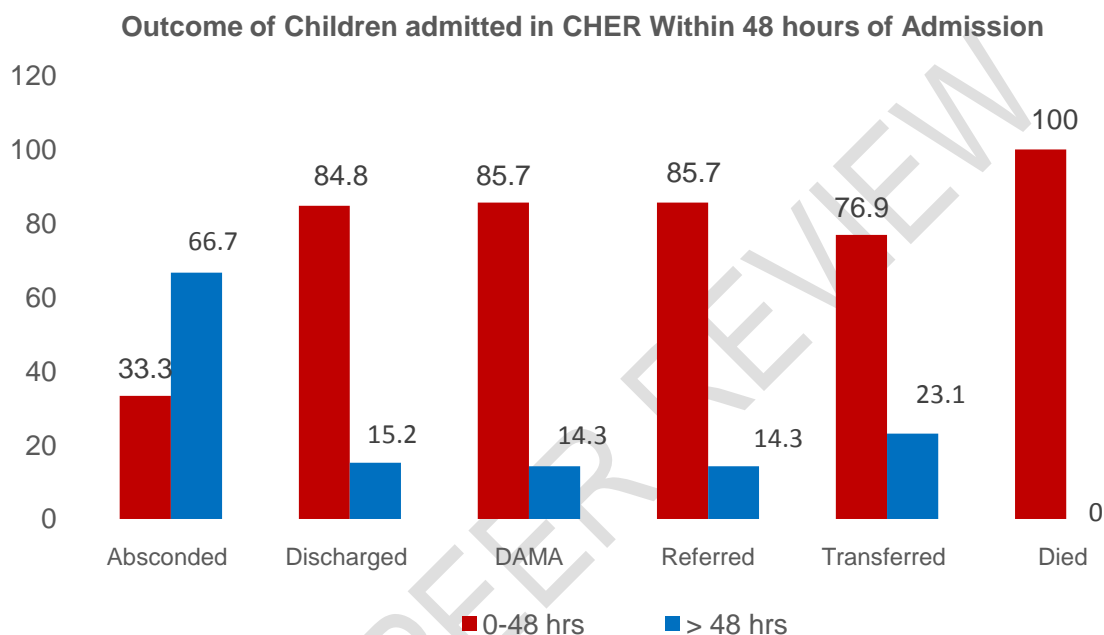
#### Outcome of domestic injuries in CHER

The duration of admission in the emergency room was from 0-11 days with a mean of  $1.27 \pm 1.90$  days. Of the 179 children with domestic injuries, 147 (82.1%) were admitted for 0-2 days, 29 (16.2%) for 3-7 days and 3 (1.7%) stayed for more than 7 days. Seventy-nine (44.1%) children were discharged from the emergency ward, and 28 (15.6%) referred out to other health facilities for further treatment. A total of 14 (7.8%) children, (2 females and 12 males) were discharged by caregivers against medical advice (DAMA), Fisher's exact = 0.036. Three children (1.7%) died in the CHER over the five years study period. All the mortalities were from burns injury and took place within 48 hours of admission into the emergency room, table 5 and figure 3.

Table 5: Sex distribution of outcome of domestic accident injuries in the study population.

Parameters	Sex		Frequency (%)	P value
	Female	Male		
<b>Duration of admission (Days)</b>				
0-2	56 (78.9)	91 (84.3)	147(82.1)	0.607*
3-7	14 (19.7)	15 (13.9)	29 16.2)	
> 7	1 (1.4)	2 (1.9)	3 (1.7)	
<b>Total</b>	<b>71(100)</b>	<b>108 (100)</b>	<b>179 (100)</b>	
<b>Outcome of admission</b>	<b>Female</b>	<b>Male</b>		

Discharged	33 (41.8)	46 (58.2)	79(44.1)	0.360
Transferred	24 (46.2)	28 (53.8)	52(29.1)	0.163
Referred	9 (32.1)	19 (67.9)	28(15.6)	0.252
DAMA	2 (14.3)	12 (85.7)	14(7.8)	0.036
Absconded	2 (66.7)	1 (33.3)	3 (1.7)	0.346
Died	1 (33.3)	2 (66.7)	3 (1.7)	0.654
<b>Total</b>	<b>71(100)</b>	<b>108 (100)</b>	<b>179 (100)</b>	



**Fig 3. Outcome of Children admitted in CHER within 48 hours of admission**

#### 4. DISCUSSION

The 4.48% prevalence of domestic accidents obtained in our study was low when compared to the prevalence of 13.7% reported in a multicenter emergency rooms study in Kano, Nigeria<sup>13</sup> and 9.2% in a similar hospital-based study carried out in Congo.<sup>12</sup> The differences in prevalence in these studies could be attributed to environmental and cultural differences in the locales where these studies were carried out. For example, the safety of residential buildings could be different. In addition, parenting skills and child care practices in protecting children against injuries at home are also different and play a role in the incidence and severity of domestic injuries.<sup>14,15</sup> Unfortunately, none of these studies addressed the risk factors for domestic injuries and their roles in the prevalence of domestic injuries.

Just as we found in our study, other studies in Nigeria,<sup>16,17</sup> Oman<sup>7</sup> and Benin Republic<sup>8</sup> also corroborated that almost half of all domestic accidents occurred among under five children. While it is imperative for young children to explore their environment as part of their developmental achievements, their inability to comprehend the risks of injury while exploring their environment, especially in the absence of proper parental supervision, puts them at greater risk of getting injured at home.

The commonest cause of domestic accidents in our study was falls, followed by burns, mechanical trauma and ingestion of poisonous substances. Similar to what we found in our study, Abdur-Raham et al<sup>17</sup> and Omuemu et al<sup>16</sup> in their studies also reported falls as the

commonest aetiology of domestic accidents in children. While Omuemu<sup>16</sup> reported burns as the second commonest cause of domestic accidents, laceration was the second commonest cause reported by Abdur-Raham et al<sup>17</sup> at Ilorin, Kwara State, Nigeria. However, in contrast to our findings, accidental ingestion of kerosene and other harmful substances was the commonest cause reported by Abubakar et al in Kano State, Nigeria<sup>13</sup> and Judiceal et al in Brazzaville.<sup>12</sup> The prevailing etiology of home accidents is subject to regional and seasonal variations because of differences in the home environments of children. Besides, children are prone to falls while playing especially in the presence of slippery floors and falls from heights when they are not supervised by competent caregivers. Buowari et al<sup>18</sup> in a case series of domestic accidents in an emergency room, found that most of the children that sustained injuries from falls were not supervised by caregivers. This finding was also reported by another study carried out in Benin Republic.<sup>8</sup>

This study revealed burns injuries as the commonest form of injury sustained from domestic accidents, followed by head injury and ingestion of harmful substances like caustic soda, kerosene among others. In contrast, in a study conducted in Oman,<sup>7</sup> superficial wounds and abrasions were the commonest injuries reported and kerosene poisoning in Kano State Nigeria.<sup>13</sup> It is interesting to note that while kerosene was accidentally ingested by children in the northern part of Nigeria, in our own study, it was a major contributor to burns injury especially among the female children as they were exposed to highly inflammable adulterated kerosene products while cooking.

In regards to overall gender distribution of injuries, we found that males were more involved than females. This pattern of injuries among males and female children have also been reported by other researchers in Africa<sup>4,8,12,13</sup> and other continents.<sup>3,7,15</sup> What is more interesting is the peculiarity of some home accidents among boys and girls. In our study, while girls were significantly more involved in burns injuries, probably, as a result of their participation in domestic chores like cooking, boys on the other hand, were more involved with accidental ingestion of poisonous substances and animal bites, probably as a result of lesser participation in cooking and kitchen chores making them free to explore other parts of their homes. This peculiarity in the distribution of specific injuries among boys and girls was also reported in a study carried out in north central Nigeria,<sup>17</sup> where burns was commoner among girls and falls among boys.

Younger children are known for their curiosity and avid interest in exploring their environment. Unfortunately, in the early years of life, they predominantly explore objects orally and with inadequate judgment of what is harmful or not, they are more prone to accidental poisoning than older children. It is therefore not surprising to find a significantly higher prevalence of poisoning among under five children in this study. Just like us, Manouchehrifar et al in Iran<sup>20</sup> and Vilaca et al in Brazil<sup>21</sup> also reported that accidental poisoning was commoner among under fives in their studies.

This study showed an increasing prevalence in burns, animal bites, accidental ingestion of harmful substances and head injuries from 2017 to 2019. However, in 2020, there was a marked decline in the prevalence of these domestic accidents which aligns with findings from other studies in Iran<sup>22</sup>, and New Zealand<sup>23</sup>. Although this study being a retrospective study didn't explore the reason for this observation, it could be attributed to the global lock down for Covid-19. During this period, hospital visits were minimized as patients assessed hospital care only when it was absolutely necessary.<sup>24,25</sup> Perhaps also, the fact that parents and caregivers were locked down with children at home could have resulted in better supervision of their children during this period. In contrast, however, Ferro et al in their study in Italy,<sup>10</sup> found an increase in the incidence of domestic accidents among children during the covid-19 lock down period in 2020 when compared to the same period in 2019.

The outcome of domestic accidents is dependent on the severity of the injury, the timeliness of presenting to the hospital, availability of funds, competent medical staff and equipment among others. The mortality in this study was low as three children (1.7%) died and it compares with the 1.53% mortality reported in Congo,<sup>12</sup> but is much higher than the 0.1%

recorded in Oman.<sup>7</sup> All the deaths were recorded among children with burns injury in our study while 2 children with burns and one child that drowned died in the Congo study.<sup>12</sup> As reported in Congo study,<sup>12</sup> our study also showed that all mortalities took place within 48 hours of admission. Our study therefore highlights the need for prompt resuscitation, evaluation and treatment of patients when they present to the emergency room because of domestic accidents. We have seen that majority of decisions that affect patient outcome such as discharges from the emergency room, referrals to other health facilities, transfer to the wards and signing the form to leave the hospital against medical advice took place within the first 48 hours of admission. Early intervention as soon as the patient arrives in the emergency room is key in preventing these avoidable childhood mortalities. A limitation to this retrospective study was its inability to evaluate children that had residual disabilities because of the injuries sustained from these accidents at home. However, a longitudinal study in the future would be appropriate to evaluate the long-term effects of domestic accidents on the quality of life of the children after the incident.

## **5. CONCLUSION**

This study shows that the prevalence of domestic accidents among children seen in our emergency department was low (4.48%) but more prevalent among the under five children. Fall was the commonest etiology of domestic injury, while burns injury which was more prevalent among girls, was the commonest domestic accident in our centre. Our study also highlighted the decline in hospital visits due to domestic accidents in 2020, during the Covid 19 lockdown year. The mortality in this study was low and all occurred within the first 48 hours of admission into the emergency room. This study highlights the need for parents and caregivers to address adequate supervision of their children while at home

## **CONSENT**

This was a retrospective study using medical records and patient consent is not applicable

## **ETHICAL APPROVAL**

Ethical approval for this study was obtained from the Ethical Review Committee Rivers State Hospital management board

## **LIMITATIONS OF STUDY**

The fact that this was a retrospective study was a limitation to this study. We were unable to explore the risk factors that could have contributed to the prevalence of domestic accidents among children admitted in our centre. A cross sectional study carried out in the future will be able to identify these risk factors

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