



Febrile Convulsions among Children Admitted in University of Port Harcourt Teaching Hospital, Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors designed the study. Author NGJ performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study and managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Febrile convulsion is defined as seizures occurring in children with fever in the absence of any brain pathology. It is usually a frightening experience for the caregivers and parents who in the bid to stop the seizure can apply harmful substances on the child before presenting to the hospital. This study seeks to determine the prevalence and pattern of febrile convulsion in the University of Port Harcourt Teaching Hospital.

Patients and Methods: Retrospective study of children admitted to the paediatrics emergency ward from October 2017 to October 2019 was carried out. Patient's records were used to retrieve relevant information. Descriptive analysis was done, test of significance was by chi square and a p value of ≤ 0.05 was significant.

Results: 2463 children were admitted within the period, 165(6.7%) of them had febrile convulsion. ($\chi^2=1.88$, $p= 0.17$). The ages ranged from 6 months – 60 months with a mean age of 24.08 ± 15.07 months. The median age at onset was 20.06 ± 14.02 months. About 69.0% of the cases occurred within the ages of 12-36 months. A total of 156(94.6%) of the children with febrile convulsions had

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simple febrile convulsions while 9(5.4%) had complex febrile convulsion. One hundred and twenty two (73.9%) had a family history of febrile convulsion, of which 74(60.7%) were males and 48(39.3%) were females ($\chi^2=7.01$, $p=0.008$). The causes of febrile convulsion were malaria (56.4%) and URTI (30.9%). In 119(72.1%) of the cases harmful substances were administered at home before presenting to the hospital.

Conclusion: Febrile convulsion is common in children. Over half of the cases were due to Malaria; the use of multiple harmful substances during convulsive episodes is common. Malaria control and health education may reduce the prevalence and morbidity in children.

Keywords: Fever; convulsion; pattern; children; substances.

1. INTRODUCTION

Febrile convulsion (Febrile seizure) is defined as a seizure that affects children within the ages of 6 months to 60 months, in which intracranial infection has been ruled out and in the absence of metabolic abnormalities and previous history of epilepsy [1,2]. It is a common occurrence in childhood as it has been estimated that 3-4% of children under the age six years are affected [3]. It is also common indication for admission into the paediatric emergency ward [4,5].

Prevalence has been reported as 4–6 cases/1000 children in the population [6]. Though very common in childhood, it is still a cause of fear and anxiety for parents or care-givers. In most cases no sequelae occurs and the risk of developing epilepsy later in life is low (one percent) [6].

Febrile seizure can be classified as simple or complex febrile seizures, this depend on the duration of the seizure, the number of seizure episodes the child has in a day [7,8]. In 25 -40% of cases of febrile convulsion, there is a family history and about 30% of children with febrile convulsion have recurrence. The factors that have been linked to high recurrence rates includes: the age at onset, family history and seizure type. Thus having the first episode of febrile seizure before 12 months of age, complex febrile seizure and a positive family history of febrile seizure are risk factors for a higher rate of recurrence [9,10].

It has been reported that malaria is a cause of febrile seizures in 15-57% of cases in Nigeria, other causes includes upper respiratory tract infection (URTI), sepsis, pneumonia, viral infection [11]. The peak age of onset for febrile seizure is between 18-22 months [11].

Febrile seizure is usually a frightening experience for the caregivers and parents; however, the anxiety coupled with ignorance and harmful traditional practices employed to stop the seizure has led to poor home management of febrile seizures and worsening of the child's condition. In an attempt to stop the seizure several concoctions can be administered to the child [11,12]. Common substances used at home in the bid to stop a convulsive episode among Nigerian parents includes instilling crude oil, onions juice, herbs, kernel oil and kerosene into the mouth, anus and eyes of the children as well as giving them cow urine to drink. Also two or more of these substances can be used at the same time [11,13,14].

Jarrett, et al. [11] had reported in their study in Ibadan South West, Nigeria that 40.1% of children who had febrile seizure had received home treatment before presenting to the hospital. These home treatments includes herbal concoction in 10%, applying harmful substances to the eyes in 6%, scarification of the body in 2% and burning of parts of the body especially the feet in 1.4%. Similarly, in another study in Cross Rivers State, 28.6% of children with convulsion were treated with herbal concoction [13].

In Rivers State South South Nigeria, the use of crude oil as a remedy for febrile convulsion is common [14,15] and crude oil has been reported to cause injuries to several organs. Despite the harmful effect of crude oil and other traditional remedies used in the treatment of febrile convulsion in children, care givers still utilize them as emergency treatment options before presenting in the hospital.

This study is aimed to determine the prevalence and pattern of febrile convulsion and home treatment given before presenting in the hospital among children admitted to the children emergency ward (CHEW) of university of Port Harcourt teaching hospital (UPTH).

2. PATIENTS AND METHODS

Setting: This retrospective study was carried out in the children emergency ward (CHEW) of the UPTH over a 4 month period in which records of children admitted for febrile convulsion from October 2017 to October 2019 were reviewed. All children who presented with emergency conditions (except accident and burns cases) were first evaluated and admitted into the CHEW of the hospital.

Study design: A cross sectional retrospective descriptive study spanning over two year period.

Subjects: Children aged 6 months to 60 months admitted into CHEW for febrile convulsion within this period.

Methods: Most patients are first admitted into the CHEW before they are transferred to the various wards. The records for admission and discharge in the CHEW were reviewed; the total number of children admitted within the period under review into the children emergency ward was obtained. The total number of children with a diagnosis of febrile convulsion on discharge was obtained. Their case notes were used to obtain the necessary information for this study. The information obtained includes their socio-demographic profiles, symptoms at presentation, frequency and duration of the seizures, family history of febrile convulsion, and the investigations that were carried out while on admission as well as treatment given at home before presentation. This information was entered into a data entry form. The diagnosis of febrile convulsion was based on the following criteria; children aged 6-60 months of age who had fever and convulsions after excluding central nervous system infections and abnormalities, hypoglycaemia, childhood epilepsy and electrolyte imbalance, as well as head injuries.

Data analysis: Statistical package for social science version 25 was used for analysis. A descriptive statistics was carried out. Results

were presented on tables as frequencies and percentages. Continuous data were presented as mean and standard deviation, Chi-square test was used to compare categorical data, a confidence interval set at 95% and a p- value of ≤ 0.05 was considered significant.

3. RESULTS

A total of 2463 patients admitted into CHEW within the time, 165(6.7%) of them had febrile convulsions. More females 75/995 (7.5%) compared to the males 90/1468(6.1%) had febrile convulsions. This was not statistically significant $p=0.17$ (Table 1).

The ages of the patients with febrile convulsion ranged from 6 months to 60 months with a mean age of 24.08 ± 15.07 months.

More than half of them 113(68.5%) were within the age range of 12-36 months, 32(19.4%) of them were less than 12months, while 20(12.1%) were between 48-60 months. The median age at onset of febrile convulsion is 20.06 ± 14.02 months. Majority (68.5%) of them has had a previous episode of febrile convulsion. Malaria was the cause in 56.4% of cases while respiratory tract infections accounted for 30.9% of cases (Table 2).

A total of 156(94.6%) of the children with febrile convulsions had simple febrile convulsions while 9(5.4%) had complex febrile convulsion. There was no statistical gender differences in the various types of febrile convulsions p - value = 0.19 (Table 3).

Positive family history of febrile convulsion was reported in 122(73.9%) of cases while among 43(26.1%) patients there was no positive family history. More males (82.2%) had a positive family history compared to the females (64.0%). This was statistically significant p -value = 0.008, OR = 2.60, 95% CI = 1.27-5.34 (Table 4).

Table 1. Prevalence of febrile convulsions

Sex	Febrile convulsions		Total
	Yes (%)	No (%)	
Males	90(6.1)	1378(93.9)	1468(100.0)
Females	75(7.5)	920(92.5)	995(100.0)
Total	165(6.7)	2298(93.3)	2463(100.0)

$$\chi^2 1.88, p=0.17, DF=1$$

Table 2. Ages of participants, previous history of febrile convulsion and causes of febrile convulsion

Variable	Frequency	Percentages
Ages (months)		
< 12	32	19.4
12-36	113	68.5
48-72	20	12.1
Median age at onset 20.06±14.02 months		
Previous history of febrile convulsion		
Yes	104	63.0
No	61	37.0
Causes of febrile convulsion		
Malaria	93	56.4
Tonsillitis	36	21.8
Pharyngitis	15	9.1
Measles infection	1	0.6
Post immunization	2	1.2
Bronchiolitis	18	10.9
Total	165	100.0

Table 3. Relationship between sex and the types of febrile convulsions

Variables	Seizure type		Total
	Simple	Complex	
Males	87(96.7)	3 (33.3)	90(100.0%)
Females	69(92.0)	6 (8.0)	75 (100.0%)
Total	156(94.6)	9 (5.4)	165 (100.0%)

$\chi^2 = 1.71, p \text{ value} = 0.19$

Table 4. Febrile convulsion and family history

Sex	Positive family history		Total
	Yes	No	
Males	74(82.2%)	16(17.8%)	90(100.0%)
Females	48(64.0%)	27 (36.0%)	75(100.0%)
Total	122(73.9%)	43(26.1%)	165(100.0%)

$\chi^2 = 7.01, p = 0.008$

Table 5. Proportion of children treated at home before presentation

Sex	Use of home remedies before presentation		Total
	Yes (N%)	No (N%)	
Males	62 (68.9%)	28(31.1%)	90(100.0%)
Females	57 (76.0%)	18(24.0%)	75 (100.0%)
Total	119 (72.1%)	46(27.9%)	165 (100.0%)

$\chi^2 = 1.02, p = 0.31$

Majority (72.1%) of the children received home treatment before presenting to the hospital (Table 5) The home treatment includes applying crude oil (78.9%) to the eyes, anus and the skin, instilling onion juice(63.0%), herbs(10.2%) into the orifices and the eyes. Other substances used include kernel oil (42.8%) and olive oil (9.0%). Scarification marks (2.9%) were also done in

order to stop the seizure. (Multiple responses were recorded).

4. DISCUSSION

Febrile convulsion is a common childhood neurologic condition, with varied prevalence rates [9]. The prevalence in this present study is

6.7%, this finding is similar to the report in South Eastern Nigeria by Onyearugha, et al. [16] but higher than the finding in another part of Nigeria that reported a prevalence of 2.7% among hospitalized patients [9] the higher prevalence rate recorded in this study could be due to the high prevalence of malaria and probably the poor home management of fever by the care givers.

Though more females (7.5%) compared to the males (6.1%) had febrile convulsions. This finding was however not statistically significant. This finding is at variance with other studies [9, 17,18,19] that had reported more male preponderance to febrile seizures. This difference with other studies may probably be that more female children are now brought to the health facilities for treatment whenever they are sick, hence the higher prevalence found among them.

From the finding of this study children aged 12 months to 36 months constitutes about 68.5% of the cases of febrile seizures this is similar to the report by Esegbe, et al. [9] and Onyearugha, et al. [16]. Also the median age of onset of febrile convulsion among the study participant is 20.06 ± 14.02 months this observation is consistent with previous reports [8,16]. It has been reported that children under 36 months of age have a low threshold for febrile convulsion. [16] This is as a result of rapid maturation occurring in the brain of children at this young age which has the tendency to heighten the excitability of the neurons which may predispose them to convulsive episodes when they have fever, this excitability however reduces with increasing age [16,20].

Malaria has been reported as one of the commonest cause of febrile convulsion in sub-Saharan Africa where malaria infection has remained endemic [21,22]. The finding that malaria accounted for more than 50% of the causes of febrile seizure reflects the endemicity of malaria in this region, a finding that is similar to what was reported in South-Eastern Nigeria. [16] both studies were carried out in southern Nigeria with similar geographic characteristic and probably share the same burden of malaria.

Study has shown that the recurrence rate of febrile convulsion is high especially if the first episode occurred at a much younger age of less than 12 months, if the child has a complex febrile seizure, if seizures occurs at a lower temperature

of less than 40°C and if there is a positive family history of febrile convulsion [9,10,23].

The finding of this study showed a high recurrence rate of febrile convulsion as more than 60.0% of the participants had reported to have had more than one episodes a finding that is in agreement with earlier reports [10,23]. Probably due to the age at onset reported in this study, and the positive family history found in over 70.0% of the patients may have accounted for the high recurrence rate reported in this study.

The finding that majority (95.0%) of the patient had simple febrile seizure and that 73.9% of the patients had a positive family history of febrile convulsion is in concurrence with other findings [9,10,23]. This therefore supports the genetic basis of febrile convulsion [24] and the need for proper counselling of parents who have a family history of febrile convulsion on the management of febrile episodes at home with antipyretic before presenting to the hospital.

There was a significant gender difference in the prevalence of febrile convulsion among those with positive family history, as males with febrile convulsions were 2.6 times more likely to have a positive family history compared to the females (OR 2.60, 95% CI 1.27-5.34), this may probably be why febrile convulsion is more common among males from previous studies [9,17,18,19].

Majority (72.1%) of the children received unorthodox home treatment before presenting to the hospital in this study. A finding which is though worrisome but similar to finding from other studies [9,11,15]. The substances used in this present study includes crude oil, onion juice and herbs etc which is similar to what was used in other studies [9,11,15]. This similarity could be due to the related cultural practices that are observed in Nigeria. Crude oil was very common in this study probably due to easy access to the substance as Rivers State is an oil producing state [11,15] The acceptance of crude oil to treat febrile convulsions could be ascribed to the belief that seizures are due to evil spirit and witchcraft. Study had reported that some women believed that crude oil can chase away evil spirit [11]. Crude oil can lead to lot of complications when applied to the skin, eyes, or given to a child to drink [14,15,25]. This necessitates adequate health education on the side effect of these harmful substances used in convulsions.

5. CONCLUSION

Febrile convulsion is common in children. Over half of the cases were due to Malaria; the use of harmful substances in an attempt to stop convulsive episodes is common in Port-Harcourt. Malaria control and health education may reduce the prevalence and morbidity of febrile convulsion in children.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval was from the Ethics Committee of the University of Port-Harcourt Teaching Hospital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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