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Febrile Convulsions in Jos

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Summary

Angyo IA, Lawson JO, Okpeh ES. Febrile Convulsions in Jos. *Nigerian Journal of Paediatrics 1997; 24 : 7.* A retrospective study of 163 cases of febrile convulsions which was undertaken in order to determine the pattern and outcome among children admitted into the emergency paediatric unit (EPU), Jos University Teaching Hospital (JUTH), over a two-year period, revealed that the condition accounted for 8.05 percent of all admissions during the study period. The mean age of the patients was 2.5 $\pm$ 1.3 years with the majority of 78.5 percent being aged three years and below. The male to female ratio was 2:1. A single episode of convulsion occurred in 47.9 percent of the patients; a past history of the condition was obtained from 37.4 percent of the subjects and of these, the convulsion occurred in 67 percent within the previous 12 months. The fist attack of convulsion occurred before the age of three years in 83 percent of the subjects and those with an onset of attack during infancy were more likely ($P<0.01$) to have recurrences than those with later onset. Malaria fever was the commonest underlying cause of convulsion, accounting for 74.8 percent of all the causes. Mortality in the series was 1.8 percent and this was associated with the administration of traditional concoctions, prolonged seizures and hypoglycaemia.

Introduction

FEBRILE convulsion is the commonest neurologic disorder in childhood and also one of the commonest paediatric emergencies. [1-3]

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Although the prevalence of the condition in Nigeria and indeed elsewhere in Africa, is not exactly known, the disorder appears to be more common in the tropics than in the technically developed countries. Familusi and Sinnette in 1971, reported an incidence of 15.1 percent from Ibadan, [4] while an incidence of 2.5 percent was later reported from the United States. [5] Malaria fever has been reported as the commonest aetiological cause of febrile convulsions in Nigeria, accounting for between 50 and 75 percent of cases, [1467] while viral

agents appear to be the predominant causes in developed countries.[3 5] Although febrile convulsions generally have a favourable outcome in most developed countries,[3 5] certain adverse factors contribute to less favourable outcome in the tropics.[1 8] For instance, contribution to poor outcome due to administration to patients of some traditional concoctions has been highlighted in previous studies from the tropical rain forest region of western Nigeria.[1 4 6-8]

Jos University Teaching Hospital (JUTH), a 500-bed tertiary health institution in the savannah middle belt region of Nigeria, caters for a heterogenous population mainly from Plateau State and other surrounding States. The pattern of febrile convulsions in this geographical environment has not, to our knowledge, been previously documented. The present retrospective study was therefore, designed to assess the pattern and outcome of febrile convulsions in children in Jos and its environs and compare the findings with those reported elsewhere.

Subjects and Methods

All the children admitted into the EPU at JUTH over a two-year period (January 1994 to December 1995), with a diagnosis of febrile convulsions, were studied. Febrile convulsion, as generally defined, is convulsion associated with fever and occurring in children between the ages of six months and six years, in the absence of any central nervous system (CNS) infection, or pre-existing neurological abnormality.[5] Similarly, a simple febrile convulsion is defined as convulsion which is generalized and lasting for less than 15-30 minutes and occurring only once during the illness, while a complex febrile convulsion is one that is associated with one or more of the following features: focal, lasting for 30 minutes or longer and occurring more than once during the precipitating febrile illness.[9]

The medical records of all those who fulfilled the above defined criteria were reviewed and relevant data that were extracted included age, sex, date of admission, duration of symptoms, previous history of febrile convulsion with dates, family history of febrile convulsions, type and duration of convulsions, treatment received at home, including history of ingestion and/or application of any traditional concoctions. The physical findings on admission and at discharge, the results of investigations carried out to determine the underlying cause(s) of the convulsion, the duration of hospitalization and the outcome of the illness were recorded. For statistical analysis, the means and ranges of the variables were calculated as appropriate, while the student's "t" and chi-square tests were used to assess the differences between the means and proportions respectively.

Results

One hundred and sixty three (8.1 percent) of the 2,024 patients admitted into the EPU during the two-year study period fulfilled the criteria for the diagnosis of febrile convulsion. Fig. 1 shows the age and sex distribution of the patients. One hundred and nine were males and fifty-four were females (M:F 2:1). The ages of the children ranged from six months to six years (2.5 ± 1.3 years); 94 (57.7 percent) of the 163 patients were aged two years and below, while 128 (78.5 percent) were aged three years and below.

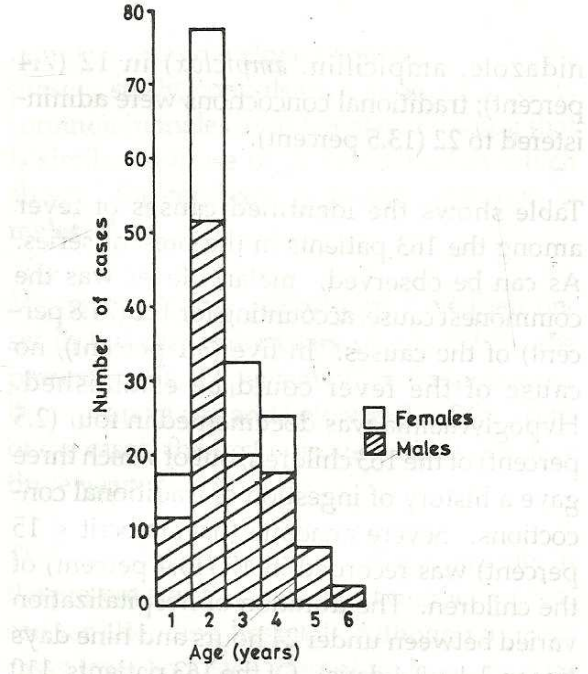

Fig 1 Age and sex distribution in 163 children with febrile convulsion.

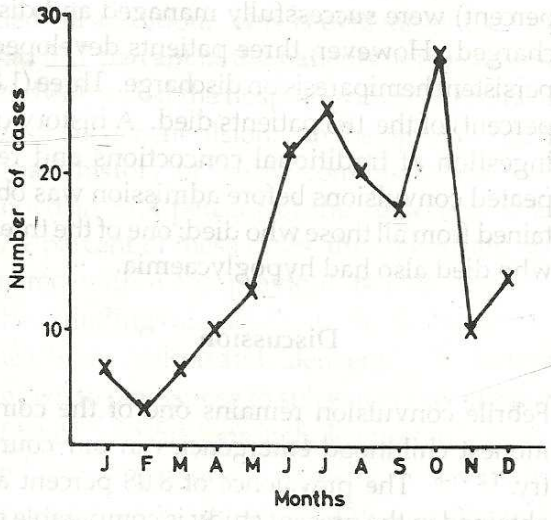

Fig 2 Monthly distribution of admissions due to febrile convulsion

Fig. 2 shows the monthly admissions. It is evident that 127 (77.9 percent) of the 163 cases were admitted between the months of April and October, the rainy period in the Jos environment.

The interval between the onset of convulsion and presentation to hospital varied between 20 minutes and three days (mean 1.17 ± 0.6 days). Of the 163 patients, 143 (87.7 percent) presented within 24 hours of the onset of convulsion that was generalized with tonic-clonic seizures in 151 (92.6 percent) and focal in 12 (7.4 percent) of the cases. The duration of convulsion ranged from a few seconds to about one hour (mean 11.5 ± 9.2 minutes). Out of the 163 subjects, 78 (47.9 percent) had a single episode of convulsion, 51 (31.3 percent) had two, while 15 (9.2 percent) had three and 19 (11.6 percent) had more than three episodes respectively, during the precipitating febrile illness. History of convulsion in the past was obtained from 61 (37.4 percent) of the 163 patients and in 41 (67.2 percent) of these, the convulsion had occurred within the previous twelve months. In 17 (10.4 percent) of the 163 subjects, the first episode of convulsion occurred between one year of age and in 119 (73.0 percent), it occurred below one year and three years, while in the remaining 27 (16.6 percent), the first episode occurred between three and six years of age. Thus, 136 (83.4 percent) of the patients had the first episode of convulsion before the age of three years. Ten (58.8 percent) of the 17 infants with first episode of convulsion, had a subsequent attack, while 30 (25.2 percent) and six (22 percent) of those who had their first episode in the age group between one year and two years and between three and six years respectively, had subsequent attacks of convulsion. Patients who experienced their

first episode of convulsion during infancy therefore, had a higher risk of recurrence than those who had their first convulsion later in life ($P<0.01$). Of the 163 patients, there was a positive family history of febrile convulsion in 34 (20.9 percent).

The duration of fever before presentation to the hospital varied between four hours and three weeks (mean 3.2 ± 4.0 days). The temperature on admission, ranged between 36.0°C and 40°C (mean 38.5 ± 1.0°C). There was no association between the degree of fever and the number or duration of convulsions ($P>0.05$). Some form of treatment, including drugs and traditional concoctions were administered to 110 (67.5 percent) of the 163 patients before they were brought to the hospital. The drugs that were administered included antipyretics in 54 (33.1 percent), antimalarials in 36 (22.1 percent), antiemetics in 29 (17.8 percent), antimicrobial syrups (commonly co-trimoxazole, metronidazole, ampicillin, *ampiclox*) in 12 (7.4 percent); traditional concoctions were administered to 22 (13.5 percent).

Table

Identified Causes of Fever in 163 Patients with Febrile Convulsions

Cause of Fever	*No of Cases*	*Percent of total*
Malaria infection	122	74.8
Pneumonia	13	8.0
Otitis media	7	4.3
Septicaemia	6	3.7
Measles	4	2.5
Urinary tract infection	3	1.8
Pharyngotonsillitis	3	1.8
Unknown	5	3.1
Total	163	100.0

Table shows the identified causes of fever among the 163 patients in the present series. As can be observed, malaria fever was the commonest cause, accounting for 122 (74.8 percent) of the causes. In five (3.1 percent), no cause of the fever could be established. Hypoglycaemia was documented in four (2.5 percent) of the 163 children, out of which three gave a history of ingestion of traditional concoctions. Severe anaemia (haematocrit $\leq$ 15 percent) was recorded in 17 (10.4 percent) of the children. The duration of hospitalization varied between under 24 hours and nine days (mean 3.4 ± 2.4 days). Of the 163 patients, 110 (67.5 percent) were discharged within 72 hours of admission, while 21 (12.9 percent) stayed for seven days or longer. In general, patients with convulsion secondary to malaria fever were discharged earlier than those with other causative factors. Of the 163 patients, 160 (98.2 percent) were successfully managed and discharged. However, three patients developed persistent hemiparesis on discharge. Three (1.8 percent) of the 163 patients died. A history of ingestion of traditional concoctions and repeated convulsions before admission was obtained from all those who died; one of the three who died also had hypoglycaemia.

Discussion

Febrile convulsion remains one of the commonest childhood emergencies in our country.[1,2,4,6-8] The prevalence of 8.08 percent as obtained in the present study is comparable to previous prevalence rates reported from other parts of the country,[6,7] but higher than those

reported from developed countries. [3 5] In the present study, convulsion was about twice as common in males as in females, a finding that is similar to those of previous studies which showed the condition to be more common in males. [4 5]

Majority of febrile convulsions have their onset in the first three years of life. [3-5 8] In the present study, 79 percent of the patients were three years of age and below and in 84 percent of the cases, the first episode had occurred by three years of age.

The onset of convulsions in all the patients in the present study was the most compelling reason for attending hospital. Although in most cases fever had been present for sometime before the onset of convulsions, the fever on its own, was not considered sufficient reason to seek medical attention. The onset of convulsions, however brief, is a dreadful and frightening experience to most mothers [10] and its occurrence usually results in seeking prompt medical attention. This is evident by the fact that 87.7 percent of the patients in the present study attended the hospital within 24 hours of the onset of convulsions. In the present study, a past history of febrile convulsion was obtained in 37.4 percent of the subjects and in 67.2 percent of these cases, the convulsion occurred within the previous twelve months. These findings are similar to those reported in the USA by Nelson and Ellenberg.[11] The factors known to predispose to subsequent recurrence of febrile convulsions include onset in infancy and focal or prolonged seizures. [3 9 10 12] In the present study, the factor most commonly associated with this risk of recurrence, was onset in infancy.

Malaria infection, accounting for 74.8 percent in the present study, was the leading causative factor of febrile convulsion, which is in keeping with the findings in most studies from our country. [1 2 4 6-8] Reports from developing countries, however, have shown that viruses are the leading causes of febrile convulsions among their childhood populations; Lewis *et al*, [13] had reported that viral infections occurred in 87.0 percent of patients admitted to hospital for a first febrile seizure. Although viruses may play a role in febrile seizure in technically developing countries, including ours, their significance has not been clearly defined as most centres do not routinely perform viral studies. Familusi and Sinnette [4] in Ibadan, isolated viruses in only 2.4 percent of their subjects with febrile seizures who had viral studies performed. It is known that children in the age group, six months to six years are particularly susceptible to infections and infectious diseases and in our environment where malaria is holoendemic, this is also the age group most susceptible to malaria infections. The fact that the prevalence of convulsions was higher during the rainy than the dry season, thus coinciding with the peak mosquito breeding activity in our environment, would further lend support to the important role of malaria infection as the major cause of convulsions. Traditional concoctions were administered in 13.5 percent of the patients with convulsions. In the present study, administration of traditional concoction was associated with a higher incidence of prolonged and repeated seizures, hypoglycaemia and death. The mortality of 1.8 percent in the present study is comparable to that reported from Sagamu [6] and Ilorin, [7] but much lower than the earlier reports by Familusi and Sinnette [4] and Osuntokun [8] from Ibadan. Febrile convulsion is generally con-

sidered benign with a favourable outcome elsewhere,[3,5] but in our environment, certain adverse factors combine to bring about poor outcome. The administration of traditional concoctions to convulsing children is a common practice which has been recognised as being associated with poor outcome, and must therefore be vigorously discouraged through health education.

Although the use of prophylactic phenobarbitone and sodium valproate in febrile convulsions in patients with poor prognostic factors has been advocated,[5,9-10] a rational preventive approach, where over three quarters of the cases are due to malaria infection, would be malaria control. Efforts towards malaria control, including effective control of mosquito breeding, use of impregnated mosquito nets, and insecticides, should all be vigorously pursued. Health education of mothers to expose and tepidsponge the febrile child should also be undertaken and encouraged. Although the use of antimalarial prophylaxis in our environment as well as the role of prophylactic phenobarbitone in febrile convulsions in general, remain controversial, these options must be considered in selected patients with poor prognostic factors. It should however, be remembered that prophylactic phenobarbitone therapy in febrile convulsions has been associated with unacceptable side effects, including a deleterious effect on intellectual development with prolonged administration.[3,14] Availability and use of malaria vaccine may, in future, offer a more effective control of malaria infection and thereby reduce the high prevalence of febrile convulsions.

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References

1 Osuntokun BO. Neurology of malaria. *Postgrad Doctor (Africa)* 1983; **5:** 420-6.

2 Ighogboja IS, Angyo I, Okolo AA, Szlachetka R. Morbidity and mortality patterns of paediatric emergencies in Jos, Nigeria. *Nig Med Pract* 1995; 30: 15-8.

3 Gilberg C. Epilepsy and other seizure disorders. In: J Aicardi J, ed. Disease of the Nervous System in Childhood. MacKeith Press (Publishers), 1992: 958-61.

4 Familusi JB, Sinnette CH. Febrile convulsions in Ibadan children. *Afr J Med Sci* 1971; **2:** 135-49.

5 Hirtz DG, Nelson KB. The natural history of febrile seizures. *Ann Rev Med* 1983: **34:** 453-71.

6 Olowu AA, Olanrewaju DM. Pattern of febrile convulsions in hospitalized children. *Nig J Paediatr* 1992; **19**: 1-5.

7 Fagbule D, Chike-Obi UD, Akintunde EA. Febrile convulsions in Ilorin. *Nig J Paediatr* 1991; **18**: 23-7.

8 Osuntokun BO, Odeku EL, Sinnette CH. Convulsive disorders in Nigerians: the febrile convulsions (an evaluation of 155 patients). *E Afr Med J* 1969; **46**: 385-94.

9 Fishman MA. Febrile seizures: the treatment controversy. *J Pediatr* 1979; **94**: 177-84.

10 Freeman JM. Febrile seizures: a consensus of their significance, evaluation, and treatment. *Pediatrics* 1980; **66**: 1009-12.

11 Nelson KB, Ellenberg JH. Prognosis in children with febrile seizures. *Pediatrics* 1978; **61**: 720-7.

12 Berg AT, Shinnar S, Hauser A, Leventhal JM. Predictors of recurrent febrile seizures: a metaanalytic review. *J Pediatr* 1990; **116**: 329-37.

13 Lewis HM, Parry JV, Parry RP, Davies HA, Sanderson PJ, Tyrell DAJ, Valman HB. Role of viruses in febrile convulsions. *Arch Dis Child* 1979; **54**: 869-76.

14 Smith JA, Wallace SJ. Febrile convulsions: intellectual progress in relation to anticonvulsant therapy and to recurrence of fits. *Arch Dis Child* 1982; **57**: 104-7.