

Febrile seizures in Kaduna, north western Nigeria

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ABSTRACT

Background: Febrile seizure is the most common seizure of childhood and has a good prognosis. However its presentation is fraught with poor management, with grave consequences, in our environment. Thus a review of its current status is important. **Objective:** To review the status of febrile seizures in Kaduna metropolis. **Materials and Methods:** A review of cases seen in the Department of Paediatrics, 44 Nigeria Army Reference Hospital, Kaduna between June 2008 and June 2010. **Results:** Out of the 635 cases admitted in the department 17 (2.7%) fulfilled the criteria for febrile seizures. There were 11 Males and 6 Females (M: F, 1.8:1). Age range was from 9 months to 5 years with a mean of 2.2 years \pm 1.1 and peak age of 3 years. Twelve (70.6%) were in the upper social classes (I-III). Fever, convulsion, catarrh and cough were major presenting symptoms. Incidence of convulsion was least on the 1st day of complaint. Fourteen (82.4%) of the cases were simple febrile seizures while 3 were complex. There was a positive family history in 5 (29.4%) of the cases. Eleven (64.7%) had orthodox medication at home, before presentation, 5 (29.4%) consulted patient medicine sellers and 7 (41.7%) received traditional medication as part of home management. Malaria and acute respiratory infections were the identifiable causes. Standard anti-malaria and anti-biotic therapy were instituted, where indicated. All recovered and were discharged. **Conclusion:** There was a low prevalence of febrile seizures among the hospitalized children and a poor pre-hospitalization management of cases. It highlighted the need for improved community awareness on the prevention and management of febrile seizures.

Key words: Fever, seizures, children, Kaduna

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INTRODUCTION

Febrile seizure is the most common seizure disorder in childhood.^{1,2} Its cumulative incidence is approximately 3%, but it is quite varied in Nigeria with values ranging from 10-18%.¹⁻⁷ The International league against epilepsy (ILAE) defines febrile seizure as a seizure occurring in childhood after one month of age, associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or a previous unprovoked seizure, and not meeting criteria for other acute symptomatic seizures.⁸ It is often characterized by a generalized tonic-clonic convulsion lasting less than 15 min, fever of non-central nervous system infection with full regaining of consciousness after the convulsion and occurring commonly in children between 3 months and 5 years.^{1,2}

There are two types of febrile seizures: the simple and complex types.^{1,3,8} The simple type is characterized by an episode of generalized tonic-clonic seizure lasting less than 15 min in 24 h while in the complex type the convulsions are multiple, lasting more than 15 min and associated with focal findings after the ictal period. While the majority of febrile seizures are simple (70-75%), 9-35% of them are complex.^{3,8}

A positive family history for febrile seizures can be elicited in 25-40% of patients with febrile seizures.⁸ Studies also show a high concordance rate in monozygotic rather in dizygotic twins.⁸ The febrile seizure gene has been mapped to chromosome 19p and 8q13-21.¹ In addition to the positive history in a first or second degree relative, occurrence of febrile seizure has been associated with: human herpes virus-6 infection,⁹ influenza viral infection¹⁰ and iron deficiency anaemia.¹¹ The overall recurrence rate is 30%.^{3,8} Predictors of recurrence include: complex seizures, positive family history, onset at less than 12 months and temperature $<40^{\circ}$ C.^{1,3,8}

Management is achieved through controlling fever by tepid sponging or giving antipyretics, aborting ongoing convulsion with an anticonvulsant and treatment of the underlying cause of fever. Prognosis is usually good even

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though a low proportion (2-4%) go on to develop epilepsy.¹² However, mortality can arise from poor or unorthodox management.⁷

Kaduna is in Northwestern Nigeria a region with high under-five mortality rate in the country and, where care givers have demonstrated inappropriate management of febrile illnesses in children.¹³⁻¹⁵

The aim of the study was to review the current status of febrile seizures in Kaduna metropolis.

MATERIALS AND METHODS

We reviewed hospital records of 635 children to determine the rate and descriptions of febrile seizures among admissions in the Department of Paediatrics, 44 Nigeria Army Reference Hospital (NARH), a tertiary health facility in Kaduna, between June 2008 and June 2010. All who had seizures or seizure related disorders were reviewed for history of fever, type of seizure, level of consciousness using the Glasgow coma scale (GCS),¹⁶ outcome of cerebrospinal fluid (CSF) analyses, urea and electrolytes, random blood sugar, blood film for malaria parasitemia, full blood count, electroencephalogram (EEG) and cultures of throat swab, urine, stool and blood, where indicated. Other Parameters reviewed were age, sex, social class, actions taken by parents and outcome of hospitalization. Social class classification was that of the parents and based on Oyediji's classification¹⁷ and utilized by Akpan *et al.*,¹⁸; Grade I- Professionals, Senior public servants, Large scale businessmen; Grade II-Intermediate civil servants, Senior school teachers; Grade III-Junior school teachers, drivers and artisans with secondary education; Grade IV-Petty traders, laborers, messengers and Grade V-Unemployed, students, and subsistence farmers.

Those reviewed fulfilled the following criteria for febrile seizures^{1,2}:

1. Had a history of fever associated with the onset of seizure
2. Had seizures described as generalized tonic-clonic convulsion, an episode in 24 h lasting less than 15 min (simple febrile seizure) or greater than 15 min or multiple convulsions in 24 h (complex febrile seizure)
3. Non-central nervous system infection as indicated by absence of bacterial isolates in the CSF or the combination of pleocytosis, reduced CSF glucose and elevated CSF protein level¹⁹
4. Full regaining of consciousness after seizure as indicated by a normal GCS.

Ethical approval was obtained from the Ethical Committee of 44 NARH Kaduna.

Data analysis

Epi Info version 3.5.3 was used in analysis. Values were assessed for frequencies and proportions. Discrete variables

were further assessed for significance using chi-square and fisher's exact where applicable. A *P* value <0.05 was regarded as significant.

RESULTS

Out of 635 cases, 79 (12.4%) children had seizures or seizure related disorders [Table 1]. Of these 17, 21.5% of the seizure related disorders and 2.7% of the total cases, fulfilled the criteria for febrile seizures. Meningitis seen in 33 children was the commonest (41.8%) among the seizure related disorders.

There were 11 males and 6 females (M: F, 1.8:1). There was a male preponderance. The mean age was 2.2 years±1.1 with a range of 9 months to 5 years and a peak age of 3 years. Table 2 show the age and sex distribution. Twelve (70.6%) were in the upper social classes (I-III) while the others were in the lower classes (IV and V).

All the 17 eligible children presented with fever and convulsions [Table 3]. Other symptoms were cough, catarrh, abdominal pain, headache, diarrhea and sore throat. The main physical and laboratory findings were under weight, inflamed pharynx, anaemia, malaria parasitemia and neutrophilia. Comparatively, only the presence of convulsions and coma were significantly (*P*<0.05) commoner in the 79 children presenting with seizures or seizure related disorders as against the others without seizures.

Eleven (64.7%) received an antipyretic (Acetaminophen) or an anti-inflammatory (ibuprofen) drug. Six (35.3%) were given antimalarials syrups (chloroquine, sulphadoxine/pyrimethamine, artesunate or quinine) while 2 were given an antibiotic (metronidazole) for diarrhea. Seven (41.2%)

Table 1: Disease conditions among 79 patients with seizure related disorders

| Disease condition | No. of patients | Percent of total |
|-------------------|-----------------|------------------|
| Meningitis | 33 | 41.8 |
| Cerebral malaria | 20 | 25.3 |
| Febrile seizures | 17 | 21.5 |
| Epilepsy | 9 | 11.4 |
| Total | 79 | 100 |

Table 2: Age and sex distribution of 17 patients with febrile seizures

| Age (years) | Sex | | Total (%) |
|-------------|-----|---|-----------|
| | M | F | |
| <1 | 1 | 0 | 1 (5.9) |
| 1 | 2 | 1 | 3 (17.6) |
| 2 | 3 | 1 | 4 (23.5) |
| 3 | 2 | 3 | 5 (29.4) |
| 4 | 1 | 1 | 2 (11.8) |
| 5 | 2 | 0 | 2 (11.8) |
| Total | 11 | 6 | 14 (100) |

had traditional herbal mixture given orally or rubbed on the skin during or after a seizure.

Five (29.4%) consulted patent medicine sellers (PMS) and received an antimalarial (chloroquine, artesunate, or quinine syrup) and an antibiotic (chloramphenicol, co-trimoxazole or ampicillin/cloxacillin).

Actions instituted by caregivers are further indicated in Table 4. Thrusting of an object (mainly the finger or spoon) in the mouth during the seizure was the major physical intervention undertaken.

Drug administration was characterized by inadequate and irregular dosing.

Fourteen (82.4%) had simple febrile seizures while 3 (17.6%) had the complex variety. There was a positive family history in 5 (29.4%) cases: 2 among those with simple seizures and all the three with complex seizures. The observation was significant ($P=0.01$). It was the first episode in 11 (64.7%) cases and all simple seizures. In 6 (35.3%) of the cases experiencing a second seizure, 3 (50%) were complex seizures. This was also significant ($P=0.03$). Only one incident of seizure occurred on the first day of illness.

The causes were, only malaria in 7 (41.2%) cases, acute respiratory infections alone in 5 (29.4%) and a combination of malaria and ARI in the remaining 5 (29.4%).

Where indicated an antimalarial (Artesunate/lumefantrine combination) and/or antibiotic (Amoxicillin for those without prior antibiotic administration and Cefuroxime for those with previous antibiotic administration) were administered. All recovered and were discharged.

DISCUSSION

The prevalence of febrile seizures among hospitalized patients in this study (2.7%) was low compared to that seen at other centers in Nigeria.^{7,20,21} This might be attributable to home treatment, presentation at lower levels of health care delivery or an actual reduction of its incidence in the community.

The age distribution observed is conventional. The male preponderance observed in this study has also been reported in other studies.²¹ Tailor *et al.*, opined that the comparatively earlier maturation of the female brain could provide protection against potential triggers such as fever.²² Others have inferred that such observation could be as a result of cultural attitude that encourages earlier presentation of males.^{21,23} The higher number of patients in the upper social classes could be as a result of this group's capacity to access and afford health care.²⁴

The observation of a positive family history in some of the patients support a genetic basis for its occurrence and

Table 3: Clinical Features of 17 patients with febrile seizures

| Clinical features | No. of patients | Percent of total |
|---------------------|-----------------|------------------|
| Fever | 17 | 100 |
| Convulsion | 17 | 100 |
| Abdominal pain | 10 | 58.8 |
| Cough | 10 | 58.8 |
| Catarrh | 7 | 41.2 |
| Headache | 4 | 23.5 |
| Diarrhea | 3 | 17.6 |
| Vomiting | 3 | 17.6 |
| Sore throat | 2 | 11.8 |
| Underweight | 3 | 17.6 |
| Anaemia | 5 | 29.4 |
| Malaria parasitemia | 2 | 70.6 |
| Neutrophilia | 7 | 41.1 |

Table 4: Actions taken by caregivers of 17 of patients with febrile seizures

| Clinical features | No. of patients | Percent of total |
|-----------------------------------|-----------------|------------------|
| Thrusting of object in mouth | 13 | 76.5 |
| Orthodox medication given | 11 | 64.7 |
| Traditional medicine use | 7 | 41.2 |
| Onion squash to the eyes | 6 | 35.3 |
| Cold bath | 10 | 58.8 |
| Visit to patient medicine sellers | 5 | 29.4 |

this has been previously highlighted.^{1,2,3} Furthermore, the occurrence of most seizures after the first day of onset of symptoms underscores the need to urgently identify and adequately manage underlying conditions. Also, the incidence of all the complex seizures in the subsequent episodes of febrile seizures suggests a higher risk of its occurrence among those with recurrent febrile seizures. It calls for closer monitoring of fever in those who have had an episode of simple febrile seizure.

Inappropriate home management of fever, which has also been observed by Audu and Ogala in Zaria,¹⁴ and Ndifon *et al.*, in Calabar,²⁵ was also noted in the study. The implication is the subsequent development of severe or complicated forms of disease among children as observed by Eseigbe *et al.*¹⁵ However, it unveils the beneficial potential of caregivers, if properly trained on home management of common childhood illnesses, in child health care delivery in the country.

Patent medicine sellers are part of the informal health sector in the country and licensed to sell mainly over the counter drugs. However, they have been found to prescribe and sell proprietary drugs, inappropriately and incompetently, beyond their statutory limits. Due to their accessibility and affordability, they are highly patronized. The PMS were patronized for the management of febrile seizures in this study and they rendered extracurricular services inappropriately. Akuse *et al.*,¹³ assessed the role of PMS in the control of childhood malaria. They also

found that the PMS were highly patronized and rendered these services inefficiently. It can be concluded, as did Akuse *et al*, that with proper training PMS have the potential to improve control of common diseases in the community.

The use of traditional medicine observed in the study is in conformity with the fact that its use is a viable part of the complex health care system in Nigeria.^{26,27} Furthermore, it underscores the need to address its role in health care delivery in the country. The use of traditional medication, and its attendant challenges, in the treatment of febrile convulsions and other seizure related disorders have been documented in other parts of the country.^{21,28,29} Ojukwu *et al*, reported that mortality with febrile seizures was associated with traditional medicine ingestion.⁷ Considering the degree of utilization, traditional medicine if properly harnessed could play a more significant role in health care in the country. An example is seen with valuable use of artesunate, obtained from a Chinese herbal extract, in the treatment of malaria.³⁰

Some of the pre-hospital interventional practices carried out by the care givers in this study and that observed in other similar studies,^{21,28,29} such as thrusting of objects in the mouth of a convulsing child, application of onion squash to the eyes, applying scarification marks to the body and burning of the feet, are harmful. Its occurrence emphasizes the need to improve public awareness about seizure related disorders and their pre-hospital management.

Malaria and ARI, major causes of childhood illness in the country,^{31,32} were the identifiable causes of febrile seizures in this study. This was similar to findings of Osaghae and Mukwuzi-Odum in Benin City²¹ where both conditions were associated with 80% of the children with febrile convulsions. It highlights the need to vigorously pursue already existing programs such as Millennium Development Goal 6³³ targeted at combating endemic diseases and, implementing new policies geared towards prevention and control of these conditions.

The outcome in the study affirms the good prognosis associated with febrile seizures.

CONCLUSION

The study revealed a low prevalence of febrile seizures among hospitalized patients with majority presenting with the first episode of the simple variety and poor pre-hospitalization management. It highlighted the need to improve community awareness, establish appropriate caregiver health seeking behavior and promote malaria and ARI prevention initiatives.

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