

*Full Length Research Paper*

# Pre-hospital management of childhood convulsions in Ilesa, South-west, Nigeria

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Convulsion evokes a lot of fear in mothers and caregivers whenever it occurs. They even think that their child is dying. Many interventions are often carried out because of anxiety and limited knowledge. The aim of this study is to examine the interventions instituted by caregivers for children with convulsions before presentation in the hospital for treatment. We prospectively studied all the 276 children that presented to the emergency room with convulsion over a period of seven months and the care administered at home before presenting in the hospital was noted. One hundred and nine (39.5%) of the children had water poured on them during convulsion. Substances administered orally were; salt 32 (11.6%), onions 14 (5.1%), palm oil 3 (1.1%) and herbal concoctions 13 (4.7%), of which two contained cow urine. Metal spoons were used as mouth gag in 41 (14.9%) of subjects while 29 (10.5%) children had intramuscular (IM) injections given by health workers at home (eight) in various health centres (15) and hospitals (6). Other interventions were scarifications and drinking of their mothers' urine. While 40 (14.5%) children had more than one treatment given to them before their arrival, 99 (35.9%) had no treatment given before their arrival. Caregivers continue to carry out various interventions at home for convulsions in children. Majority of the interventions are not beneficial while some are harmful. There is, therefore, need to continue to educate caregivers on the appropriate prehospital interventions of convulsions in children before presenting in the hospital.

**Key words:** Convulsion, pre-hospital interventions.

## INTRODUCTION

Convulsion is the sudden or violent involuntary contractions of one or more groups of muscles following

abnormal or excessive paroxysmal neuronal discharges from the brain (Mikati and Abeer, 2016; Alikor and Paul,

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2016). It may manifest as conjugate deviation of the eyeballs upward or to one side, fast or laboured breathing, sustained stiffening or series of extreme jerky movements of the limbs, excessive salivation or foaming from the mouth. There may be loss of tone in the limbs with falling to the ground. The teeth are usually tightly clenched, sometimes causing serious bites to the tongue and the cheek (Mikati and Abeer, 2016; Alikor and Paul, 2016; Eseigbe et al., 2015). Convulsions are common reasons for presentation at the children emergency rooms (CHER) (Olubosede, 2012; Akpede et al., 1993; Ofovwe et al., 2005; Idro et al., 2008; Uzodike, 1976). The prevalence of convulsion in the paediatric emergency room ranges widely from 3.5% to 31.4% (Mikati and Abeer, 2016; Akpede et al., 1993; Ofovwe et al., 2005; Idro et al., 2008; Uzodike, 1976).

It is a common cause of childhood morbidity and mortality in the developing world (Olubosede, 2012; Idro et al., 2008; Wammanda and Ali, 2004). Convulsion is not a disease entity in itself, but a symptom of an array of clinical conditions varying from the relatively harmless to life-threatening ones, hence, the need for prompt diagnosis of underlying cause to facilitate appropriate therapy and forestall undesirable outcome (Mikati and Abeer, 2016; Alikor and Paul, 2016; Olubosede, 2012). Convulsion may occur with or without fever in childhood. It may be caused by various conditions among which is febrile convulsion (Alikor and Paul, 2016; Olubosede, 2012; Akpede et al., 1993; Ofovwe et al., 2005; Idro et al., 2008). This particular aetiology has an excellent outcome. Other causes that have been associated with convulsion include cerebral malaria, hypoglycemia, meningitis, encephalitis, stroke, head injury (Mikati and Abeer, 2016; Alikor and Paul, 2016; Olubosede, 2012; Akpede et al., 1993; Idro et al., 2008), epilepsy (Mikati and Abeer, 2016; Alikor and Paul, 2016; Ahmed and Obembe, 1997; Eseigbe et al., 2012), intracranial space occupying lesions such as brain tumors, cerebral abscesses and intracranial haemorrhage (Mikati and Abeer, 2016; Alikor and Paul, 2016; Ofovwe et al., 2005).

Convulsions provoke much parental fear and intense anxiety especially when it occurs for the first time. Some parents even think that the child is dying (Anigilaje and Anigilaje, 2013; Baumer et al., 1981; Angyo et al., 1997). Some other reasons for parental concern include fear of recurrence, mental retardation, physical disability and visual impairment (Anigilaje and Anigilaje, 2013, 2012). Consequently, multiple and often harmful measures are taken, most of which contribute to the higher mortality and poor prognosis of the underlying aetiologies in this part of the world (Anigilaje and Anigilaje, 2013; Nyaledzigbor et al., 2016; Ofodile and Oluwasanmi, 1978; Fagbule et al., 1991; Ndukwe et al., 2007).

Several studies in different parts of Nigeria (Jarret et al., 2012; Angyo et al., 1997; Ndukwe et al., 2007), Cameroon (Chiabi et al., 2018) and Ghana (Nyaledzigbor

et al., 2016) have reported harmful traditional practices of caregivers and mothers in their efforts to manage children with convulsions at home before presenting in the hospital. These practices vary widely and may reflect differences in culture and perception of the people. They include administration of concoctions, burning of feet in fire, forceful introduction of objects and substances into the mouth and topical application of various substances to different parts of the body including the eyes. The present study is designed to document the prehospital treatments for convulsion in the Southwestern part of Nigeria and to complement the paucity of local data on the prehospital management of convulsions in the locality of the study. It is also hoped that the findings of the study will help in health educating caregivers in the study environ on practices to avoid when children convulse.

## PATIENTS AND METHODS

This prospective, cross-sectional study was conducted at the Children Emergency Room of the Wesley Guild Hospital (WGH) Ilesa, between May 1<sup>st</sup> and November 31<sup>st</sup>, 2010. Wesley Guild Hospital is a tertiary unit of the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife. The Children Emergency Room (CHER) of the hospital is a seven-bedded ward. The average patient turn-over in the CHER is about 1000 patients per annum.

### Data collection

All consecutive children aged one month to 15 years admitted into the children emergency room of the hospital with convulsions with or without fever, during the study period were recruited. Exclusion criteria were refusal of consent from parent(s) or accompanying relative(s), lack of eye-witness account of the convulsive episodes and children with conditions simulating convulsions such as syncope, tics, cataplexy, narcolepsy, pseudoseizures and other non-epileptic disorders.

The history was obtained from the caregivers, eye-witnesses and from subjects when they were able to communicate intelligibly. The technical terms contained in the data proforma were translated where necessary to vernacular, explained and demonstrated where needed to the understanding of the informants. The data obtained included age, sex, address and socio-economic status of the child's parents. The latter was assessed using the method recommended by Oyedeji (1985) based on the parental occupation and the educational qualifications and re-grouped into upper, middle and lower social classes. Details of the history of the illness and interventions carried out at home while the children were convulsing were recorded. The children were managed according to the standard protocol as related to the aetiology of the convulsion as follows. Investigations carried out on the children with convulsions included packed cell volume, blood film for malaria parasite, blood chemistry, random blood sugar, lumbar tap for cerebrospinal fluid analysis and others like skull radiograph as indicated. Lumbar tap was done in all the children according to the departmental protocol. The main objectives of treating the children were to support vital functions following ABC principles of resuscitation, termination of seizures and identification and treatment of causal or precipitating factors. Associated problems and complications were also identified and treated. Mothers and caregivers were also educated on the

**Table 1.** Age and sex distribution of the 276 children in the study.

Age group (years)	Males n (%)	Females n (%)	Total n (%)
Age less than 1	18 (11.8)	23 (18.6)	41 (14.9)
Age 1 – 5	125 (82.2)	95 (76.6)	220 (79.7)
Age greater than 5	9 (6.0)	6 (4.8)	15 (5.4)
<b>Total</b>	<b>152 (100.0)</b>	<b>124 (100.0)</b>	<b>276 (100)</b>

Figure in parenthesis are percentages of the total in each column. n = number of children. ( $\chi^2 = 2.486$ ,  $df = 2$  and  $p = 0.289$ ).

**Table 2.** Type of intervention.

Type of intervention	Frequency	Percentage
1. Water was poured on the body	109	39.5
2. Substances were given by mouth		
Salt	32	11.6
Onions	14	5.1
Palm oil	3	1.1
Herbal concoction	13	4.7
Mothers urine	2	0.7
3. Gagging the mouth with metal spoon	41	14.9
4. Intramuscular injections	29	10.5
5. Scarification marks	3	1.1
6. No intervention	99	35.9

\*Two of the herbal concoctions contained cow's urine. \*40 children had more than one intervention.

appropriate home management of convulsions.

#### Ethical clearance

The Research and Ethical Clearance Committee of OAUTHC approved the study. For each child, a written informed consent was obtained from the parent(s) or the accompanying relative(s), after carefully explaining the purpose of the study to them.

#### Data analysis

Data were analyzed using the SPSS for Windows software version 16 package. Means and standard deviations (SD) were computed and where necessary, comparison of means was done using the Student's "t" test; while proportions were compared using the Chi squared ( $\chi^2$ ) test. When more than 20% of cells have expected frequencies < 5, Fisher's exact probability test was used.

## RESULTS

During the period of the study, 880 patients were admitted into the children emergency room (CHER) of the Wesley Guild Hospital, Ilesa, consisting of 463 males and

417 females, with a male: female ratio of 1.1: 1. Of these 880 children, 276 (31.4%) consisting of 152 males and 124 females, with a male: female ratio of 1.2: 1 having convulsions. Their ages ranged from one month to 156 months with a mean (SD) of 29.5 (22.0) months (Table 1).

#### The nature of convulsion and the type of pre-hospital management

The nature of convulsion was classified into tonic, clonic, and tonic-clonic. Tonic-clonic convulsion was the most common form of convulsion seen in 230 (83.4%) of the children, 34 (12.3%) had tonic convulsions while 12 (4.3%) had clonic convulsions. There was no statistically significant difference in the nature of the convulsion and the prehospital intervention instituted. ( $\chi^2 = 11.57$ ,  $df = 10$  and  $p = 0.315$ ). Sixty-four (23.2%) of the 276 children have had convulsion previously. Forty-nine (76.6%) of the 64 children have had convulsion once previously, while the remaining 15 (23.4%) have had convulsion previously more than once (Table 2).

**Table 3.** Prehospital interventions in relation to the socioeconomic class of the parent.

Type of intervention	Upper	Middle	Lower	Total
Pouring water on the child	14 (40)	33 (23.6)	32 (31.7)	79 (28.6)
Administration of salt/ onions/ palm oil	4 (11.4)	30 (21.4)	15 (14.8)	49 (17.8)
Gagging with objects	3 (8.6)	13 (9.3)	15 (14.9)	31 (11.2)
Native concoction	0	8 (5.7)	5 (5.0)	13 (4.7)
Others	0	4 (2.9)	1 (1.0)	5 (1.8)
No intervention	14(40.0)	52 (37.1)	33 (32.7)	99 (35.9)
Total	35 (100)	140 (100)	101 (100)	276 (100)

( $\chi^2 = 15.346$ ,  $df = 10$  and  $p = 0.120$ ). Figures in parenthesis show percentages of total in each class. Others = intramuscular injections (29), scarification marks (3) and oral administration of mother's urine (2).

### Socio-economic status and the type of pre-hospital management

Table 3 shows the interventions carried out at home in relation to the socioeconomic classes. The socioeconomic classes have been regrouped as higher SEC (I and II), middle SEC (III) and lower SEC (IV and V). There was no statistically significant difference between the types of prehospital interventions given in different socioeconomic classes.  $\chi^2 = 15.346$ ,  $df = 10$  and  $p = 0.120$ . None of the children in the upper socioeconomic class had native concoctions.

### DISCUSSION

Convulsion is a common symptom reported by mothers and caregivers at the Children's Emergency Room in the hospital. The prevalence of convulsion in the study is 31.4%. This is higher than the prevalence of 15.0 (Ofowwe et al., 2005) and 18.3% (Idro et al., 2008) reported from Benin City in Nigeria and Kenya. This is probably because this study is prospective unlike that which is from Benin City in Nigeria (Ofowwe et al., 2005) which may have suffered data loss because it was retrospective. Although the study from Kenya (Idro et al., 2008) is prospective, the authors acknowledged that only about 20% of the children with seizures in the community are admitted into the hospital. The hospital of our study is in the centre of the town and is readily accessible to caregivers of the children with convulsion. There was a predominance of boys in the study. This finding is in consonance with Ofowwe et al. (2005); Jarret et al. (2012) and Esegbe et al. (2012).

Although the belief, knowledge and perception of mothers are important factors that will influence the type of care that the mother will institute for the convulsing child at home, the socioeconomic status of the caregivers in this study was not significantly associated with the type of prehospital intervention that was administered at home

to the convulsing child ( $p = 0.120$ ). This is in contrast with the study by Jarret et al. (2012) which found that the socioeconomic status was significantly associated with the prehospital intervention by the caregiver. However, similar to that study by Jarret et al. (2012) none of the children from the upper socioeconomic class in our study had local concoction administered on them.

Convulsion causes much fear and anxiety to the parents and caregivers and various measures are often taken in an effort to abort it (Jarret et al., 2012; Esegbe et al., 2012; Angyo et al., 1997; Ndukwe et al., 2007; Onyearugha et al., 2019). Majority, 64.1% of the caregivers in this study were involved in home management of the convulsion before presenting in the hospital. This finding is similar to the report by Angyo from Jos (Angyo et al., 1997) where 67.5% carried out home intervention before presenting in the hospital for treatment. The measures taken in this study were similar to those found in some previous studies.

The most frequently administered prehospital intervention in the study was pouring water on the convulsing child. This is probably because in Nigeria, pouring water on a convulsing child is borne out of the fact that convulsions have been associated with high fever, besides the fact that water is a readily available substance. One hundred and nine (39.5%) of the caregivers poured water on the child in the study, Esegbe et al. (2012) from Kaduna reported 58.8%, while 13.6% is reported by Jarret et al.<sup>12</sup> from Ibadan. The wide variations in the proportions of caregivers using this intervention may be due to methodological differences in the study; the underlying belief is that convulsion results from high fever. The lower percentage from Ibadan may be because the study is retrospective and there may have been incomplete data and data loss. Gagging of the mouth was practiced by 14.9% of the caregivers in this study. This practice was also reported by Esegbe et al. (2012) from Kaduna, Nigeria, Chiabi et al. (2018) from Cameroon and Ndukwe et al. (2007) from Ile-Ife in Nigeria. Gagging the mouth is usually carried out in an

effort to prevent the convulsing child from clenching the teeth. This is because of the erroneous belief that if the child succeeds in clenching the teeth, he may not be able to regain consciousness and then die (Anigilaje and Anigilaje, 2013). In our study, 17.8% of the caregivers put salt, onions or palm oil into the mouth of the convulsing child. Similar substances were reported to have been used in several other studies (Jarret et al., 2012; Akpan and Nyong, 2011; Chiabi et al., 2018). These substances were either rubbed into the body, eyes or forced down the throat of the convulsing child. They are cheap and readily available items in the household (Akpan and Nyong, 2011). Administration of local concoction remains a common practice in this environment although the frequency of its use is reducing. It is also interesting to observe the significant decline in the use of local concoction as only 4.7% administered local concoctions in this study compared to the 21.7% reported (Oseni, 1997) earlier in the same centre 14 years previously and 60.2% reported from Ilorin (Fagbule et al., 1991) 20 years ago. This is probably as a result of health education on the harmful effects of the concoction. Intramuscular injections were administered to 10.5% of the children who convulsed in the study. A higher percentage of 42.3 of the children with status epilepticus was reported to have had intramuscular injections by Akpan and Nyong (2011) from Uyo in Nigeria (Chiabi et al., 2018). This higher percentage is probably because of the long duration of the convulsion, delayed hospital presentation and the small sample size in their study (Chiabi et al., 2018). Three (1.1%) of the children in this study had scarification marks administered on them for the convulsion. Similar findings were reported from various parts of Nigeria (Jarret et al., 2012; Ndukwe et al., 2007; Onyearugha et al., 2019) and Cameroon (Chiabi et al., 2018). The practice of scarification marks may be a reflection of the belief that convulsion may be caused by evil spirit and angry gods (Anigilaje and Anigilaje, 2013). None had his or her feet put in hot water or fire as was reported in some studies (Eseigbe et al., 2015; Ofodile and Oluwasanmi, 1978; Fagbule et al., 1991). This may be a result of positive effect of health education

The high proportion of mothers, 35.9%, who did not administer prehospital treatment during the convulsion as against 2.6% in an earlier study<sup>10</sup> in the same centre may be a reflection of improvement in their practice due to health education over time. Some other studies also reported a high percentage, 59.8% (Jarret et al., 2012) and 60.0% (Famulusi and Sinnet, 1971), of the caregivers who did not administer any intervention but presented promptly to the hospital when their children convulsed. It is also possible that general increase in literacy levels showed mothers the wrong things to avoid. Also, there may have been loss of knowledge of these primitive practices over time. Thus, health education must be continued to discourage these unhelpful and sometimes

harmful practices. The use of intramuscular injections at home sometimes probably medical quacks and scarification marks may increase the risks of transmission of infections such as human immunodeficiency virus and hepatitis. Other problems that may arise are wound infection leading to septicemia, tetanus (Ofodile and Oluwasanmi, 1978; Oche and Onankpa, 2013), abscesses as well as the development of disfiguring scars.

Most of the measures taken on the convulsing child have been found to be useful. Rather, they are deleterious. For instance, pouring of cold water on the child as opposed to the use of lukewarm water which is the ideal for tepid-sponging could engender conservation of heat and eventually worsen the fever. Febrile convulsion which is ordinarily benign may be associated with significant morbidity and mortality through harmful interventions (Oche and Onankpa, 2013). Problems that could arise from prehospital management of convulsions include bruises and laceration to the lip, tongue and oropharynx and malocclusion from loss of teeth (Fagbule et al., 1991; Ndukwe et al., 2007). This is due to forceful insertion of spoon and other hard objects into the mouth of the child during convulsion to prevent clenching of the teeth. Chemical conjunctivitis and sometimes blindness may arise from the application of traditional substances to the eyes (Anigilaje and Anigilaje, 2013; Fagbule et al., 1991). Local concoctions are often unhygienically prepared and sometimes contain heavy metals that may result in hepatic toxicity. They may lead to hypoglycaemia and subsequently prolonged seizures or status epilepticus with increased risk of neurologic sequelae (Idro et al., 2008) and death especially when the local concoctions contain cow urine (Angyo et al., 1997; Oche and Onankpa, 2013). They are often forced down the throat of the convulsing child with the consequent risk of aspiration pneumonitis (Anigilaje and Anigilaje, 2013; Fagbule et al., 1991; Ndukwe et al., 2007; Oche and Onankpa, 2013), prolonged hospital stay and even death. Burns to the feet may result in increased cost of care because of the prolonged hospital stay and need for skin grafting in some cases, septicaemia, tetanus, contractures and even death (Anigilaje and Anigilaje, 2013; Fagbule et al., 1991; Ndukwe et al., 2007). Management of convulsion at home also contributes to prolong the duration of convulsion because it gives a false assurance that something is being done for the child (Nyaledzigbor et al., 2016), therefore delays presentation in the hospital with the attendant worsening of outcome for the underlying aetiologies such as cerebral malaria and meningitis. In the present study, 39.5% of the mothers did nothing other than bringing the children to hospital. This compares favourably with the Camroonian study where 26% of the children were immediately taken to the hospital during a seizure episode (Chiabi et al., 2018).

In home treatment of convulsions, the cause of the

convulsion is almost never ascertained but the mothers go to institute for one form of treatment or the other at home (Chiabi et al., 2018). With three quarters of mothers still give useless and harmful measures to their convulsing children, it will be important to direct health education towards the futility of these practices and that what may kill is not the convulsion but underlying aetiology and the harmful interventions that are given. It may be advised that only for children with recurrent history of fever-associated convulsion may buccal midazolam and rectal diazepam be given while all other children with convulsion regardless of presumed cause should be presented in hospital immediately.

### Limitation of the study

This study would have been more all-embracing if it was community based. This would have been able to capture all the children convulsing in the community.

### Conclusion

This study reveals that majority of the mothers carried out inappropriate intervention when their children convulsed. Thus, the education of the caregivers on the dangers associated with these practices may help to reduce such harmful practices (Oche and Onankpa, 2013). Therefore, there should be continuous health education on the causes and appropriate home management of convulsion in children and the need for prompt hospital presentation so that the exact cause can be elicited and the correct management administered whenever a child convulses. Appropriate preventive measures and home management for seizures such as tepid sponging if there is fever, administration of rectal diazepam and buccal midazolam could be taught to mothers and caregivers.

### CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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