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The Clinical Classification of Seizures among Children with Epilepsy Seen at The Moi Teaching and Referral Hospital in Eldoret, Kenya

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Abstract

Epilepsy continues to take its toll among children causing impaired physical, psychological and social functioning of those affected. The annual rate of new cases of epilepsy is approximately 5-7 cases per 10,000 children from birth to age 15 years, and in any given year, about 5 of every 1,000 will have epilepsy. Classification of epileptic seizures relies on clinical phenomenology as well as electroencephalography (EEG), and accurate classification is important since it impacts on choice of medication as well as prognostication. This paper sought to describe the Clinical Classification of epilepsy in children seen at Moi Teaching and Referral Hospital, Eldoret. A cross sectional study was carried out between January 2011 and July 2011 in the general peadiatric wards and the paediatric outpatient clinic at the MTRH. The study subjects were all children aged one month to 14 years. Consecutive sampling of children who had clinical features consistent with epilepsy was done for in the recruitment of study subjects. Data was collected in a structured questionnaire and EEGs were recorded in the hospital's EEG laboratory. Descriptive data was grouped in frequencies and mean and range was used to summate data. Association between factors was analysed by linear regression and Chi-square was used to analyse differences in epilepsy classification based on clinical features or EEG independently. From the study, fifty-six children with epilepsy were enrolled into the study, 35(62.5 %) of whom were male and 21(37.5%) were female (M:F 1:0.6). The youngest age at onset of seizures recorded in the study was one month and the mean age was 4.2 years. Twenty-six patients (46.4%) had generalized tonic clonic seizures, nine (16.1%) had partial seizures, eight (14.3%) had mixed seizures, six children (10.7%) had absence seizures, six (10.7%) had tonic seizures and one (1.8%) had myoclonic seizures. The commonest seizure types in children seen at MTRH are generalized tonic-clonic and partial seizures. The generalized spike-and-wave patterns and focal spike-and-wave patterns were the commonest EEG patterns. However, EEG findings increased the proportion of children with partial (focal onset) seizures. Therefore, physicians should use both clinical phenomenology and EEG patterns in classifying patients with epilepsy so as to improve on treatment and follow-up.

Keywords: Clinical Classification, Seizures, Epilepsy, Children, Referral Hospital, Kenya

1. Introduction

The World Health Organization in 2001 estimated that up to 5% of the world's population may have a single seizure at some time in their lives and that 50 million people in the world have epilepsy. A child has a one in ten chance of experiencing at least one epileptic seizure in his/her life with the incidence of epilepsy in children and adolescents being relatively consistent across all populations studied, ranging from 50 to 100/100,000 (WHO (2004). The average annual rate of new cases of epilepsy is approximately 5-7 cases per 10,000 children from birth to age 15 years, and in any given year, about 5 of every 1,000 children will have epilepsy (Hauser, 1994).

The factors that are known to increase risk of epilepsy in children include congenital malformations of the central nervous system (CNS), moderate to severe head trauma, CNS infections, certain inherited metabolic conditions, and genetic factors. However, these factors account for only 25% to 45% of cases, and thus, the etiology of most cases of the epilepsies remains obscure. The paucity of well-controlled etiological studies is due largely to formidable methodological problems in conducting epidemiological studies of the epilepsies. With appropriate management of children with epilepsy, complete seizure control can be achieved. Those with neurological disabilities do less well (Mattson, 2003).

International League Against Epilepsy (1989) classifies epilepsy as partial, generalized and unclassified. Partial seizures are seizures that occur generally without loss of consciousness. In simple partial seizures, consciousness is not impaired while in complex partial seizures consciousness is impaired. Partial seizures with secondary generalization do occur mimicking a generalized tonic clonic seizure which is difficult to diagnose. Generalized seizures are seizures with loss of consciousness lasting seconds to minutes and include absence, tonic-clonic, tonic, atonic and myoclonic seizures. Neonatal and infantile seizures are unclassified seizures (International League against Epilepsy, 1989).

In resource-poor settings, treatment of epilepsy is largely based on the clinical presentation of the patient at the time of diagnosis. The response to this treatment may be good or poor depending on several factors including choice of drugs and dosage, underlying causative factors and drug compliance. EEG identification of seizure type thus not only refines diagnosis but also the choice of long term anti-epileptic drugs administered to the patient. The study was, therefore, carried out as an attempt at identifying seizure types locally on the basis of clinical presentation and it is hoped that the results from the study will inform clinicians on seizure and by extension accurate treatment of epilepsy.

1.1 Clinical Features of Epilepsy

An epileptic seizure may be understood to represent an imbalance between excitatory and inhibitory currents within the brain. Neuronal circuits are made up of axonal conduction, mediated by the propagation of action potentials along the neuronal axon and synaptic transmission, which occurs between neurons. Both of these processes employ ion channels.

The ion channels are membrane-spanning proteins that form selective pores for sodium, potassium, chloride, or calcium ions. Movement of ions across the neuronal membrane determines the electrical membrane potential and generates the action potential. A gradient of sodium and potassium ions (in relatively high concentration outside and inside the cell, respectively) is maintained by an ATP-dependent sodium/potassium pump which maintains the resting membrane potential in a polarized state (about -70 MV). When an ion channel is opened, the ion moves passively into or out of the cell along its electrochemical gradient (Stafstrom & Rho, 2009).

Two major types of ion channels are responsible for inhibitory and excitatory activity: Voltage-gated channels are activated by changes in the membrane potential that alter the conformational state of the channel, allowing selective passage of charged ions. On the other hand, voltage-gated sodium and calcium channels function to depolarize the cell membrane toward action potential threshold and are excitatory. Voltage-gated potassium channels largely function to hyperpolarize the cell membrane away from the action potential threshold and are inhibitory. Ligand-gated channels mediate signals from neurotransmitters such as glutamate and gamma-amino butyric acid (GABA). After release from a presynaptic terminal into the synaptic cleft, the neurotransmitter binds with selective affinity to a membrane-bound receptor on the postsynaptic membrane. This in turn activates a cascade of events, including a conformational shift to reveal an ion-permeant pore (Stafstrom & Rho, 2009).

The molecular basis of seizure generation is based on the passage of ions across these voltage-gated and ligand-gated channels which results in either depolarization or hyperpolarization. Depolarization manifests as a seizure if the threshold is attained.

The factors that are known to increase risk of the epilepsies in children include congenital malformations of the central nervous system (CNS), moderate or severe head trauma, CNS infections, certain inherited metabolic conditions, and genetic factors. However, these factors account for only 25% to 45% of cases, and thus, the etiology of most cases of the epilepsies remains obscure (Edwads *et al.,* 2008). In a Tanzanian study, a family history of epilepsy in first-degree relatives was found in 46.6% of patients, but in only 19.6% of controls. A past history of febrile convulsion was found in 44% of patients in comparison to 23% of the control group which was significant while a history of intrapartum complications was found in 12.1% of patients and 1.8% of controls. Head injury was not found to be a significant risk factor for epilepsy in the study. The study showed a

strongly independent association between four factors and the risk of developing epilepsy. Previous brain insults play a significant major role in the cause of epilepsy (Matuja *et al.,* 2001).

Classification of epileptic seizures and epilepsy syndromes as either focal or generalized is a fundamental and early part in the diagnostic process and is generally easy to accomplish (Liporace, Tatum, Morris, & French, 1998). Correct diagnosis and classification are important for choosing the most appropriate treatment. This classification can be based on the Classification of Epileptic Seizures of 1981 or Classification of Epilepsies and Epileptic Syndromes of 1989, as proposed by International League Against Epilepsy [ILAE] (1989). As for Classification of Epilepsies and Epileptic Syndromes, two divisions continue to be widely used to shape the major classes and these classifications are based on the clinical features. The first separates epilepsies with generalized seizures from epilepsies with partial or focal seizures.

Classifications are useful in regard to the management and prognosis of the patient (Okuma, 2004). In a study conducted in a south Indian university hospital on the syndromic classification of the ILAE, 48% of the study subjects were found to have primary seizures while 62% had localization-related epilepsies (LREs) and epileptic syndromes (Murthy, Yangala & Srinivas, 1998). In another study done in Norway on the prevalence, classification, and severity of epilepsy in children, the main seizure types were found to be classified in 90% of patients. Seizure types were more often partial than generalized. Among generalized epilepsies, idiopathic forms were more frequent in girls, and symptomatic forms more frequent in boys. Epileptogenic EEG activity was most often generalized or localized to one or two areas of the brain and was never found in 14% of patients. Symptomatic etiology was found in 46% of all children. Symptomatic etiology was frequent, especially in therapy-resistant cases (Waaler, Blom, Skeidsvoll & Mykletun, 2000).

A study in Finland on the prevalence, classification and severity of epilepsy and epileptic syndromes in children showed that generalized seizure types were more prevalent in children 0-6 years of age and partial in children 6-15 years of age. Epilepsy was intractable in 17% of all cases and correlated significantly with symptomatic etiology and early onset of epilepsy, as well as with additional neuroimpairments (Eriksson & Koivikko, 1997). Another study in Saudi Arabia on epilepsy in Saudi children with cerebral palsy found the main clinical features to be language delay, 61%, hypotonia, 45%, hypertonia, 38%, and behavioural abnormalities in 41%. Seizure types included generalized in 85%, and partial and complex partial with or without secondary generalization in 15%. None of the patients had simple partial seizures. The generalized seizures were non-convulsive in 4 patients 3.5%, tonic/clonic 65%, atonic 3%, myoclonic 14%, and mixed 2% (AL-Sulaiman, 2001).

1.2 Problem Statement

Epilepsy provides the clearest example of a neurological disorder for which effective and cost efficient treatment is available. Recent studies, both in the developing and in the developed world, reveal that if properly treated up to 70% of children with this condition could live productive and fulfilling lives, free from seizures. Yet in developing countries, Kenya included, up to 90% of the people who have this condition do not fully benefit from available care. Epilepsy, when poorly managed, continues to take its toll on children causing impaired physical, psychological and social functioning of those affected, and equally serious psychological, social and economic consequences for their families given the chronicity of the condition. Children with epilepsy, sometimes along with their family members, are often stigmatized. This stigmatization compounds a hidden burden, which discourages parents and guardians of affected children from seeking the diagnosis and care they need and deserve.

Average annual rate of new cases of epilepsy is approximately 5-7 cases per 10,000 children from birth to age 15 years, and in any given year, about 5 of every 1,000 will have epilepsy (Hauser, 1994). Epilepsy carries a heavy burden with prominent risk factors like CNS infections and birth-related complications being high in developing countries like Kenya. There has been clinical picture dependence in the diagnosis of epilepsy as EEG studies on children have not been previously done routinely in the region.

Diagnosis is based almost exclusively on clinical history. EEG can be used to make a diagnosis only if epileptic EEG is recorded. Interictal epileptic form activity is often recorded and is useful in confirming seizure type as well as syndromic classification. Correct classification is important because some seizure types and epileptic syndrome respond to specific treatment and have defined clinical course and prognosis. Developing countries are thought to carry the highest burden of epilepsy due to high rate of infections and trauma.

Diagnosis limited by lack of trained human resource and diagnostic facilities. For instance, in 2006 Kenya had only 3 paediatric neurologists, all based in Nairobi, and 2 EEG machines. Most children with epilepsy seen by non-neurologists and often lack the benefit of having EEG done. These factors may impact on classification and ultimate management.

1.3 Limitations of the Study

The initial clinical presenting features may have been limited by the persons who gave the history as they may have had recall bias. This would have influenced the clinical seizure type assigned to an individual patient. In addition, patients on treatment may have had altered symptoms and signs. It is likely that patients who had been on treatment could have had different signs and symptoms that placed them in a different class from those who were beginning treatment. Moreover, patients on treatment may have had altered EEG Patterns. It is likely that patients who had been on treatment could have had different seizure patterns from those who were newly diagnosed and were beginning treatment. This could have placed a subject on a different EEG class.

2. Materials and Methods

The study was conducted at the Moi Teaching and Referral Hospital (MTRH). The hospital is located in Uasin-Gishu County in Western Kenya which is about 300km North West of Nairobi, the Kenyan capital city. The hospital serves as a teaching hospital for the Moi University School of Medicine, University of Eastern Africa, Baraton and the Kenya Medical Training College, Eldoret. It is the second largest national referral hospital in Kenya and serves patients from the western part of Kenya and the North and south Rift region and has a catchment population of about 13 million people. The hospital has several out-patient clinics which include the paediatric out-patient clinic which sees about 2000 patients per year. It also has in-patient wards for the children.

The study was conducted between January 2011 and July 2011 as a descriptive cross-sectional study. Children aged above 1 month to 14 years on follow-up for epilepsy who attended POPC clinic or were admitted to the paediatrics wards at MTRH during the study period. The sample size was determined using the formula given below.

$n= Z^2 p\ q/d^2$ [42]

Where:

Z=1.96 confidence interval, p=16.4%[16], q= (1-p) and d=precision determined by error 0.05(5%)

Thus the total number of children seen in POPC in 2009 = 1758.

No. of children with epilepsy = 154; Approximately 77 seen in half the year.

P=0.164 [16]

$n= (1.96^2)\ (0.164)\ (0.836)/\ (0.05^2)$

=210 patients

Applying the above formula n=210 and N=77

Correcting for small sample population n= n/1+n/N)

n=56

Children with a diagnosis of epilepsy made by a clinical officer, medical officer, resident doctor or a consultant, attending POPC or those admitted to the paediatric wards during the study period were seen by the investigator or his assistant during the POPC clinics and in the wards and those meeting the inclusion criteria were included in the study. Systematic sampling was used to get the desired sample size. The inclusion criteria were: children aged one month to 14 yrs old; clinical diagnosis of epilepsy and patients whose guardians consented to participate in the study and patients 7 years and above who gave assent to participate in the study. The exclusion criterion sought patients who had completed treatment and were on follow-up at the POPC.

The principal investigator or his assistant saw the children with diagnosis of epilepsy at the Paediatric Out-patient clinic and those that were admitted to the Paediatric Wards with the diagnosis of epilepsy and evaluated them. Informed consent was then obtained from the guardians of the children who qualified for inclusion into the study. Assent was sought from children older than 7 years.

A structured questionnaire was then used to collect the demographic characteristics of the study subjects, age at first onset and information on the clinical presenting features and seizure descriptions obtained as per ILAE 1989 classification. The demographic and clinical data was obtained from the parents or guardians of the patients. The investigators examined the study subjects and made the final diagnosis of epilepsy before the information was used to classify the seizures on clinical basis. Information on the identifiable risk factors, conditions co-existing with epilepsy and precipitating factors of epilepsy was also obtained from the parents or guardians.

Patients studied had EEGs done either prior to the study or during the study period. EEG Machine model RMS EEG-32 Super Spec was used for the EEG recordings. The EEGs done and reported by the neurophysiologists

were reviewed by two neurologists independently together with the investigator. This was done by reviewing the actual EEG machine recordings in the EEG laboratory and the final reports were then coded and entered into the Microsoft Excel spreadsheets. Analysis was then done once the EEG reports by the two reviewers agreed. In the study the reports by the two reviewers agreed. Where the two reviewers would have disagreed then the two would have had to look at the EEGs together and agree.

Data was entered into spreadsheets and analyzed using SPSS 16. Frequency listings and percentages were used to describe categorical variables while descriptive statistics such as mean and median were used for continuous variables. Linear regression analysis was used to establish whether a relationship existed between epileptic features with selected variables. These variables included the age, sex, age at first onset, child epilepsy years and the frequency of seizures. A significant relationship was assumed if p value was <0.05. Chi square was used to compare the seizure classifications on clinical and EEG basis and was considered significant at a P value <0.05. Data was presented in tables and pie charts.

3. Results

Fifty six children with epilepsy were enrolled into the study, 35(62.5 %) of whom were male and 21(37.5 %) were female (male to female ration 1:0.6). Majority of the children were in the age group of 1yr to 5 years as shown in Table 1.

Table1 : Demographic Characteristics of Children with Epilepsy

Descriptive	Frequency
Age groups	
1 month to 1 yr	4(7.1%)
>1yr to 5yrs	20(35.7%)
>5yrs to 12yrs	15(26.8%)
>12yrs	17(30.4%)

3.1 Clinical Features of Epilepsy

The youngest age at onset of seizures recorded in this study was one month and the mean age was 4.2 years. The study subjects had a mean of 3.4 child epilepsy years. Majority of the patients (73.2%) had onset of seizures by their 5th birthday (Table 2).

Table 2 : Age at first onset of Epilepsy

Descriptive	Frequency (%)
Age at first Onset	
1 month to 1 yr	17(30.4%)
>1yr to 5yrs	24(42.8%)
>5yrs to 12yrs	5(8.9%)
>12yrs	10(17.9%)

There were no identifiable risk factors for epilepsy in 24(42.9%) patients. The most common risk factors in the rest of the patients were CNS infections and birth complications followed by family history of epilepsy as shown in Table 3.

Notably head trauma was only seen in one patient.

Table 3 : Identifiable risk Factors of Epilepsy in Children

Identifiable Risk Factor	Frequency (%)
CNS infection	11(34.4%)
Birth complications	8(25 %)
Family history	6(18.7%)
Febrile convulsions	2(6.3%)
Head trauma	1(3.1%)
Others (tumors, brain infarcts)	4(12.5%)
TOTAL	**32(100%)**

Twenty-six children (46.4%) did not have an identifiable precipitating factor. Acute febrile illness (60%) was the leading factor precipitating a seizure as shown in the Table 4.

Table 4 : Common Precipitating Factors of Epilepsy in Children

Factor	Frequency (%)
Acute Febrile illness	18(60%)
Emotions (anger, excitement, etc)	6(20%)
Physical stress	2(6.66%)
Sound, sensation and smell	2(6.66%)
Others	2(6.66%)
TOTAL	**30(100%)**

Seventeen children (30.4%) had fever at first onset of seizures while the rest presented with afebrile seizures. Nine (15.25%) patients had controlled seizures while the rest still had seizures by the time of the study with an average of 12.4 seizures per month.

Forty-three children (76.8%) had normal physical findings. Those who had abnormal physical findings had cerebral palsy (8.9%), hypotonia (5.35%), focal motor deficits (5.35%), and hypertonia (3.6%).

3.2 Clinical Classification of Seizures

Single type of seizure was observed in 85.7% of the patients while the rest had mixed seizures. Twenty-six patients (46.4%) had generalized tonic clonic seizures, nine (16.1%) had focal tonic-clonic seizures and six children (10.7%) had absence seizures as shown in Table 5.

Table 5: Classification of Seizure Types on Clinical basis

Classification	Type of seizure	Frequency and Percentage (n=56)
Generalized seizures	Generalized Tonic-clonic	26(46.4%)
	Tonic	6(10.7%)
	Absence	6(10.7%)
	Myoclonic	1(1.8%)
Partial Seizures	Focal	9(16.1%)
Unclassified	Mixed	8(14.3%)
		56(100%)

4. Discussions

This study shows that childhood epilepsy is mostly common in children below 12 years, a finding that was also reported in Uganda where 68% of children with epilepsy were below the age of 10 years. Majority of the children in the study population were aged between one and five years making about a third of the study population. This could be a reflection of the population proportion of children in Kenya were 43% of the Kenyan population is under 5 years age according to the Kenya population Census of 2009.

There was a male preponderance which is similar to findings from Uganda (Duggan, 2010) and Kenya (Munyoki *et al.,* 2010). A study done at a south Indian hospital found out that idiopathic forms were more frequent in girls while the symptomatic forms were more frequent in boys (Eriksson & Koivikko, 1997). There has been no explanation for this male preponderance from various studies.

The early median age of onset of seizures reported in this study is lower when compared with results in USA where the median age of onset was found to be 12.8 years (Worrell, Lagerlund, & Buchhalter, 2002). From the study, about one-third of the patients had their first onset of seizures at infancy which is lower than findings of a Ugandan study where about 50% of the children were reported to have had their onset at infancy (Duggan, 2010). In addition, nearly three-quarters of the children had their first onset of seizures by their fifth birthday. This can be attributed to the fact that between the ages of one and four the resistance to seizures is very low. After the age of four the resistance is again high, and seizures are mainly seen in already-brain damaged children. This resistance diminishes again from about the seventh year when the idiopathic epilepsies tend to appear. The resistance is at its lowest around the time of the prepubertal growth spurt (Brown, 1982).

Epilepsy in the sub-Saharan Africa is thought to be mainly secondary to CNS disease which is a reflection of the persistent high risks at birth and adverse neurological sequelae of infections which could be viral, bacterial or parasitic. In the study, majority of the children had risk factors which is in keeping with the WHO (2004) postulation and indeed could even be higher if recollection bias was eliminated. Neurological infections and birth complications were the most common risk factors for seizures in children which was similar to findings in Uganda by Duggan (2010) where birth trauma and neurological infections were the leading risk factors. In the study, nearly three-quarters of the children had the onset of seizures by age five; an age group of the children that are likely to suffer infections which can involve the central nervous system and later complicate to epilepsy. Birth related complications continue to be a risk factor, especially where most children are delivered at home by the traditional birth attendants rather than by the skilled birth attendants in the health facilities.

In Kenya, according to the Kenya Demographic Health survey of 2008-2009, 43 per cent of births in Kenya are delivered in a health facility, while 56 per cent of births take place at home and this puts the children at risk of birth trauma and CNS infections that could lead to development of epilepsy. Family history of epilepsy was present in about a fifth of the patients which was less than the report from Tanzania where family history of epilepsy was the most important risk factor (Matuja *et al.,* 2001). A past history of febrile convulsion was found to be seven times less than what was found in the Tanzanian study and this could be due to the different study settings, the Tanzanian study having been done in a rural setting. A Danish study, however, has reported the risk of developing epilepsy from a febrile convulsion to be less than 7% (Vestergaard, Pedersen, Sidenius, Olsen, & Christensen, 2007). Head injury was not found to be a significant risk factor for epilepsy in the study, a finding which is similar to that of another study in another part of Kenya where 8% of children had history of head injury (Munyoki *et al.,* 2010) which suggests possibility of similarity in risk factors in Kenya.

From the study, the frequency of head injury is much lower than the WHO (2005) findings where 92% of countries globally report head trauma as the leading cause of epilepsy. According to the WHO, probable aetiology or risk factor for epilepsy depends on the age of the patient and the type of seizure. The most common acquired causes of epilepsy in young infants are perinatal hypoxia and trauma, metabolic disturbances, congenital malformations of the brain, and infection. In young children and adolescents, idiopathic epilepsies account for the majority of cases, although trauma and infection play a role (WHO, 2005).

In this study, one-quarter of patients had abnormal physical findings which included cerebral palsy, hypotonia, focal motor deficits and hypertonia. A study in Saudi Arabia on epilepsy has found the main clinical features to be language delay (61%), hypotonia (45%), hypertonia (38%), and behavioural abnormalities (41%). The higher proportions observed in the Saudi Arabian study was because the study subjects were patients with cerebral palsy. This study found that a third of patients had fever at first onset which could be associated with possible CNS infection as a leading identifiable risk factor for epilepsy in the study. Nearly half of the patients did not have identifiable risk factor. This is similar to WHO findings where about 40% of epilepsies have no identifiable cause (WHO, 2005).

In this study, majority of children did not have an identifiable precipitating factor and among those with one, acute febrile illness was the leading factor followed by emotions. Emotions, particularly anger and excitement,

was a notable precipitant of seizure in this study. Mental retardation was the leading condition associated with epilepsy followed by learning disability and behavioural disorders. The mental retardation was likely to be a result of frequent uncontrolled seizures over a prolonged period of time in the setting of the treatment gap management of the patients with epilepsy. A Finland study found that the cumulative risk of epilepsy varies according to the severity and the cause of the retardation as well as the presence of additional disabilities. The probability of developing epilepsy was increased fivefold in severely mentally retarded children compared with mildly retarded children (Airaksinen *et al.,* 2000).

In this study, majority of the children had generalized epilepsy on clinical classification while a fewer number had focal seizures. The proportion of children diagnosed with generalized epilepsy in this study is similar to recent reports from East Africa by Munyoki *et al.* (2010), Duggan (2010) and Kaiser (2000) reported 43.1%, 53% and 63% respectively. It is likely that the high proportion of generalized tonic clonic seizures could due to the fact that these seizures are easily recognized and present in such a way that the parents or guardians take children to hospital for medical treatment. On the contrary, some seizure types like absence seizures could be missed out as most parents may not consider them to be serious enough to warrant urgent medical treatment. Reliance on clinical history alone to diagnose and classify epilepsy could lead to focal seizures with secondary generalization being classified as primarily generalized seizures giving a high proportion of generalized seizures. A Spanish study has found patients with mixed types of seizures to be 2% of the study subjects, which was about half of those found in this study (Martínez-Menéndez *et al.,* 2000). The higher proportion of those with mixed seizures observed in this study could have been due to changing clinical presentation of seizures resulting from use of anti-epileptic drugs or some types of seizures such as the absence seizure that could have become generalized with time. The lack of EEG use to aiding the clinical classification of seizures may have contributed to the higher proportion of mixed seizures.

In this study, majority of children had seizures with no diurnal variation. This was seen in about half of the study population. This finding could be attributed to most seizures being generalized as opposed to partial seizures which tend to occur mostly at night as brain chemical changes during sleep have been noted to trigger partial seizures. Myoclonic seizures tend to occur during the morning awakening periods. These findings compares to a study in the United states of America which found out that the frontal lobe complex partial seizures secondarily generalized at equal rates during sleep (22%) and wakefulness (20%), but temporal lobe Complex partial seizures generalized much more frequently during sleep (45%) than in wakefulness (19%). Frontal lobe seizures were more likely to occur during sleep (37%) than were temporal lobe seizures (26%). Sleep has a pronounced effect on secondary generalization of partial seizures, especially those of temporal lobe origin. Frontal lobe seizures occur more often during sleep than do temporal lobe seizures, and occurrence during sleep helps to distinguish psychogenic non-epileptic seizures from Complex partial seizures (Bazil & Walczak, 1997).

5. Conclusion

The commonest seizure types in children seen at MTRH are generalized tonic-clonic and partial seizures. Physicians should use both clinical phenomenology and EEG patterns before classifying patients with epilepsy so as to improve treatment and long term follow-up of these patients.

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