ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 04 | April - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ETIOLOGY OF EPILEPSY IN CHILDREN PRESENTING IN TERTIARY CARE HOSPITAL

Paediatrics

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ABSTRACT

Background:- Epilepsies are the most common conditions encountered in most pediatric neurology clinics in many parts of developing world . Etiology and EEG are strongest predictors of recurrence with recurrence risk as low as 24 and high as 65 %. Better understanding of seizures is needed not only for abortion of acute attack but also for control of epilepsy thus enabling the undertaking of several preventive measures at community level.

Materials and Methods:- An observational descriptive study conducted in the Department of Paediatrics BSMC&H,Bankura between january2016 to july 2017. All cases of epilepsy came to pediatric epilepsy clinic of BSMCH aged between 2 months to 15 years and had 2 episodes of unprovoked seizure 24 hours apart as per ILAE 2014 definition criteria are included in the study.Toatal 100 cases were taken but patients with febrile seizure and neonatal seizure were excluded from study, hence a total of 75 cases were there. Specific etiology of seizure were noted.

Conclusion:- Abnormal Neurological findings and family H/O seizure disorder were established as important risk factors for the future development of epilepsy. Developmental and perinatal factors were mostly responsible for the symptomatic and probably symptomatic epilepsies.

KEYWORDS

Seizure, Epilepsy, Syptomatic seizure

I.INTRODUCTION:

Epilepsies are the most common conditions encountered in most pediatric neurology clinics in many parts of developing world. Seizures and epilepsy are not same. An epileptic seizure is transient occurrence of signs and/or symptoms due to abnormal excessive and/or synchronous neuronal activity in brain. A seizure is an event and epilepsy[1] is a disease involving recurrent unprovoked seizures.

According to ILAE definition 2014 epilepsy[1] is defined as:

1. At least two unprovoked (or reflex) seizure occurring greater than 24 hours apart
2. One unprovoked (or reflex) seizure and probability of further seizure similar to general recurrence risk (at least 60%) after 2 unprovoked seizure occurring over next 10 years .

DIAGNOSIS OF AN EPILEPSY SYNDROME –Epilepsy is considered to be resolved for individuals who have age dependent epilepsy but are now past the applicable age or those who remain seizure free for last 10 years , with no seizure medications for last 5 years .

EPIDEMIOLOGY :

Incidence of childhood epilepsy is 40 cases/100000 per year in developing countries .In India reported prevalence rate is 5-22/1000. Prevalence rates are higher in developing countries due to perinatal events,CNS infections[2,3].Seizures constitute 1% admissions in pediatric emergencies and 4-10% children have seizures during first 16 years of life[4].Risk of recurrence of seizure is 40 % after first and 80 % after second Seizure. Etiology and EEG are strongest predictors of recurrence with recurrence risk as low as 24 and high as 65 %[5]

PURPOSE OF THE STUDY

Limited data available on types of epilepsy and clinical presentations .The main motive was to study the clinical pattern of childhood epilepsies and probable etiologies . Better understanding of seizures is needed not only for abortion of acute attack but also for control of epilepsy thus enabling the undertaking of several preventive measures at community level .

1. Aim: To study the clinical profile of children with epilepsy

2. Objective: To study the etiology of epilepsy in children presenting in tertiary care hospital

II. MATERIALS & METHOD

STUDY DESIGN: Observational descriptive study

PLACE OF STUDY: Department of Paediatrics, BANKURA SAMMILANI MEDICAL COLLEGE,BANKURA

DURATION OF STUDY: January 2016 to July 2017

INCLUSION CRITERIA: All cases of epilepsy which came to paediatric epilepsy clinic of BSMCH aged 2 months to 15 years and had 2 episodes of unprovoked seizures 24 hours apart as per ILAE 2014 definition criteria .

EXCLUSION CRITERIA: Febrile seizures and neonatal seizures

SAMPLE SIZE: A sample size of 100 was calculated based on the approximate number of cases of epilepsy who attend BSMCH OPD and IPD each year as per case registry records for last 3 years. However, only 75 cases could be collected.

METHODOLOGY:

1. Case records of all patients who attended the pediatric epilepsy clinic was screened, and information such as history, elaborate physical findings, age of onset of first afebrile seizures was noted, frequency,family history, developmental milestones, previous neurological abnormalities and etiological data which include birth injuries, CNS infections, CNS malformations, cerebral palsy, cerebral vascular injuries and degenerative disorders were noted down.

2. Percentages of specific etiologies like perinatal insults, cerebral palsy, neurodegenerative disorders and CNS infections were noted .

Following details of seizures were recorded

Clinical characteristics of the seizure: This includes a detailed history given by an eyewitness or observation including the type of seizure was noted.

Age of onset of first afebrile seizure was noted.

Frequency of seizure along with details of antiepileptic drugs was also recorded.

3. Developmental assessment.
4. Previous neurological abnormalities.
5. Perinatal complications like prematurity, IUGR, anoxic or metabolic brain damage, CNS infections or seizures in the immediate postnatal period and malformations was recorded.

III. RESULTS & ANALYSIS

For statistical analysis data were entered into a Microsoft excel spreadsheet and then anlysed by SPSS 20.0.1 and GraphPad Prism

version 5. Data have been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. The median and the interquartile range have been stated for numerical variables that are not normally distributed. Student's independent sample's t-test was applied to compare normally distributed numerical variables between groups; Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate.

Explicit expressions that can be used to carry out various *t*-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a *t*-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a *t* value is determined, a *p*-value can be found using a table of values from Student's t-distribution. If the calculated *p*-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis.

p-value ≤ 0.05 was considered for statistically significant.

1.Table: Distribution of Mean Age

Parameter	Number	Mean (Months)	SD	Minimum	Maximum	Median
Age	75	25.3200	20.4828	4.0000	89.0000	18.0000

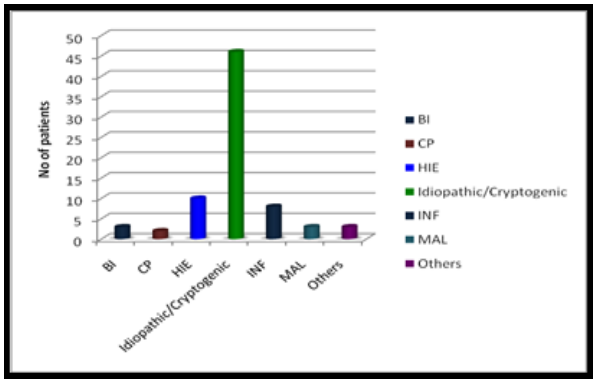
The mean age (mean± s.d.) of patients was 25.3200 ± 20.4828 months with range 4.00-89.00 months and the median age was 18.00 months.

Out of total 75 patients 20 were female and 55 were male.
29 patients were symptomatic in our study , 46 were asymptomatic.

2.Table: Distribution of cause in all patients

Cause	Frequency	Percent
BI	3	4.0%
CP	2	2.7%
HIE	10	13.3%
Idiopathic/Cryptogenic	46	61.3%
INF	8	10.7%
MAL	3	4.0%
Others	3	4.0%
Total	75	100.0%

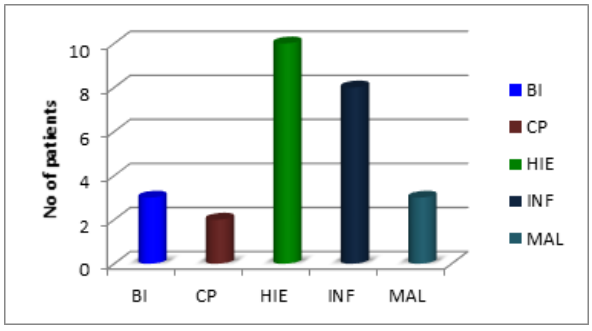
BI-Birth injury,CP-Cerebral Palsy,HIE-Hypoxic ischemic enceph alopathy, INF-Infection,MAL-Malformation



The Z-Score is 6.077. The p-value is 0. The result is significant at p <0.05.

3.Table: Distribution of cause in Symptomatic patients

Cause	Frequency	Percent
BI	3	10.3%
CP	2	6.9%
HIE	10	34.5%
INF	8	27.6%
MAL	3	10.3%
Others	3	10.3%
Total	29	100.0%



The Z-Score is 0.5676. The p-value is 0.56868. The result is not significant at p<0.05.

IV. DISCUSSION

From the present study following inferences were made:

The relative frequencies of symptomatic epilepsies were 38.7% and cryptogenic /idiopathic epilepsies were 61.3 %. This is in contrast to the famous Rochester study by Hauser et al 1993 where the corresponding results in children were 20 % symptomatic, cryptogenic -50 % and idiopathic -31%[6]. Epidemiological studies carried out in different parts of India showed much higher prevalence of idiopathic epilepsy ranging from (60-90)%. This gross discrepancy of numerics is due to utilization of neuroimaging techniques like MRI, which provides information about subtle abnormalities. In the present study there is a strong male preponderance; the boy and girl ratio is 3.74:1. This is in corroboration with the study by Eriksson and Koivikko in 1997, published in the journal *Epilepsia*[7], where the incidence varied markedly with age, with a higher ratio in case of boys. A comprehensive meta-analysis of all published studies on the Indian prevalence prepared by Sridharan, R. and Murthy B.N., *Epilepsia*, 1999 showed the prevalence rate per 1000 population to be 6.05 (3.79-8.31, 95% CI) in males and 5.18 (3.04-7.32, 95%CI) in females[8].

In the present study the **etiologies** of symptomatic and probably-symptomatic epilepsies were predominantly perinatal (HIE) having 34%, followed by infectious causes 10%, followed by other causes (birth injuries-10%, others-4 %) The results were identical to the **Rochester** study where developmental and perinatal factors contributed to 65% of similar cases (Hauser et al. 1993)[6]. 46 out of 75 patients contributed to idiopathic /cryptogenic causes. The most important risk factors for the development of epilepsy in children are congenital Malformations, Family H/O epilepsy, Past H/O Febrile seizures, Head Trauma, CNS Infections, Mental Retardation and Cerebral Palsy[6]. Adverse pre/perinatal events by themselves are not independent risk factors for epilepsy.

Family H/O seizure disorder (seizures) was elicited in 18.38 % children,. Risk of epilepsy in family members varies with the type of epilepsy, age at onset of seizures etc in the index case.

H/O **CNS infections** were present in total 8 (10.7%) patients, No positive association was found between CNS infections and future development of epilepsy.

Remote **H/O head trauma** could be elicited in 1 patients. The Direct causal relationship of head trauma and epilepsy could be established in none. In contrast with the West (eg. Annegers et al. 1980)[9] . Several Indian studies reveal that the role of head trauma in the causation of epilepsy is negligible[10,11,8].

Lastly, true remission refers to seizure free at the end of follow up period of 5 years[7,12]. As the present study was done over a 1 year period, the true remission rate could not be determined.

V.CONCLUSION

- Abnormal **Neurological** findings and family H/O **seizure disorder** were established as important risk factors for the future development of epilepsy.
- **Head Trauma** and Past H/O **CNS infections** were other important risk factors which did not show any significant association.
- **Primary generalized seizures**_were the predominant types, **Idiopathic epilepsy** comprised 41% (approx.).
- **Developmental** and **perinatal** factors were mostly responsible for the symptomatic and probably symptomatic epilepsies.

- Symptomatic epilepsy has an earlier age of onset than idiopathic and cryptogenic epilepsy.
- Intractable seizures are common in patients with symptomatic epilepsy.

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