



## Clinical Spectrum and Etiology of Seizures in Children in Age Group of Two Months to Twelve Years: A Cross Sectional Observational Study

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### Abstract

**Background:** Not only the incidence, clinical profile and etiology of seizures vary between populations. This knowledge is very useful for health care planning by health care providers.

**Method:** A total of 110 cases in age group of 2 months to 12 years brought to emergency department with acute convulsions and those patients admitted in paediatric ward and PICU (Paediatrics Intensive Care Unit) who develop acute seizures were included in the study. Relative incidence of clinical seizure types and etiological factors was determined on the basis of clinical examination and laboratory investigations.

**Result:** Generalised tonic clonic (GTC) seizures were present in 65.4% of patients while as 61.8% of patients were having infective pathology (neuro-infections) as the etiological factor for occurrence of seizures.

**Conclusion:** GTC seizures were the most common clinical seizure type while neuroinfections was the most common etiology factor for seizures in our population.

### Introduction

A seizure (from the Latin *sacire*, “to take possession of”) is a paroxysmal event due to abnormal excessive or synchronous neuronal activity in the brain. Depending on the distribution of discharges, this abnormal brain activity can have various manifestations, ranging from dramatic convulsive activity to experiential phenomena not readily discernible by an observer. Although a variety of factors influence the incidence and prevalence of seizures, 5-10% of the population will have at least

one seizure, with the highest incidence occurring in early childhood and late adulthood. <sup>(1)</sup> A seizure is a general term that is usually used to include any one of the several disorders including epilepsy, febrile seizures and possibly single seizures and seizures secondary to metabolic, infectious, or other etiologies (e.g., hypocalcemia, meningitis). <sup>(2)</sup>

The incidence of epilepsy is ~0.3-0.5% in different populations throughout the world, and the prevalence of epilepsy has been estimated at 5-10 persons per 1000. Epilepsy in resource-poor

countries is generally higher in the range of 100-190 cases per 100000, population per yr<sup>(3)</sup>. Not only the incidence, clinical profile and etiology of seizures vary between populations. This knowledge is very useful for health care planning by health care providers. This study was designed to find out the clinical spectrum and etiology of seizures in socioeconomically deprived selected Indian population

### Materials and Methods

This study was carried out in a tertiary care level Paediatric and Neonatology Department of Rajendra Institute of Medical sciences. Study period was from February 2013 to June 2014. Before commencing the study ethical clearance from hospital ethical committee was obtained. Informed written consent was taken from the parents or guardians of the patients before enrolment. A total of 110 cases in age group of 2 months to 12 years brought to emergency department with acute convulsions and those patients admitted in paediatric ward and PICU (Paediatrics Intensive Care Unit) who develop acute seizures were included in the study. Type of seizure was determined on the basis of clinical criteria. To determine the etiology, apart from history and clinical examination, CSF (cerebrospinal fluid) examination, ultrasonography of cranium, CT brain, MRI brain and EEG were performed as appropriate.

### Observations and Results

Table 1 depicts baseline and other demographic characters, table 2 clinical spectrum of seizures and table 3 etiological diagnosis

**Table 1** Baseline and other demographic characters

Attribute	No.(%age)	No.(%age)
Age (months)		
2-11	Male : 5 (7.6)	Female: 2 (4.6)
12-59	Male: 36(54.5)	Female: 18 (40.9)
60-144	Male: 25(37.9)	Female: 24( 54.5)
History of Perinatal asphyxia		
	Yes	105 (95.5)
	No	5 (4.5)
Developmental delay		
	Yes	100 (90.9)
	No	10(9.1S)
Family history of seizures		
	Yes	11 (10)
	No	99 (90)

### Discussion

A total of 110 subjects in the age group of 2 months to 12 years were enrolled in our study. Generalized tonic clonic seizures were the most common clinical seizure type (65.5%) at presentation (Table 2).

**Table 2** Clinical spectrum of seizures

Type of seizure	Male	Female	Total
Generalized Tonic Clonic	35 (63.6)	37 (67.3)	72 (65.4)
Generalized Tonic	15 (27.3)	14(25.4)	29 (26.4)
Partial	5 (9.1)	4(7.3)	9 (8.2)
Total	55 (50)	55 (50)	110 (100)

Neuroinfections (combined) were the most common etiological factor. Meningoencephalitis was the most common etiological diagnosis among infective causes (22.7%) followed by cerebral malaria (20.9%; table 3).

**Table 3** Etiological diagnosis

Diagnosis	No. of cases	percentage
Febrile Convulsion	9	(8.2)
Pyogenic meningitis	3	(2.7)
Meningoencephalitis	25	(22.7)
Cerebral malaria	23	(20.9)
Neurocystis cercosis	5	(4.6)
Tubercular meningitis	8	(7.3)
tuberculoma	4	(3.6)
Cerebral palsy	6	(5.5)
Unknown etiology	27	(24.5)
Total	110	(100)

### Age of Distribution

In the present study majority of the cases were in the age group less than 5 years of age (55.45%). In the study conducted by Koul R et al<sup>(4)</sup> as many as 42.65% cases were below 6 years of age. Shakya KN et al<sup>(5)</sup> and Shah et al also reported maximum number of cases (about 56%) in the age of less than 5 yrs (56% and 75% respectively).

### Sex distribution of the cases

In present study there was male preponderance. Out of 110 cases of convulsion 66 (60%) were male which is comparable to studies by Senanayake et al<sup>(6)</sup> (78%), Usman et al<sup>(7)</sup> (58%) and Koul R et al<sup>(8)</sup> (60.5%). This could be because generally, for any illness males are brought to medical attention more when compared to females because of the male dominant societal pattern.

**Type of convulsion**

Generalised Tonic Clonic Seizures (GTCS) were the most common type of convulsions (65.45%) followed by Generalized Tonic Seizure (26.37%). Tinuade Ogunieso et al.<sup>88(9)</sup>, Koul R et al.<sup>84(4)</sup>, Shah et al.<sup>5(10)</sup> and Shakya et al.<sup>(5)</sup> found that Generalized Tonic Clonic Seizures were the commonest seizures type (76.9% and 72.6%, 54.8% and 36% respectively)

**Family history**

Family history is important while evaluating epilepsy patients because many epileptic syndromes have a familial predisposition and some may possibly have an autosomal dominant pattern of inheritance.<sup>(11)</sup> Our study showed a positive family history in 10%. In studies by Koul R et al.<sup>(4)</sup>, positive family history of seizures was reported in 8.9% cases. Risk of epilepsy increases by 3 folds in first degree relatives. In developing countries due to inbreeding customs, the stigmatism of epilepsy prevents those affected from finding marriage partners from healthy families. Such practice actually increases risk of epilepsy in offspring.<sup>(12)</sup>

**Birth history**

In the present study only 4.55% of the cases had significant birth history mainly in the form of birth asphyxia which was comparable in both the drug groups. In the study conducted by Tinuade Ogunieso et al.<sup>(9)</sup> birth asphyxia was leading etiology for seizures (37.3%). This may be related to high fatality of HIE II and HIE III patients in our setup.

**Developmental History**

Developmental delay should be evaluated in all cases. Mental retardation, global developmental delay is most common neurologic abnormality with seizures. In the present study 9.09% had significant developmental delay. Apart from cerebral palsy, developmental delay of varying grades may be found with associated conditions like mental retardation or failure to thrive. Similar findings were reported in reported done by Koul R et al.<sup>(13)</sup> and Blume WT et al.<sup>(14)</sup>

**Diagnosis of the cases**

In the present study majority of the cases were due to neuroinfection with infective cause (25.45%) were diagnosed as seizure disorder. 22.73% were diagnosed as meningoencephalitis, 20.91% were due to Complicated malaria. 8.18 % were due to febrile convulsion, 7.72% were due to TBM (Tubercular meningitis), 4.55% were due to Cerebral palsy, 4.55% were due to neurocysticercosis, 3.63% were due to tuberculoma, 2.73% were due to pyogenic meningitis. These results were comparable to the study done by Pratibha Singhi<sup>(15)</sup>.

**Conclusion**

The most common clinical seizure type in our setup is Generalised Tonic Clonic Seizures and the most common etiologic factor is neuro-infection in our study population.

**Conflict of interests:** Nothing to disclose

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