## **Original Research Article**

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# Study of prevalence and clinical spectrum of seizures in children in a teaching hospital in rural Telangana, India

C. P. V. Ramana Sastry\*, R. Manohar Reddy

Department of Peadiatrics, Maheshwara Medical College, Patancheru, Telangana, India

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## \*Correspondence:

Dr. C. P. V. Ramana Sastry, E-mail: cpvramana@gmail.com

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## **ABSTRACT**

Background: To study the prevalence and clinical spectrum of seizures and treatment outcome in children.

**Methods:** A hospital based prospective study was done at Maheshwara Medical College and Hospital, Patancheru, Telangana in the department of Paediatrics over one-year period. A total of 75 cases presenting with seizures were studied for demographics, clinical features, imaging studies where possible and patient response to treatment.

**Results:** T Patient age ranged from one week to 14 years with male to female ratio of 1:4. Majority were in the age group of 1-3 years 25/75 (33.3%). Fever was present on admission in 66.6% of cases in 1 month to 6 years. Unprovoked seizure was common 20/75 (26.6%) in age group 6 to 14 years. Neonatal seizures were seen in 6.6% cases. Generalized tonic clonic seizures were common and were seen in 63.3% cases. Only 5 (6.6%) cases presented with status epilepticus. CT scan was done in 20 cases in unprovoked seizures and showed various etiologies.

**Conclusions:** Seizures in children are a common indication for hospital admission. They can be febrile or unprovoked. CNS infections and space occupying lesions are common causes for paediatric seizures. Early detection of the cause of seizures helps in instituting appropriate treatment. Children with unprovoked seizures should be on regular long term follow up and treatment.

Keywords: Afebrile seizures, Neurocysticercosis, Seizures in children, Unprovoked seizures

## **INTRODUCTION**

Epilepsy is a common medical illness worldwide. It is estimated that 0.5-1% of all children have epilepsy, with the majority presenting during infancy or early childhood.<sup>1</sup>

The incidence is highest from 12 months of life through 2 years of age which is due to epilepsy associated with mental retardation and cerebral palsy.  $^{2}$ 

Also epilepsy increases the mortality. But it is known that childhood epilepsy has a better prognosis when compared to epilepsy in adults.<sup>3</sup> The prevalence rate (PR) of

epilepsy for developed and developing countries has a wide range and has been reported between 3/1000 and 22.2/1000.<sup>4-6</sup>

The high incidence in developing countries is attributable to high incidence of parasitosis like neurocysticercosis (NCC), central nervous system (CNS) infections, HIV, head injury and perinatal morbidity.<sup>7</sup>

The incidence of epilepsy (recurrent unprovoked seizures) in children and adolescents seems relatively consistent across all populations studied, ranging from 50 to 100/100, 000 person-years. In most of the studies, febrile seizures were reported to be the most common

type seen in the paediatric population and account for the majority of seizures seen in children younger than 5 years of age. 9,10

Febrile seizure was defined by the 1993 International League Against Epilepsy as, "an epileptic seizure occurring in childhood after 1 month of age, associated with febrile illness not caused by an infection of the central nervous system (CNS), without previous neonatal seizure or previous unprovoked seizure, and not meeting criteria for other acute symptomatic seizure."

In addition, febrile seizures were classified as simple febrile seizures or complex febrile seizures. A simple febrile seizure lasts less than 15 minutes, is initially generalized in nature and occurs once during a 24-hour period. In contrast, a complex febrile seizure lasts more than 15 minutes, has focal features at any time, or recurs within a 24-hour period. 11

Other common etiologies include meningitis, encephalitis and CNS infections that are diagnosed based upon the correct recorded clinical and laboratory investigations.

Seizures in children have a considerable mortality and morbidity. <sup>12</sup> Status epilepticus may also give rise to defective cognitive development and psychiatric impairments in later life. <sup>13</sup> The aim of the study is to observe the prevalence, the clinical spectrum and the outcome of seizures in children in a rural teaching hospital.

#### **METHODS**

No ethical issues were involved in the present study. This was a hospital based prospective study done at Maheshwara Medical College and Hospital, Patancheru, Telangana, in the department of Paediatrics over a duration of one-year ie from February 2017 to January 2018. Informed consent was taken from parents of all the children included in the study.

In present study included a total of 75 cases who presented with complaints of seizures and were admitted in the paediatric ward.

## Inclusion criteria

- Age group of 1 week to 14 years
- Both genders
- Febrile seizures
- Afebrile seizures
- Recurrent episodes of seizures.

## Exclusion criteria

- Age group above 14 years.
- Seizures in developmentally abnormal children.
- Children admitted for other complaints and developed seizures during the course of their illness.

Neonatal seizures admitted in neonatal intensive care unit.

Patients attending Paediatric OPD or the Emergency departments with complaints of seizures that were febrile or unprovoked were admitted in the paediatric ward.

Clinical history was taken including patient demographics like age and gender, type of seizure, associated symptoms (fever, cough, rhinorrhea, vomiting, diarrhea and headache), family history of seizure or epilepsy, birth history, developmental history, immunization status, past history of seizures and treatment history.

Routine laboratory investigations were done including complete blood picture, (hemogram), complete urine examination, serum C-reactive protein, serum electrolytes, blood glucose estimation.

CT scan head was done in the department of Radiodiagnosis.

CSF analysis was done wherever indicated and results recorded.

We classified seizure type as generalized tonic-clonic (GTC), absence, myoclonic, partial and other seizures types based on the Commission on Epidemiology and Prognosis, 1993 International League Against Epilepsy.<sup>11</sup>

## **RESULTS**

Total number of cases admitted in peadiatric ward in oneyear duration was 960 patients and 75 cases presented with both febrile and unprovoked seizures and neonatal seizures. In the present study, the patient age ranged from 1 week to 14 years.

There were 60 (80%) females and 15 (20%) males. The male to female ratio was 1:4.

The prevalence was calculated as

Total no. of cases with seizures x 100

Total no. of cases admitted

 $=75 \times 100 = 0.7 \%$ 

=960

Hence, prevalence of seizures in children in a teaching hospital in rural Telangana was about 0.7 %. In the present study, majority (25/75 cases, 33.3%) of the children were in the age group of 1-3 years.

Next common age group was of 4-6 years having 22/75 (29.3%) cases. Neonatal seizures were seen in 5 /75 (6.6%) cases.

Fever was present on admission in 50/75 cases (66.6%) of children. The age range of 1 to 6 years had most (94%) cases of febrile seizures.

Table 1: Age distribution of the children presenting with seizures.

Age group	Number of cases	Percentage
1 week to one month	5	6.6%
1 month-12 months	3	4.0%
1 year-3 years	25	33.3%
4 years-6 years	22	29.3%
7 years-12 years	15	20%
>12 years	5	6.6%
Total	75	100%

Afebrile seizures were common 20/75 (26.6%) cases in the age group of 6 years to 14 years. The febrile seizures

were treated with clobazepam 0.1mg /kg/day in two divided doses along with hydrotherapy and antipyretics.

Table 2: Age distribution of patients presenting with febrile seizures.

Age group	Number of cases	Percentage
1 month-12 months	3	6
1 year- 3 years	25	50
4 years- 6 years	22	44
Total	50	100

Majority (25/50, 50% cases) of the children were in the age group of 1-3 years and next common age group was 4-6-year olds having 22/50, 44% cases. In the present study 20 cases presented with unprovoked seizures. The cases of TB granuloma were treated with anti-tuberculous treatment (ATT) for 6 months (HREZ for 2 months, HR for 4 months and prednisolone in 3 divided doses.

Table 3 Age distribution of patients presenting with unprovoked seizures

Age group	Number of cases	Diagnosis on CT scan / MRI	Percentage
6 years	4	Tuberculous granuloma	20
7 years	4	Neurocysticercosis	20
8 years	2	Medulloblastoma	10
9 years	6	Multicystic encephalomalacia	30
10 years	1	Sturge-Weber syndrome	5
11 years	1	Von Hippel syndrome	5
12 years	1	Subcortical band heterotopia	5
13 years	1	Cerebrohemangioblastoma(MRI)	5
Total	20	-	100

In Neurocysticercosis, Albendazole 400 mg was given BD for 28 days and injection decadron 0.1mg/kg divided 6th hourly.

The patients with neoplastic conditions were referred to higher centers for appropriate neurosurgical procedures. The infectious conditions were treated in our hospital. No child had any neurological deficits post-treatment.

## Distribution of neonatal seizures

There were five cases of neonatal seizures. The etiology for neonatal seizures was hypoxic ischemic encephalopathy (HIE), hypoglycaemia, multicentric encephaomalacia and West syndrome in one case each. The hypoxic ischemic encephalopathy was treated with phenobarbitone.

The hypoglycaemic seizures were treated with 10% glucose. One case of Hypocalcaemia was treated with 5 ml of 10% calcium. One case of West syndrome was treated with prednisolone. Generalized tonic clonic

seizures were the commonest seizure type accounting for 63.3% cases.

Table 4: Distribution of cases based on type of generalised seizures.

Type of seizure	Number of cases	Percentage
GTC	38	63.3
Tonic	10	16.6
Clonic	5	8.3
Myoclonic	2	3.3
Absence	1	1.6
Atonic	4	6.6
Total	60	100

GTC:Generalised tonic clonic

## Distribution of cases based on partial seizures

There were 5 (33.3%) of simple partial seizures and 10 (66.6%) of complex partial seizures. In the present study only 5 (6.6%) cases presented with status epilepticus. All

were treated with injection lorazepam 0.05mg/kg intravenously, followed by Phenytoin sodium 20mg/Kg loading dose dissolved in 100 ml normal saline, then phenobarbitone was given 20mg/kg/stat, 5 mg every 15 minutes.

One case had uncontrolled seizures, despite the above treatment and was shifted to tertiary care centre. In the present study positive family history of seizures was present in 6 (8%) cases. In the present study, 80% children had presented with first episode of seizures and 20% children had a past history of seizures.

Table 5: Clinical features of patients with generalized tonic-clonic seizures (GTCS) and partial seizures.

Clinical features*	GTCS	Partial seizures
Fever	50	10
Vomiting	30	10
Headache	30	-
Meningeal irritation	10	10
Unconsciousness	10	5

## **DISCUSSION**

Age distribution: In the present study, 75 patients with seizures in the age range of 1 week to 14 years were studied. Majority (33.3% cases) of the children were in the age group of 1-3 years. Children less than 6 years accounted for 73.2% cases. Idro et al., studied paediatric patients in rural Kenya and found that the median age was 25 months i.e. around 2 years. <sup>10</sup>

Saravanan studied 520 paediatric seizure patients and found 74.6% cases to be less than 6 years age. <sup>13</sup> Chaudhary et al., conducted a study in western Nepal with 168 children aged 2 months to 16 years admitted for seizures. They observed a mean age of 8.2 years in children with seizures. <sup>15</sup>

Mwipopo et al., studied 200 children who were admitted with seizures as their presenting complaint. In their study 96.5% patients were in the age range of 1 month to 5 years. Kandil et al., study from Egypt studied a total of 127 patients with age range from birth to 18 years old. In their study for 70% cases the age of presentation of seizures was 5.9 years. <sup>16,17</sup>

## Gender distribution

In the present study there was a female predominance with male to female ratio of 1:4. In the Kenyan study by Idro et al., there was a slight male predominance with 54.2% of male children. Saravanan observed slight male preponderance with 57.7% males and 42.3% females and the male to female ratio was 1.36:1. Chaudhary et al., also in their study observed a male predominance with 104 male patients and 64 female patients and the male to female ratio in their study was

1.6:1.<sup>15</sup> Mwipopo et al., also observed a slight male predominance with 54.5% males and 45.5% female patients.<sup>16</sup> Kandil et al., reported an almost equal gender ratio for seizures (64 males and 63 females).<sup>17</sup> Prevalence of seizures: Idro et al., in their Kenyan study observed a prevalence of 18.3%.<sup>10</sup> Chaudhary et al., found a prevalence of 3.4% for seizures in Western Nepal.<sup>15</sup> The present study has lesser prevalence (0.7%) than the above studies.

Febrile seizures: In the present study, febrile seizures were seen in 66.6% (50/75) cases. Afebrile seizures were common 26.6% (20/75) in age group 6 to 14 years. In the study by Mwipopo et al., observed febrile seizure as the leading cause of seizure in 175 (87.5%) children in their study. Afebrile seizures (seizures without fever) were common 5 (57.1%) in age group of 5 to 14 years. Saravanan S also reported seizures coexisting with fever in 51.5% of cases. In a study by Dhakal et al., febrile seizures were commonly observed in children below 2 years age. Rebrile seizures were observed in 8.3% of cases by Chaudhary et al.

## Generalised versus partial seizures

Generalized tonic clonic seizures were the commonest seizure type in the present study and were seen in 63.3% (38/60) and most of them were febrile. Complex partial seizures were seen in 10 cases (66.6%) and simple partial seizure were seen in 5 cases (33.3%). Saravanan S observed that generalized tonic-clonic seizures and partial seizures as the common type among children more than 7 years.<sup>14</sup>

Partial seizures represented 212 (40.8%) of children in the thier study. Chaudhary et al observed 138 (82.1%) of their patients having generalized tonic-clonic seizures and 30 (17.9%) patients having partial seizures. To GTCS were more common than partial seizures in both the genders (M=82.7%; F=81.2%) in their study. Mwipopo1 et al, also observed generalized seizure to be mostly tonic clonic type and was seen in 196 (98.0%) cases. Children with focal seizures were only 4 (2%). Kandil et al., also observed generalized tonic-clonic seizures as the most common type of seizures and was seen in 72.1% cases.

In the present study only 5 (6.6%) cases presented with status epilepticus. Irdo et al, in their study found status epilepticus in 9.1% cases. 10 Our observations compare well with the above studies. Space occupying/organic lesions: in the present study, computed tomography (CT) scan was done in 20 cases who had unprovoked seizures. The CT scan results showed 4 cases as Tuberculous granulomas, 4 cases as Neurocysticercosis, 2 cases as Medulloblastoma, 6 cases Multicystic as encephalomalacia and one case each of Sturge-Weber syndrome, Von Hippel Lindau syndrome and Subcortical band heterotopia.

Chaudhary et al, reported 168 seizure patients with neuroimaging done in 138 patients of which 73 (43.4%) were normal and 72 (42.9%) showed neurocysticercosis. Saravanan S reported 25% cases having abnormal neuroimaging studies of which 4% were of Neurocysticercosis. Mwipopo et al, also observed abnormal brain images in 10 (20%) out of 50 patients in their study. Missing the seizure patients with neuroimages in 10 (20%) out of 50 patients in their study.

Associated clinical features: In the Kenyan study by Idro et al, 92.1% patients had fever. Hypoglycemia was seen in 3.1% patients.<sup>10</sup> In their study 58% cases of seizures were due to falciparum malaria. Mwipopo observed fever in 91% (n=200) patients in their study.

In the present study positive family history of seizures was seen in only 6 (8%) cases. Kandil et al, and Mwipopo et al, observed a positive family history of seizures in 17.3% and 9.5% of their patients respectively. 16,17 In the present study, 80% of children had presented with first episode of seizures and 20% of children had past history of seizure.

Saravanan S found that 81% of children presented with first episode of seizures whereas 19% of children already had one or more episodes before. Our findings compare well with the above author.<sup>14</sup>

#### **CONCLUSION**

Seizures in children are a common indication for hospital admission. Seizures in children can be febrile or unprovoked.

CNS infections and space occupying lesions are common causes for paediatric seizures which require thorough evaluation including neuroimaging studies. Early detection of the cause of seizures helps in instituting appropriate medical or surgical treatment. Children with unprovoked seizures should be on regular long term follow up and treatment.

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Institutional Ethics Committee

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