

### **Clinical profile and outcome of seizures in hospitalized children**

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### **Introduction**

Seizures are the most common pediatric neurological disorder globally.<sup>1</sup> A seizure consists of transient symptoms and/ or signs due to abnormal excessive or synchronous neuronal activity in the brain with a clear start and finish (ILAE 2015).<sup>2</sup> Seizures can present as a wide array of physical changes or changes in consciousness and of varying severity. According to World Health Organization (WHO) emergency, triaging and treatment (ETAT), a seizure is recognized as one of the most common danger sign in children.<sup>3,4</sup>

Approximately 4–10% of children experience at least one episode of seizure in the first 16 years of life and about 1% of children land in emergency with the complaint of seizure.<sup>5</sup> Incidence of seizure is highest in children less than 3 years, which then gradually decreases with increase in age.<sup>6</sup> Most studies show higher incidence in males than in females.<sup>7,8</sup> Febrile seizure is the most common type of acute seizure in children all around the globe.<sup>9</sup>

Though convulsion is an obvious manifestation of some underlying condition it produces scare in the parents. It is

necessary to find out exact cause of convulsion. Number of diseases causing convulsion are ranging from birth trauma, asphyxia, infections, metabolic disorders, electrolyte disturbances, neuro-anatomical defects, and degenerative diseases to idiopathic group.<sup>10</sup>

In some Asian countries central nervous system infections (CNS) especially neurocysticercosis, are mentioned to be the main cause of seizures.<sup>11-14</sup> In Sub Saharan Africa malaria is the leading cause. Therefore a major risk factor for cognitive, neurological impairment and development of epilepsy in children living in these regions is acute seizures.<sup>15,16</sup> In patients with simple Febrile Seizures (FS) routine brain imaging like head CT (cranial Tomography) scan or MRI (magnetic resonance imaging), is discouraged as it has no additional diagnostic and prognostic value; and there is a concern about the cost of these investigations in developing countries which are having limited and poor resources. Nevertheless, children admitted with afebrile seizure are often evaluated using these imaging examinations even though

some reports indicate they should not be routinely done in these patients.<sup>17</sup>

Further investigations likewise, are not routinely suggested, unless necessary. Complete blood count is indicated in children who appear ill, electrolyte studies and serum glucose are considered when there is a history of vomiting or diarrhea and urinalysis can be done when the source of fever is not identified.<sup>18,19</sup>

Seizure control usually requires transport to an emergency room and immediate management of continuing seizures with the key role of drug treatment for its termination.

An ideal drug is the one which is easy to administer, effective, safe and has long lasting anticonvulsant activity.<sup>20</sup> Benzodiazepines are used as first line agents in parenteral, rectal and sublingual routes.<sup>21,22</sup>

Emergency room doctors and staff should be well aware of standard management in children who present with seizures in order to avoid complications of prolonged seizures and early seizure control. Hence this study was conducted to visualize the clinical profile and outcome for pediatric seizure control being followed in a tertiary care hospital.

### Aims & objectives

1. To study the clinical profile of seizures in hospitalized children.
2. To study the commonest risk factors and outcome of seizures in children who were admitted to pediatrics ward with complaint of seizure.

### Material & methods

**Type of study:** Prospective observational study.

**Study period:** July 2022 to Dec 2022.

**Sample size:** The total numbers of patients with seizure under study are 124 admitted during study period.

### Inclusion criteria

This study includes all children in the age group 1 month to 12 years who presented in the department of pediatrics with episode of seizure.

### Exclusion criteria

1. Children below 1 month of age.
2. Children after 12 years of age.
3. Children with head injuries.

### The data extracted from the medical records of each patient included

date of admission, age (range from 1 month to 12 years), sex, type of seizure, fever onset, duration of convulsion, frequency of seizures in the current illness, past medical history, family history of seizure or epilepsy, developmental history, associated symptoms, duration of hospital stay, final diagnosis and outcome.

- Preliminary investigations such as complete blood count, blood glucose, serum electrolytes, cerebrospinal fluid (CSF) analysis, Chest X-ray, Mantoux test, and neuro imaging including computed tomography (CT) scan head, EEG, and other tests were undertaken.

### Data analysis

Fischer exact test was applied in 2x2 tables and Association of hospital stay of patients presented with seizures with respect to CSF study, EEG and MRI calculated.

### Results

The total numbers of patients with seizure under study are 124 in which 72 were males and 52 were females. Among these patients, 87 were aged 1 month to 5 years. The most common clinical seizure type was generalized tonic-clonic. Febrile seizure was the leading cause of seizure in children.

Table 1: Distribution of study subjects according to age.

Age	Number	Percentage (%)
1 month to 5 years	87	70
5.1 to 12 years	37	30

Graph 1: Distribution of study subjects according to age.

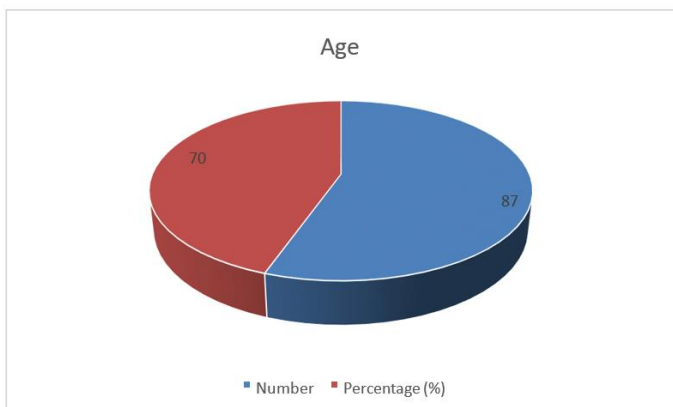


Table 2: Distribution of study subjects according to sex.

Sex	Number	Percentage (%)
Male	72	58
Female	52	42

Graph 2: Distribution of study subjects according to sex.

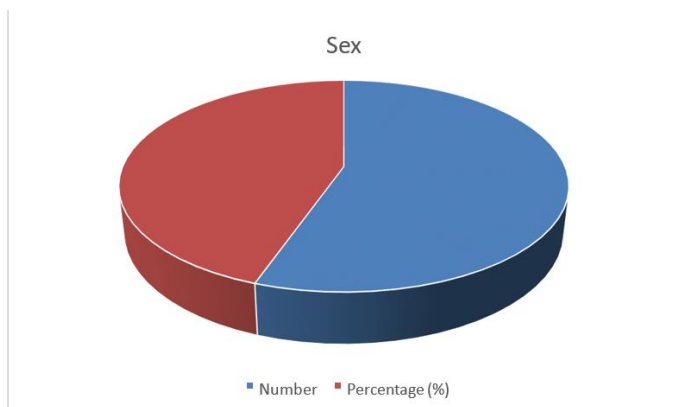


Table 3: Distribution of study subjects according to type of seizures.

Type of seizures	Number	Percentage (%)
GTC (Generalized tonic-clonic)	91	73
Focal	22	18
Absence	1	1
Myoclonic	3	2
Status epilepticus	7	6
Total	124	100

Graph 3: Distribution of study subjects according to type of seizures.

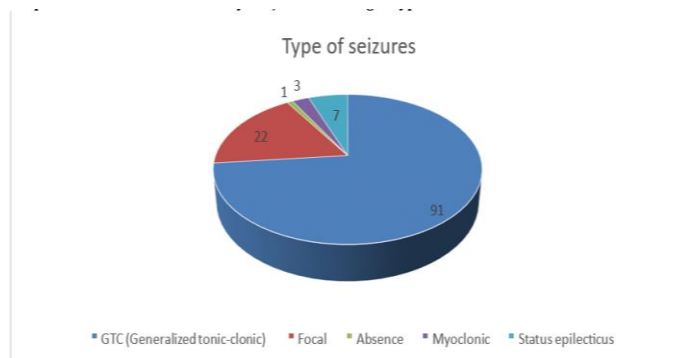


Table 4: Distribution of study subjects according to etiology.

Etiology	Number	Percentage (%)
Infection	24	19
Febrile	81	65
Epilepsy	12	10
Space occupying lesion	1	1
Metabolic disorder	6	5
Total	124	100

Graph 4: Distribution of study subjects according to etiology.

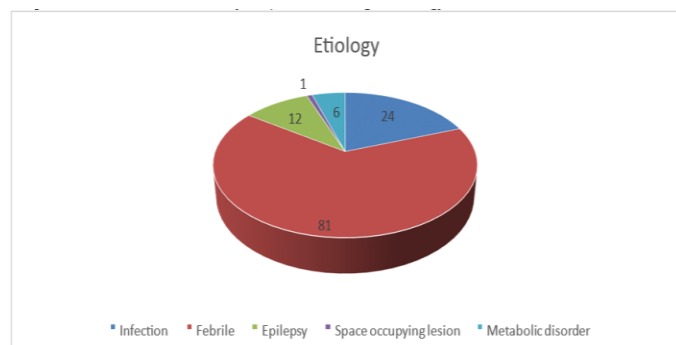


Table 5: Distribution of study subjects according to outcome.

Outcome	Number	Percentage (%)
Discharge without deficit	106	85
Discharge with deficit	15	12
Death	3	2

Graph 5: Distribution of study subjects according to outcome.

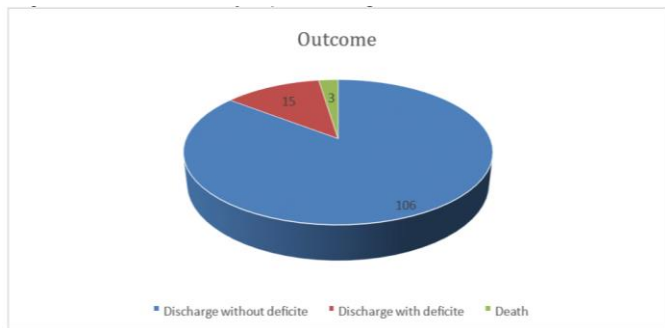


Table 6: Distribution of study subjects according to Investigations.

Investigations	Number	Percentage (%)
CSF	Not done	84
	Abnormal study	24
	Normal study	16
EEG	Not done	97
	Abnormal study	17
	Normal study	10

Graph 6: Distribution of study subjects according to Investigations.

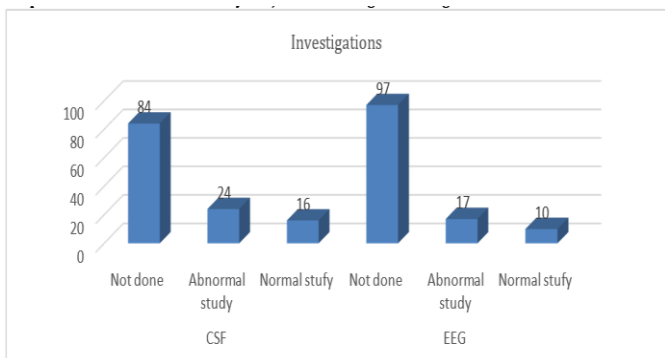


Table 7 (a): Distribution of study subjects according to duration of stay.

Duration of stay	Normal	Abnormal	p value
CSF Level	< 7 days	11	0.0032
	≥ 7 days	5	19
EEG	< 7 days	8	0.015
	≥ 7 days	5	12

Graph 7 (a): Distribution of study subjects according to duration of stay.

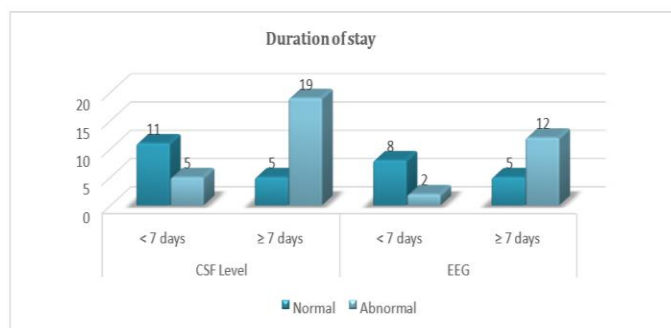
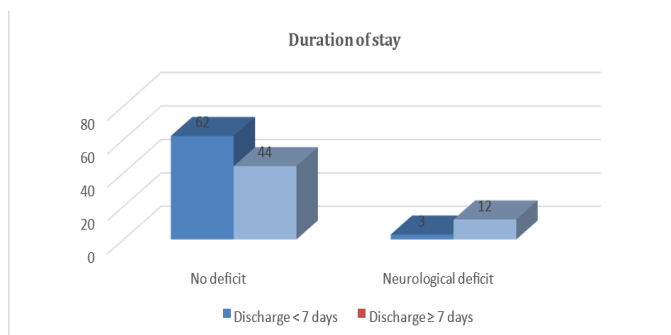


Table 7 (b): Distribution of study subjects according to duration of stay.

Duration of stay	No deficit	Neurological deficit	p value	
Discharge	< 7 days	62	3	0.0053
	≥ 7 days	44	12	

Graph 7 (b): Distribution of study subjects according to duration of stay.



## Discussion

This was a record based cross sectional study of children presented with seizure. This study aimed to analyse demographics, clinical seizure types, etiologies and outcome of those children as well as duration of hospital stay for seizures.

Neonates are excluded because frequently they comprise one spectrum of diseases like septicemia, hypoxic-ischemic encephalopathy, and metabolic disorders.

- There is high incidence of seizures in younger age group of children and a decreasing trend in older ones. In

this study also most children were younger than 5 years of age, even though not very significant but males had higher prevalence compared to female. Generalized tonic clonic seizure are found to be the commonest clinical seizure type and had higher incidence among children presenting with febrile seizure.

- First attack of seizure can have many possible etiologies, febrile seizure, infection, neuro logic / developmental causes, metabolic disturbances, traumatic head injury, toxins, febrile seizure etc.

One of the most common cause of seizure attack was reported to be due to febrile seizure. In this study febrile seizures constitute 76% and was found to be main the etiology of a first attack of seizure in children less than 5 years of age.

- In patients presented seizures EEG, MRI or CSF study done as required depending on clinical presentation

- CSF study done for 40 patients who presented with signs of meningeal irritation, unconsciousness, 2 or more episodes of seizures and out of which 24 results came abnormal. EEG done for total 27 patients out of which 17 reports showed abnormal reports.

- Out of 124 patients 106 were discharged without any neurological deficit.

- In patients presented seizures EEG, MRI or CSF study done as required depending on clinical presentation. CSF study done for 40 patients who presented with signs of meningeal irritation, unconsciousness, 2 or more episodes of seizures and out of which 24 results came abnormal. EEG done for total 27 patients out of which 17 reports showed abnormal reports.

- Out of 124 patients 106 were discharged without any neurological deficit.

- The findings in the present study are consistent with the previous studies done by Mwipopo E et al, Poudel P et al, Mwoyofiri T et al, Abbasi A et al, Bhandari I et al.

## Conclusion

1. Seizures are the commonest neurological presentation in children.
2. Most of childhood seizures are caused by febrile seizure resulting in good outcome, good prognosis and short duration of hospital stay.
3. Routine examination of brain imaging studies, blood sugar and electrolytes are not necessary in all cases presenting with seizures.
4. However, children with unprovoked seizures require brain imaging studies for better understanding of seizure etiology.

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