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Original Research Article

CLINICAL PROFILE OF CHILDREN WITH FEBRILE SEIZURES IN GOVERNMENT GENERAL HOSPITAL, NAGARKURNOOL, TELANGANA

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ABSTRACT

Background: Febrile seizures are the most prevalent seizures in children aged between 6 – 60 months. They are generally benign however; they are of great concern to the parents. Understanding the clinical profile of these seizures is crucial for effective management and counseling. The current study tried to evaluate the clinical profile and seizure characteristics of children presenting with febrile seizures at our hospital.

Materials and Methods: This cross-sectional observational study was conducted on 74 children aged 6–60 months from July to December 2024. A detailed history and clinical examination were done for each case. Relevant investigations and laboratory tests were done for all cases. Data was recorded using a predesigned proforma and analyzed by SPSS version 25 for statistical analysis.

Results: Most of the children in this study were between 13 and 36 months old (62.2%), and just over half were boys (51.4%). About three-quarters (77%) of the cases involved simple febrile seizures. In most children, the seizures happened within 24 hours of developing a fever. Approximately one-third of the children had a family history of seizures (32.4%), and this was more common among those with simple febrile seizures. The most frequent cause of fever was an upper respiratory tract infection (54.1%). Nearly half of the children showed an increase in white blood cells (45.9%). Cerebrospinal fluid (CSF) examination was normal in all cases. There was no significant difference in hemoglobin levels between the different types of seizures.

Conclusion: Febrile seizures occurred in children aged 1 – 3 years most of these were simple in nature and occurred following respiratory tract infections. Family history of seizures and early fever onset were significant predictors. Early diagnosis and appropriate evaluation and treatment play a key role in managing febrile seizures effectively.

Keywords: Febrile Seizures, Respiratory Tract Infections, Pediatric Age Group, Complex Seizures.

INTRODUCTION

Febrile seizures (FS) are the most common type of seizure seen in children. They usually affect children between the age group of 6 months and 60 months. In the majority of cases, fever acts as a triggering factor without evidence of intracranial infections or electrolyte imbalances, and in most of these cases they are benign in nature.[1] FS occurs in 2-5% of neurologically normal children however, their prevalence is higher in certain regions and parts of India where there is a lack of awareness and access to medical care is limited.[2,3] The definition of febrile seizures as defined by International League Against Epilepsy (ILAE) as seizures occurring in children aged 6 – 60 months associated with fever of more

than >38°C without evidence of CNS infections or previous afebrile seizures.[4] FS are classified into two groups based on their presentation. Simple febrile seizures which are generalized last for less than 15 minutes and do not recur within 24 hours. Complex febrile seizures are those that last for more than 15 minutes, are focal, and recur within 24 hours.[5] Simple febrile seizures are the cause of seizures in 70 – 75% of all cases of FS however, the complex seizures raise concern regarding future risk of epilepsy or neurodevelopmental risks.[6,7] The etiology of FS appears to be multifactorial which includes genetic predisposition and a positive family history is present in approximately 25-40% of cases.[8] Common triggering factors are viral infections which include upper respiratory tract infection, herpesvirus-6, influenza, and adenovirus.[9] The rapid rise in body temperature rather than the peak temperature itself is believed to be a significant precipitating factor.[10] In rural and semi-urban Indian settings, timely diagnosis and management of febrile seizures are often hindered by limited healthcare access, lack of awareness, and cultural beliefs. This frequently results in delayed presentation or inappropriate first-aid measures, which may further complicate the clinical picture. Moreover, the anxiety associated with seizure episodes, especially when witnessed for the first time, leads to significant parental distress, often resulting in overmedication or unnecessary investigations.[11,12]

Despite their benign prognosis, febrile seizures may serve as a marker of underlying systemic illness or a precursor to future neurological conditions in a small subset of children. Hence, understanding the clinical profile of affected children is essential to improve early recognition, ensure proper management, and provide appropriate counseling to caregivers.[13] While several studies have examined FS in various Indian regions, data from the Telangana state, especially in government healthcare settings such as Government General Hospital, Nagarkurnool, remain scarce. The current study was designed to evaluate the clinical profile, type, frequency, family history, precipitating factors, and outcomes of febrile seizures in children presenting to the Government General Hospital, Nagarkurnool.

MATERIALS AND METHODS

This cross-sectional observation study was done in the Department of Pediatrics, Government Medical College and Hospital, Nagarkurnool, Telangana, India. The duration of the study was from 1st July 2024 to 31st December 2024. Institutional Ethical approval was obtained for the study. Written consent was obtained from the parents/guardians of the cases included in the study after explaining the nature of the study in vernacular language.

Sample Size calculation: The sample size was calculated using the formula: N = Z2 p (1-P)/ d2 Where: Z = 1.96 (for 95% confidence interval), p = expected prevalence, d = precision or allowable error. A total of 74 children were enrolled in the study.

Inclusion Criteria

1. Children aged between 6 months and 60 months present with febrile seizures.
2. Males and Females
3. Admitted to Pediatric ward of Govt. General Hospital, Nagarkurnool.

Exclusion Criteria

1. Children aged <6 months or >60 months.
2. Children with febrile illness and evidence of intracranial infections (e.g., meningitis, encephalitis).
3. Children with known chronic neurological disorders, and metabolic abnormalities.
4. Hemodynamically unstable children and those in status epilepticus at presentation.

After identifying the cases based on the inclusion and exclusion criteria, a detailed clinical history was recorded using a predesigned proforma. Data included Demographic information (age, sex, residence), Presenting complaints, onset and duration of fever. Description of seizure episode (duration, type: generalized/focal, recurrence within 24 hours), history of seizures, birth history, developmental milestones, Family history of febrile or afebrile seizures, Use of antiepileptic medications, and any similar previous episodes. Following history, all enrolled children underwent a thorough physical and neurological examination.

Relevant investigations were performed as per clinical requirement, including Complete blood count (CBC), Serum urea, creatinine, electrolytes, calcium, Random blood sugar, Urine routine examination, Fundoscopic examination, Lumbar puncture when clinically indicated to rule out CNS infections, Chest X-ray and computed tomography (CT) of the brain were done if clinically warranted, Blood culture was sent in cases without obvious localizing signs of infection. All clinical and laboratory data were recorded systematically in the study proforma.

Statistical analysis: Data was refined, segregated, and uploaded to a Microsoft Excel spreadsheet and analyzed by using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY). The continuous variables were represented as mean, standard deviation, frequencies, and percentages. The categorical variables were evaluated by Fisher's exact test was applied to assess associations, particularly for a family history of febrile seizures. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1 gives the demographic characteristics of children with febrile seizures included in the study. Analysis of the table shows that out of the 74 children included in the study, most were between 13 and 36 months old (62.2%). Children aged 37 to 60 months made up 24.3% of the group, while those between 6 and 12 months accounted for 13.5%. This age

distribution was statistically significant ($p < 0.05$), suggesting that children aged 1 to 3 years are more likely to experience febrile seizures. Based on gender, the group was almost equal, with 51.4% boys and 48.6% girls. This difference was not statistically significant ($p = 0.552$), indicating that febrile seizures affect boys and girls at similar rates in this study population.

Table 1: Demographic Characteristics of Children with Febrile Seizures (n=74)

Characteristic	Category	n (%)	p-value
Age (months)	6 – 12	10 (13.5%)	<0.05*
	13 – 36	46 (62.2%)	
	37 – 60	18 (24.3%)	
Gender	Male	38 (51.4%)	0.552
	Female	36 (48.6%)	

Significant

Table 2 depicts the seizure characteristics and family history in the cases of the study. A critical analysis of the table shows that most of the children in the study (70.3%) experienced seizures within the first 24 hours after their fever began. This was found to be statistically significant ($p < 0.05$), highlighting that a short interval between the onset of fever and the seizure is a common pattern. Simple febrile seizures were the most frequent type, occurring in 77% of cases, while complex seizures were seen in 23%. This difference was also statistically significant. Additionally, about one-third of the children (32.4%) had a family history of febrile seizures, which points to a possible genetic link ($p < 0.05$). These results underline the importance of recognizing fever early and considering family history when assessing the risk of seizures in children with fever.

Table 2: Seizure Characteristics and Family History (n=74)

Variable	**Category**	**N (%)**	**P value**
Fever-to-Seizure Duration	<24 hours	52 (70.3%)	<0.05*
	>24 hours	22 (29.7%)	
Seizure Type	Simple	57 (77.0%)	<0.05*
	Complex	17 (23.0%)	
Family History	Positive	24 (32.4%)	<0.05*
	Negative	50 (67.6%)	

Significant

The causes of fever and febrile seizures are given in Table 3. The results show that upper respiratory tract infections were the leading cause of fever among children who had febrile seizures, accounting for 54.1% of cases. Lower respiratory tract infections came next, seen in 28.4% of the children. Bacteremia was identified in 9.5% of cases, while urinary tract infections were responsible for 5.4%. Acute gastroenteritis was found in 2.7% of the children, and there were no cases of malaria reported. These findings show that respiratory infections are the most common triggers for febrile seizures. This emphasizes the importance of closely monitoring infections and managing fevers promptly in young children.

Table 3: Etiology of Fever in Febrile Seizures (n=74)

Etiology	**n (%)**
Upper Respiratory Tract Infection	40 (54.1%)
Lower Respiratory Tract Infection	21 (28.4%)
Bacteremia (Positive Blood Culture)	7 (9.5%)
Urinary Tract Infection	4 (5.4%)
Acute Gastroenteritis	2 (2.7%)
Malaria	0 (0.0%)
Total	74 (100%)

The laboratory parameters of the cases are given in Table 4. A critical analysis of the table shows that nearly half of the children (45.9%) had anemia, defined as hemoglobin levels below 11 g/dL, but this was not statistically significant ($p = 0.324$). About the same proportion (45.9%) showed elevated white blood cell counts (leukocytosis), while 9.5% had low white blood cell counts (leukopenia). Normal white blood cell counts were seen in 44.6% of the children. The presence of leukocytosis was statistically significant ($p < 0.05$), suggesting that many of these children were experiencing an active infection or inflammation at the time of their seizure. Cerebrospinal fluid (CSF) tests were performed in 17 cases, and all results were normal ($p < 0.05$). This supports the conclusion that these seizures were not caused by meningitis or other central nervous system infections, reinforcing the diagnosis of febrile seizures.

Table 4: Laboratory Parameters (n=74)

Parameter	Category	n (%)	p-value
Hemoglobin (g/dL)	< 11 (Anemia)	34 (45.9%)	0.324
	≥ 11	40 (54.1%)	
WBC Count (x109/L)	> 11 (Leukocytosis)	34 (45.9%)	<0.05*
	< 4.5 (Leukopenia)	7 (9.5%)	
	Normal (4.5-11)	33 (44.6%)	
CSF Examination	Normal (n= 17)	17 (100%)	<0.05*
	Abnormal	0 (0%)	

**Significant*

The clinical and laboratory correlations are given in Table 5. The analysis of the table shows that children who experienced simple febrile seizures were, on average, slightly older (25.6 months) than those with complex seizures (23.8 months), though this difference wasn't significant. However, a positive family history was much more common in the simple seizure group 42.1% compared to just 5.9% in the complex seizure group a difference that was statistically significant ($p < 0.04$). Seizures that occurred within 24 hours of fever onset were also more frequent in the simple seizure group (78.9%) than in the complex group (41.2%), and this difference was significant as well ($p < 0.02$). When it came to laboratory findings like leukocytosis and anemia, rates were similar in both groups, with no meaningful differences. Overall, these results highlight that family history and how quickly the seizure follows the onset of fever are important factors in distinguishing between simple and complex febrile seizures.

Table 5: Clinical and Laboratory Correlations

Parameter	Simple Seizures (n=57)	Complex Seizures (n=17)	P value
Mean Age (months)	25.6 ± 12.3	23.8 ± 1 1.9	0.228
Family History Positive	42.10%	5.90%	<0.04*
Fever Duration <24h	78.90%	41.20%	<0.02*
Leukocytosis	43.90%	52.90%	0.884
Anemia	42.10%	58.80%	0.712

**Significant*

DISCUSSION

Febrile seizures form one of the most prevalent forms of neurological disorder in children below the age of five years. This prospective study was done in Government General Hospital, Nagarkurnool, Telangana on the clinical profile of 74 children between the ages of 6-60 months presenting with febrile seizure. The results of this study were in agreement with previous studies in this field having similar epidemiological and clinical patterns. The common age group affected in this study was 13 – 36 months (62.2%). This corresponds with the established peak incidence between the 12 – 36-month age group from other studies.[14,15] This may be due to the fact that the brain may not be fully developed at this age and this makes children susceptible to fit during febrile conditions. There was no difference in the gender distribution which resonates with the findings of other researchers that it is an equal or prevailing male research percentage in certain studies.[16] Most of the children (77%) in our study experienced simple febrile seizures which is in line with international findings that show that simple seizures occur more than complex ones.[17,18] Moreover, 70.3% of children had seizures during the first 24 hours after developing a fever. The pattern has become a diagnostic criterion of febrile seizures and also helps clinically distinguish it from other types of seizures e.g. CNS infections.[19] A positive family history of seizures was present in 32.4% of the patients. This confirms the genetic etiology of febrile seizures evident in studies that place familial incidence at 25 to 40 percent.[20,21] Our results also show that there is a significantly stronger association of family history with simple febrile seizures compared to complex types, suggesting possible genetic differences between the two subtypes.

Upper respiratory tract d infections (54.1 %) and lower respiratory tract infections (28.4 %) were the most common causes of fever in our study as reported by other similar studies that respiratory infections are the most common precipitating illnesses during febrile seizures.[22,23] This underlines the importance of early diagnosis and treatment of young children with respiratory infections. The laboratory parameters of our cases show that leukocytosis in 45.9% of cases, was statistically significant. It indicates the state of acute inflammatory or infectious process of the febrile disease. We also found the existence of anemia in 45.9% of children although it was not significantly associated with the type of seizure. However, few studies have shown an association between iron deficiency anemia and febrile seizures,[24] although our study did not find a strong correlation.

CSF evaluation of the 17 cases was FS and all the cases were found to be normal which was due to the fact the febrile seizures are not due to meningitis or encephalitis. These findings justify the selective use of lumbar puncture in specific cases based on clinical suspicion rather than routine procedure in all cases.[25] Clinical observations showed that simple febrile seizures were more often linked to a shorter duration of fever and a family history of similar seizures. However, there were no significant differences in rates of leukocytosis or anemia

between simple and complex seizure types (Table 5). These findings are helpful for clinicians, as they can reassure parents and reduce the need for unnecessary tests when a child presents with typical features of febrile seizures. To sum up, febrile seizures most commonly affect children between 1 and 3 years old, are usually simple in nature, and are often triggered by respiratory infections or occur in children with a family history of seizures. Most cases follow a mild, uncomplicated course, and focusing investigations on children with unusual symptoms can help prevent overtreatment.

CONCLUSION

Febrile seizures are a common presentation in pediatric wards. They are frequently reported in children aged 13 – 36 months age. The results of our study showed that simple febrile seizures were much more common than complex ones, and most cases were triggered by upper respiratory infections. We identified that simple febrile seizures were strongly associated with positive family history and fevers lasted for less than 24 hours. Those children who have undergone a CSF analysis had normal findings which shows the benign nature of febrile seizures. By focusing investigations on children with unusual symptoms, clinicians can avoid unnecessary interventions and help reduce anxiety for caregivers.

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