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Clinical Profile and Short-Term Outcomes of Febrile Seizures in Children Aged 6 Months to 5 Years: A Hospital-Based Observational Study

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Abstract

Background: Febrile seizures are common acute neurological events in early childhood and often cause marked caregiver anxiety despite their generally favourable prognosis. Local hospital-based data help define age distribution, seizure pattern, fever source, and early outcomes. **Objectives:** To describe the clinical profile and short-term outcomes of febrile seizures among children aged 6 months to 5 years. **Methods**: This hospital-based observational study was conducted at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation, Chinna Avutapalli, Gannavaram, Vijayawada, Andhra Pradesh, India, from August 2025 to January 2026. A total of 100 children aged 6 months to 5 years presenting with febrile seizures were included. Demographic details, family history, fever duration, seizure type, seizure duration, recurrence during the same febrile episode, associated febrile illness, treatment requirement, paediatric intensive care unit admission, hospital stay, neurological status at discharge, and mortality were recorded. **Results:** The mean age was 24.8 ± 12.7 months, and the largest proportion of children belonged to the 13-24 months age group. Males constituted 62.0% of cases. Simple febrile seizures were observed in 72.0%, whereas complex febrile seizures occurred in 28.0%. Generalized seizures were the predominant seizure pattern. Upper respiratory tract infection was the commonest associated febrile illness. Seizure recurrence during admission occurred in 12.0%, injectable anticonvulsants were required in 14.0%, and paediatric intensive care admission was required in 3.0%. No child had persistent neurological deficit at discharge, and no mortality was recorded. **Conclusion:** Febrile seizures were most frequent in children aged 13-24 months, with male predominance and simple generalized seizures. Short-term outcomes were favourable, supporting fever source identification, parental counselling, and selective escalation of care.

Keywords: febrile seizures; children; simple febrile seizure; complex febrile seizure; fever; short-term outcome

INTRODUCTION

Febrile seizures are among the most frequent seizure events encountered in paediatric emergency and inpatient services. They are classically described in infants and young children between 6 and 60 months of age, in association with fever and without evidence of central nervous system infection, acute metabolic imbalance, or a previous history of afebrile seizures [1,2]. Although the clinical episode is often brief and self-limiting, its sudden onset creates substantial fear among parents and caregivers. For clinicians, the immediate task is to distinguish a benign febrile seizure from meningitis, encephalitis, epilepsy, metabolic derangement, and other serious conditions that require urgent intervention [1,3].

The clinical classification of febrile seizures has practical relevance. A simple febrile seizure is generalized, lasts less than 15 minutes, and does not recur within the same 24-hour febrile period. A complex febrile seizure has one or more of the following features: focal onset or focal manifestations, duration of 15 minutes or longer, or recurrence within the same febrile episode [1,2,4]. This distinction helps guide observation, counselling, selective investigations, and follow-up planning. In neurologically healthy children with simple febrile seizures, routine electroencephalography, neuroimaging, and extensive laboratory testing are generally not required, and evaluation should focus on identifying the source of fever and excluding serious infection where clinically indicated [1,5].

Febrile seizures show strong age clustering, with peak occurrence during the second year of life. Several factors influence susceptibility, including genetic predisposition, family history of febrile seizures, family history of epilepsy, duration of fever before seizure onset, and the child's individual convulsive threshold [3,6]. Viral respiratory infections are commonly reported as associated febrile illnesses, although gastroenteritis, urinary tract infection, lower respiratory tract infection, and viral exanthems also contribute to the clinical spectrum [4,7]. Most children recover completely after the acute event, but recurrence risk and the small risk of later epilepsy remain important counselling points, particularly in children with complex features or developmental abnormalities [6,8].

Hospital-based studies remain valuable because they reflect the pattern of cases that actually reach clinical care, including children with prolonged seizures, recurrent seizures, parental anxiety, uncertain fever source, and those requiring admission for observation. Regional data are also useful because the causes of fever, health-seeking behaviour, access to emergency care, and admission practices differ across settings [7,9]. Such data support rational use of investigations, avoidance of unnecessary long-term anticonvulsant therapy, timely acute seizure control, and structured parental education regarding home care and danger signs [4,5,10].

The objective of the present study was to describe the clinical profile and short-term outcomes of febrile seizures among children aged 6 months to 5 years presenting to a tertiary care teaching hospital. The study specifically assessed demographic distribution, family history, seizure type, seizure pattern, duration of seizure, fever duration before seizure onset, associated causes of fever, need for injectable anticonvulsants, paediatric intensive care unit admission, hospital stay, neurological status at discharge, and mortality.

MATERIALS AND METHODS

Study design and setting: This was a hospital-based observational study conducted in the Department of Paediatrics at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation, Chinna Avutapalli, Gannavaram, Vijayawada, Andhra Pradesh, India. The study was carried out over a six-month period from August 2025 to January 2026. The hospital functions as a tertiary care teaching institution and receives paediatric patients from Vijayawada, Gannavaram, and surrounding rural and semi-urban areas. The manuscript has been prepared without author details, which can be inserted later according to journal requirements.

Study population: Children aged 6 months to 5 years presenting with seizures associated with fever were screened. Children were included when the seizure occurred in association with fever and there was no evidence of central nervous system infection, acute metabolic derangement, previous afebrile seizure disorder, or known epilepsy. Children with meningitis, encephalitis, severe electrolyte disturbance, hypoglycaemia, neurodevelopmental disorder with established epilepsy, toxic ingestion, traumatic brain injury, or incomplete clinical records were excluded. A total of 100 eligible children were included for analysis.

Definitions and clinical assessment: Febrile seizures were classified according to standard clinical criteria. Simple febrile seizure was defined as a generalized seizure lasting less than 15 minutes and occurring only once during a 24-hour febrile period. Complex febrile seizure was defined by the presence of focal features, duration greater than 15 minutes, or recurrence within the same febrile episode [1,2]. Each child underwent detailed history taking and physical examination. Particular attention was given to age, sex, developmental status, family history of febrile seizures or epilepsy, fever duration before seizure onset, seizure semiology, seizure duration, number of seizures during the febrile illness, and postictal recovery.

Data collection and outcome variables: Data were recorded using a structured proforma. The source of fever was assigned based on clinical examination and relevant laboratory testing performed as part of routine care. The main short-term outcomes were seizure recurrence during hospital observation, requirement of injectable anticonvulsant therapy, paediatric intensive care unit admission, duration of hospital stay, persistent neurological deficit at discharge, and mortality. Children were observed until discharge. Investigations, antimicrobial therapy, antipyretic measures, and anticonvulsant use were decided by the treating paediatrician according to clinical indication and institutional practice.

Ethical considerations and statistical analysis: The study was conducted after approval from the Institutional Ethics CommitteeWritten informed consent was obtained from parents or legal guardians. Confidentiality of patient information was maintained throughout data handling. Data were entered into a spreadsheet and analysed using descriptive statistics. Continuous variables were expressed as mean and standard deviation, while categorical variables were expressed as frequency and percentage. Comparative findings between simple and complex febrile seizures were presented descriptively because the primary objective was clinical profiling and short-term outcome assessment.

RESULTS

A total of 100 children aged 6 months to 5 years presenting with febrile seizures were included in the study. The mean age of the study population was 24.8 ± 12.7 months. Most children belonged to the age group of 13-24 months, accounting for 38.0% of cases. There was a male predominance, with 62 males and 38 females, giving a male-to-female ratio of 1.6:1. Most children were previously developmentally normal. A positive family history of febrile seizures was observed in 28.0% of children, while 6.0% had a family history of epilepsy. Baseline demographic characteristics are shown in Table 1.

Table 1. Baseline demographic characteristics of children with febrile seizures

Variable	Number of children	Percentage
Age group		
6-12 months	16	16.0
13-24 months	38	38.0
25-36 months	27	27.0
37-60 months	19	19.0
Sex		
Male	62	62.0
Female	38	38.0
Family history		
Family history of febrile seizures	28	28.0
Family history of epilepsy	6	6.0
No relevant family history	66	66.0

Simple febrile seizures were more common than complex febrile seizures. Simple febrile seizures were noted in 72 children, while 28 children had complex febrile seizures. Generalized tonic-clonic seizures were the most frequent seizure type, observed in 84.0% of cases. The majority of seizures lasted less than 5 minutes. Recurrent seizures within the same febrile episode were observed in 22.0% of children. The seizure characteristics are presented in Table 2.

Table 2. Clinical profile and seizure characteristics

Clinical variable	Number of children	Percentage
Type of febrile seizure		
Simple febrile seizure	72	72.0
Complex febrile seizure	28	28.0
Seizure pattern		
Generalized seizure	84	84.0
Focal seizure	16	16.0
Duration of seizure		
<5 minutes	58	58.0
5-15 minutes	34	34.0
>15 minutes	8	8.0

Clinical variable	Number of children	Percentage
Number of seizures during febrile episode		
Single episode	78	78.0
Recurrent episodes	22	22.0
Fever duration before seizure		
<24 hours	66	66.0
24-48 hours	24	24.0
>48 hours	10	10.0

Upper respiratory tract infection was the most common associated febrile illness, seen in 44.0% of children. Acute gastroenteritis was observed in 18.0%, followed by lower respiratory tract infection in 15.0%. Urinary tract infection was identified in 8.0% of cases. In 8.0% of children, no definite source of fever was established during the hospital stay. The associated causes of fever are summarized in Table 3.

Table 3. Associated causes of fever

Cause of fever	Number of children	Percentage
Upper respiratory tract infection	44	44.0
Acute gastroenteritis	18	18.0
Lower respiratory tract infection	15	15.0
Urinary tract infection	8	8.0
Viral exanthem	7	7.0
Fever without localizing signs	8	8.0

Regarding short-term outcomes, most children had favourable recovery. Recurrence of seizure during hospital observation was noted in 12.0% of children. Three children required paediatric intensive care unit admission due to prolonged seizure activity or delayed recovery after seizure. No child had persistent neurological deficit at discharge. There was no mortality in the study population. Most children were discharged within 48 hours of admission. The short-term outcomes are detailed in Table 4.

Table 4. Short-term outcomes among children with febrile seizures

Outcome variable	Number of children	Percentage
Seizure recurrence during admission	12	12.0
Requirement of injectable anticonvulsant	14	14.0
PICU admission	3	3.0
Persistent neurological deficit at discharge	0	0.0
Mortality	0	0.0
Duration of hospital stay		
≤24 hours	54	54.0
25-48 hours	34	34.0

Outcome variable	Number of children	Percentage
>48 hours	12	12.0

Children with complex febrile seizures had a higher frequency of seizure recurrence, longer seizure duration, and longer hospital stay compared with children having simple febrile seizures. However, the overall short-term prognosis was favourable in both groups, with complete recovery in the majority of children before discharge. A descriptive comparison between simple and complex febrile seizures is shown in Table 5.

Table 5. Comparison of simple and complex febrile seizures

Variable	Simple febrile seizure n=72	Complex febrile seizure n=28
Mean age, months	25.6 ± 12.4	22.7 ± 13.1
Male sex	43 (59.7%)	19 (67.9%)
Family history of febrile seizures	18 (25.0%)	10 (35.7%)
Seizure duration >15 minutes	0 (0.0%)	8 (28.6%)
Recurrent seizures during same febrile episode	0 (0.0%)	22 (78.6%)
Focal seizure	0 (0.0%)	16 (57.1%)
PICU admission	0 (0.0%)	3 (10.7%)
Hospital stay >48 hours	4 (5.6%)	8 (28.6%)

Overall, the study showed that febrile seizures were most common among children aged 13-24 months, with male predominance. Simple febrile seizures formed the major clinical pattern. Upper respiratory tract infection was the leading associated febrile illness. Short-term outcomes were good, with no mortality or persistent neurological deficit.

DISCUSSION

The present hospital-based observational study describes the clinical spectrum and early outcomes of febrile seizures in 100 children aged 6 months to 5 years. The age distribution showed maximum clustering in the 13-24 months age group, with a mean age of 24.8 months. This pattern is consistent with age-dependent vulnerability of the developing brain to fever-associated seizures and with earlier studies reporting a peak in the second year of life [3,6,7]. Male predominance was also observed, agreeing with reports from Nepal and other hospital-based cohorts [7,9].

Simple febrile seizures accounted for 72.0% of cases, whereas complex febrile seizures accounted for 28.0%. This distribution is similar to previous paediatric hospital series, in which simple febrile seizures formed the majority [7,9]. The predominance of generalized seizures and brief duration supports the typical benign pattern of febrile seizures in young children. Most seizures lasted less than 5 minutes, indicating spontaneous termination in many cases. However, seizures lasting more than 15 minutes were recorded in 8.0%, emphasizing emergency readiness and clear acute seizure protocols [10,11].

Upper respiratory tract infection was the leading associated febrile illness. This finding is in line with earlier reports where respiratory infections were common fever triggers [7,9]. Acute gastroenteritis, lower respiratory tract infection, urinary tract infection, and viral exanthem also contributed to the fever spectrum. These observations reinforce that evaluation after a febrile seizure should not be limited to the seizure event alone. Careful examination should identify the fever source and screen for serious bacterial infection when indicated. Current guidance supports selective, clinically directed investigations rather than routine neuroimaging, electroencephalography, or extensive laboratory testing in neurologically healthy children with simple febrile seizures [1,5].

Family history of febrile seizures was present in 28.0% of children, and family history of epilepsy was present in 6.0%. Familial predisposition has been linked to febrile seizure susceptibility and recurrence risk [6,12]. In this study, complex febrile seizures showed higher proportions of prolonged seizure duration, recurrence within the same febrile episode, focal seizures, paediatric intensive care admission, and hospital stay beyond 48 hours. These findings are clinically plausible because complex features increase observation needs and parental concern. Previous evidence also shows that prolonged and focal febrile seizures require closer assessment and early seizure termination when seizures persist [11,13].

Short-term outcomes were favourable. Seizure recurrence during admission occurred in 12.0%, injectable anticonvulsants were required in 14.0%, and paediatric intensive care admission was limited to 3.0%. No persistent neurological deficit and no mortality were recorded. These findings support the established view that most febrile seizures have a benign immediate prognosis when central nervous system infection and metabolic causes are excluded [3,4,8]. The results highlight practical messages for paediatric practice: use standard definitions, document complex features clearly, evaluate the fever source carefully, treat prolonged seizures promptly, avoid unnecessary long-term anticonvulsants, and provide structured parental counselling before discharge [2,5,14].

Limitations

This study was limited by its single-centre hospital-based design and modest sample size. Follow-up after discharge was not included; therefore, later recurrence and subsequent epilepsy risk were not assessed. Some seizure-duration details depended on caregiver recall before hospital arrival. Laboratory and imaging investigations were performed only when clinically indicated, producing limited uniform diagnostic data across all children.

CONCLUSION

Febrile seizures in this cohort were most common during the second year of life and showed male predominance. Simple generalized febrile seizures formed the major clinical pattern, while complex febrile seizures were associated with prolonged duration, recurrence during the same febrile episode, focal features, paediatric intensive care admission, and longer hospital stay. Upper respiratory tract infection was the leading fever source. Short-term outcomes were favourable, with no persistent neurological deficit and no mortality. The findings support careful fever-source evaluation, standard classification of seizure type, prompt management of prolonged seizures, selective use of investigations, and clear parental counselling regarding recurrence, home care, and danger signs before discharge.

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