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Original Research Article

Clinical Profile and Risk Factors for Recurrence of Febrile Seizures in Children Admitted to a Tertiary Care Hospital

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Abstract:

Background: Febrile seizures are common neurological emergencies in early childhood and are generally benign, but recurrence can cause considerable parental anxiety and repeated healthcare utilization. Identification of clinical characteristics associated with recurrence is important for appropriate counseling and follow-up.

Aim: To evaluate the clinical profile and risk factors associated with recurrence of febrile seizures among children admitted to a tertiary care hospital in Bihar, India.

Methodology: A hospital-based observational retrospective and prospective study was conducted over one year in the Department of Pediatrics, Patna Medical College and Hospital, Patna. Among 1870 pediatric admissions, 97 children were identified with febrile seizures, of whom 74 fulfilled the eligibility criteria and were included. Demographic, clinical, family-history, fever-related, and laboratory data were collected using a structured proforma and analyzed using SPSS version 25.0. Associations with recurrence were assessed using appropriate statistical tests, with statistical significance considered at $p<0.05$.

Result: Of 74 children, 56.8% were male and 52.7% were aged 6–18 months. Simple febrile seizures predominated (85.1%), with generalized tonic-clonic seizures in 95.9%. Recurrent seizures occurred in 31.1% of children. Viral fever was the commonest precipitating cause (60.8%). Higher recurrence proportions were observed with age ≤12 months, positive family history, fever–seizure interval <1 hour, anemia, seizure duration >5 minutes, and complex seizures; however, none reached statistical significance.

Conclusion: Febrile seizures predominantly affected young children and were usually simple, generalized, and brief. Several clinical characteristics showed higher recurrence patterns, highlighting the importance of careful assessment, parental counseling, and follow-up.

Keywords: Febrile Seizures; Recurrence; Children; Risk Factors; Seizure Characteristics; Anemia; Viral Fever; Tertiary Care Hospital.

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Introduction

Febrile seizures (FS) are one of the most frequently occurring neurological emergencies in paediatric practice and an important cause for acute seizure-related hospital admissions in young children. According to the International League Against Epilepsy (ILAE), febrile seizures are defined as "seizures occurring in childhood (after 1 month of age), associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or a previous unprovoked seizure and not meeting criteria for other acute symptomatic seizures" [1]. This definition focuses on the association of fever and seizures in otherwise neurologically normal children and distinguishes febrile seizures from epilepsy, central nervous system infection and other acute symptomatic seizures. Most febrile seizures last for a short time and have good prognosis, but they can be worrying for parents and carers, and can lead to emergency department attendance and hospitalization, especially if it is prolonged, frequent or accompanied by abnormal clinical features.

Febrile seizures typically develop in early childhood when the young brain is more vulnerable to neuronal excitability that is triggered by fever. Being the most frequent childhood seizure type, they are found in around 2-5% of children under 5 years of age, with the highest prevalence in the second year of life [2]. Clinical presentation varies from a short, generalized convulsion with a rapidly rising body temperature to a longer or more focal seizure. Febrile seizures can be classified as simple or complex, depending on their clinical characteristics. Simple febrile seizures are generally generalized, brief, and do

not recur during the same febrile illness episode, while complex febrile seizures are prolonged, focal, or are recurrent in the same febrile illness episode. The importance of recognition of these clinical characteristics is because they will affect further evaluation, observation and counseling about recurrence and future neurological outcome.

The impact of febrile seizures is of special interest in developing countries such as India, where childhood febrile illnesses are still frequent and the pattern of health care-seeking is different in different socio-economic and geographic areas. The prevalence of febrile seizures in India is reported to be around 8% and the average recurrence risk reported to be 30-40% [3]. Recurrence is one of the major issues associated with a child's first febrile seizure as it can result in multiple return visits to the ED and hospital admissions causing significant anxiety to caregivers. While recurrent febrile seizures are generally harmless, it is important to be able to pick out those children who are at high risk of recurrence for appropriate counselling and follow-up and anticipatory guidance.

Multiple demographic, familial, and seizure features are linked to a higher risk for recurrence of febrile seizures. These are important factors to consider: younger age at onset of the first seizure (especially younger than 18 months); a short fever period prior to onset of the first seizure; positive family history of febrile seizures in first-degree relatives; and a relatively low body temperature at the time of seizure [4]. The timing of seizure in relation to fever is particularly important as a seizure close to the onset of fever could indicate higher individual susceptibility to the effects of the fever on the neuronal activity. Conversely, a favourable family history indicates that there may be a genetic predisposition to susceptibility. Other clinical features such as type of seizures, duration of seizures or recurrence during the same febrile illness, and neurological findings may also help the clinician to discern those who need more meticulous observation from those who are less likely to have febrile seizures.

Careful clinical assessment of a child with febrile seizure must include the source of fever, characteristics of seizure, neurological status, age of onset, past history of seizures, immunization status and family history. Evaluation is necessary not only to determine the potential risk factors for recurrence but also to rule out serious causes of fever-associated seizures, especially central nervous system infections. Thus, the difference between simple febrile seizure and complex febrile seizure is clinically relevant as the latter may require more comprehensive assessment depending upon the clinical status of the child. Meanwhile, needless investigations can drive up health care costs for the family and cause further distress to the children and family. So, a systematic clinical evaluation is then necessary to ensure that the need to exclude serious disease is balanced with the avoidance of unnecessary investigations.

Growing awareness regarding the potential complications and long-term implications of febrile seizures has resulted in increasing emphasis on evidence-based evaluation and management. In 2011, the American Academy of Pediatrics (AAP) and in 2015, the Japanese Society of Child Neurology published updated guidelines for the evaluation and management of febrile seizures [5,6]. These guidelines have helped to make the evaluation of a child with febrile seizures more systematic, with clearer indications for investigations and management of children with various clinical presentations of febrile seizures. However, although the prognosis for recurrent episodes is generally good, they are a major concern for families and the identification of clinically relevant predictors of recurrence is important.

Febrile seizures are an important presentation for children in a tertiary-care centre in Bihar, India, as children are brought from small towns and villages in the region, which have different levels of primary and secondary care services. Knowledge of the demographic and clinical characteristics of affected children and the identification of factors that are related to recurrence may be useful for providing individualized counseling and follow-up. Locally generated evidence of the clinical features and factors associated with recurrence among children who present to tertiary care hospitals is important, however, as disease patterns and health care-seeking behaviour may differ between populations. Hence, the present study was initiated to assess clinical profile and risk factors of febrile seizures recurrence amongst the children of a tertiary care hospital of Bihar, India. The purpose of the study is to describe the demographic and clinical characteristics of affected children and to determine what factors are associated with recurrence to help in risk assessment, clinical management, parental counseling, and follow-up of children with febrile seizures.

Methodology

Study Design: A hospital-based observational retrospective and prospective study was conducted to evaluate the clinical profile and risk factors associated with recurrence of febrile seizures among children admitted to the Department of Pediatrics. The study included children presenting with febrile seizures during the specified study period. Relevant demographic, clinical, laboratory, and family-history information was collected and analyzed to identify factors associated with recurrent febrile seizures.

Study Area: The study was conducted in the Department of Pediatrics, Patna Medical College and Hospital (PMCH), Patna, Bihar, India.

Study Duration: The study was conducted over a period of 1 year from August 2025 July 2026

Sample Size: A total of 1870 children were admitted to the Department of Pediatrics during the study period. Among these, 97 children were identified as having febrile seizures. After application of the eligibility criteria, 74 children were enrolled in the final study population.

Thus, the final sample size for analysis was 74 children with febrile seizures.

Study Population: The study population comprised children aged 3 months to 6 years who were admitted to the Department of Pediatrics with febrile seizures. Febrile seizure was defined according to the accepted International League Against Epilepsy (ILAE) criteria as a seizure occurring in association with fever in a child without evidence of an underlying acute central nervous system infection or other defined cause.

Children were subsequently classified according to seizure characteristics into simple febrile seizure, complex febrile seizure, and recurrent febrile seizure. A child was considered to have recurrent febrile seizure when there was a documented history of at least one previous febrile seizure followed by another febrile seizure during the current illness/admission.

Data Collection: Data were collected using a predesigned and structured data-collection proforma. For retrospective cases, relevant information was extracted from hospital case records, whereas for prospectively enrolled children, information was obtained directly from the child and parents/caregivers and documented during hospitalization.

The information collected included demographic characteristics, age and sex, clinical presentation, type and duration of seizure, number of seizure episodes, interval between onset of fever and seizure, history of previous febrile seizures, family history of febrile seizures, and the underlying cause of fever. Hemoglobin level at the time of seizure was also recorded.

Relevant laboratory investigations included complete blood count, blood glucose, serum calcium, and serum electrolytes. Cerebrospinal fluid examination was performed when clinically indicated. Computed tomography (CT) of the brain, magnetic resonance imaging (MRI) of the brain, and electroencephalography (EEG) were performed only in children with clinical features suggestive of an alternative diagnosis or when otherwise clinically indicated.

For the purpose of analysis, anemia was considered present when the recorded hemoglobin level was below 11 g/dL.

Inclusion Criteria

Children were included if they fulfilled the following criteria:

- Children aged 3 months to 6 years.
- Children admitted to the Department of Pediatrics during the study period.
- Children presenting with febrile seizures according to the accepted ILAE definition.
- Children in whom adequate clinical information regarding seizure characteristics and relevant risk factors was available.
- Parents or legal guardians who provided informed consent for prospective enrollment.

Exclusion Criteria

Children were excluded if they had:

- Incomplete clinical records, particularly regarding seizure type, duration, or recurrence history.
- A previous history of afebrile seizures/epilepsy.
- Evidence of an alternative neurological diagnosis explaining the seizure.
- Clinical features suggestive of a central nervous system infection or another condition in which the seizure could not appropriately be classified as a febrile seizure.
- Incomplete essential laboratory or clinical information required for analysis.
- Children who left against medical advice before adequate clinical evaluation or completion of required data collection.

Procedure: All children admitted during the study period were screened for febrile seizures. Eligible children were evaluated clinically and categorized according to the characteristics of their seizure episodes.

A simple febrile seizure was defined as a generalized seizure lasting less than 15 minutes, occurring only once within a 24-hour period during a febrile illness, without post-ictal neurological abnormalities. A complex febrile seizure was defined as a focal or generalized seizure lasting more than 15 minutes, recurring more than once within 24 hours, and/or associated with post-ictal neurological abnormalities.

Children with a history of at least one previous febrile seizure who presented with another febrile seizure during the current episode were categorized as having recurrent febrile seizures. The history of fever, seizure characteristics, previous episodes, family history, and potential precipitating causes of fever was documented.

Routine investigations, including complete blood count, blood glucose, serum calcium, and serum electrolytes, were reviewed in retrospective cases and performed as clinically appropriate in prospective cases. CSF examination was undertaken when clinically indicated. Neuroimaging and EEG were

reserved for children with features suggesting an alternative diagnosis rather than being performed routinely.

The collected information was entered into a structured database and subsequently analyzed to determine the clinical characteristics of febrile seizures and the factors associated with recurrence.

Statistical Analysis: Data were initially entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS), version 25.0. Categorical variables were summarized using frequency and percentage, and the findings were presented in tables.

The prevalence of different clinical patterns and recurrence of febrile seizures was described using proportions. Associations between recurrent febrile seizures and relevant demographic, clinical, family-history, and laboratory variables were assessed using appropriate statistical tests for categorical data. A 90% confidence interval was calculated for point estimates of binary outcomes, along with corresponding frequencies and percentages. Statistical significance was interpreted according to the predefined level of significance used for the study".

Result

Table 1 presents the clinical characteristics of the 74 children with febrile seizures included in the study. There was a slight male predominance, with 42 males (56.8%) and 32 females (43.2%). Regarding age distribution, the majority of children were aged 6–18 months, comprising 39 cases (52.7%), followed by 32 cases (43.2%) aged 18 months–6 years, while 3 cases (4.1%) were aged 3–6 months. Simple febrile seizures were predominant, occurring in 63 children (85.1%), whereas 11 (14.9%) had complex febrile seizures. The seizure semiology was predominantly generalized tonic-clonic, observed in 71 cases (95.9%), while 3 cases (4.1%) had focal seizures. Regarding recurrence, 51 children (68.9%) presented with a first episode, whereas 23 (31.1%) had recurrent febrile seizures. Most seizures were of short duration, with 69 cases (93.2%) lasting 0–5 minutes, while 4 (5.4%) lasted 5–30 minutes and 1 (1.4%) lasted >30 minutes. A family history of febrile seizures was present in 10 children (13.5%) and absent in 64 (86.5%). Anemia (Hb <11 g/dL) was present in 52 children (70.3%), while 22 (29.7%) had no anemia.

Table 1: Clinical Characteristics of Children with Febrile Seizures (N = 74)

Variable	Categories	Febrile seizure	Percentage (%)
Sex	Male	42	56.8
	Female	32	43.2
Age	3–6 months	3	4.1
	6–18 months	39	52.7
	18 months–6 years	32	43.2
Type of seizure	Simple febrile	63	85.1
	Complex febrile	11	14.9
Seizure type	Generalized tonic-clonic	71	95.9
	Focal	3	4.1
Recurrence	First episode	51	68.9
	Recurrent episode	23	31.1
Duration of seizure	0–5 minutes	69	93.2
	5–30 minutes	4	5.4
	>30 minutes	1	1.4
Family history of febrile seizure	Present	10	13.5
	Absent	64	86.5
Anemia (Hb <11 g/dL)	Present	52	70.3
	Absent	22	29.7

Table 2 shows the etiology of fever among the 74 children with febrile seizures. Viral fever was the most common cause, accounting for 45 cases (60.8%), followed by upper respiratory tract infection in 16 cases (21.6%). Acute gastroenteritis was identified in 6 cases (8.1%), while urinary tract infection accounted for 3 cases (4.1%). Pneumonia and other causes were each reported in 2 cases (2.7%). Thus, viral infections constituted the predominant identifiable trigger of fever among children presenting with febrile seizures.

Table 2: Etiology that Triggered Fever among Children with Febrile Seizures		
Etiology	**No. of cases**	**Percentage (%)**
Viral fever	45	60.8
Upper respiratory tract infection	16	21.6
Acute gastroenteritis	6	8.1
Urinary tract infection	3	4.1
Pneumonia	2	2.7
Other causes	2	2.7
Total	**74**	**100**

Table 3 presents the distribution of recurrent febrile seizures according to the number of recurrence episodes among 23 children. The majority experienced a first recurrence, accounting for 13 cases (56.5%). A second recurrence was observed in 6 cases (26.1%), while 3 children (13.0%) experienced a third recurrence. Only 1 child (4.3%) had a fourth or more recurrence. Thus, most children with recurrent febrile seizures experienced only one recurrence, with progressively fewer children experiencing multiple subsequent episodes.

Table 3: Distribution of Recurrent Febrile Seizures by Number of Episodes (n = 23)		
Episodes of recurrent febrile seizures	**N**	**Percentage (%)**
First recurrence	13	56.5
Second recurrence	6	26.1
Third recurrence	3	13
Fourth or more recurrence	1	4.3
Total	**23**	**100**

Table 4 describes the atypical features observed among the 11 children with complex febrile seizures. The most common atypical feature was seizure recurrence within 24 hours, reported in 5 cases. Prolonged seizure duration >15 minutes and focal seizures were each observed in 3 cases, while post-ictal neurological abnormalities were documented in 2 cases. Status epilepticus was observed in 1 case. Additionally, 2 children had more than one atypical feature. Overall, recurrence within 24 hours was the most frequently observed atypical characteristic among children with complex febrile seizures.

Table 4: Atypical Features in Complex Febrile Seizures (n = 11)	
Atypical features in complex febrile seizures	**No. of cases**
Seizure reappeared within 24 hours	5
Seizure duration prolonged >15 minutes	3
Focal seizures	3
Post-ictal neurological abnormality	2
Status epilepticus	1
More than one atypical feature	2

Table 5 presents the distribution of children according to the duration of febrile seizures among the 74 study participants. The majority of children, 69 (93.2%), experienced seizures lasting 0–5 minutes. Seizures lasting 5–30 minutes were observed in 4 (5.4%) children, while only 1 (1.4%) child had a seizure lasting >30 minutes. Overall, the findings indicate that most febrile seizures in the study were of short duration, with prolonged seizures occurring in a small proportion of children.

Table 5: Duration of Febrile Seizures (N = 74)		
Duration of seizure	**Percentage (%)**	**No. of cases**
0–5 minutes	93.2	69
5–30 minutes	5.4	4
>30 minutes	1.4	1
Total	**100**	**74**

Table 6 presents the association between selected clinical factors and recurrence of febrile seizures among the 74 children studied. Recurrence was more frequent among children whose first febrile seizure occurred at ≤12 months, with 10 (45.5%) experiencing recurrence compared with 13 (25.0%) among those aged >12 months, although the association was not statistically significant (p=0.103). Recurrence was similar between males and females, occurring in 13 (31.0%) males and 10 (31.2%) females (p=1.000). Children with a family history of febrile seizures had a higher recurrence proportion

of 6 (60.0%), compared with 17 (26.6%) among those without a family history (p=0.061). Similarly, recurrence occurred in 10 (45.5%) children with a fever–seizure interval of <1 hour compared with 13 (25.0%) among those with an interval of ≥1 hour (p=0.103). Among children with anemia, 19 (36.5%) experienced recurrence compared with 4 (18.2%) among those without anemia, though the difference was not statistically significant (p=0.171). Children with seizure duration >5 minutes had recurrence in 3 (60.0%) cases compared with 20 (29.0%) among those with seizures lasting ≤5 minutes (p=0.170). Recurrence was also more common among children with complex febrile seizures, occurring in 6 (54.5%), compared with 17 (27.0%) among those with simple seizures (p=0.085). Regarding fever etiology, recurrence was observed in 16 (35.6%) children with viral fever compared with 7 (24.1%) among those with non-viral fever, with no statistically significant association (p=0.441). Overall, younger age at first seizure, positive family history, shorter fever–seizure interval, anemia, longer seizure duration, and complex seizure type showed higher recurrence proportions, but none demonstrated a statistically significant association at the conventional p<0.05 level.

Table 6: Association between Selected Factors and Recurrence of Febrile Seizures (N = 74)

Variable	Category	First episode n (%)	Recurrent n (%)	Total	p-value
Age at first febrile seizure	≤12 months	12 (54.5)	10 (45.5)	22	0.103
	>12 months	39 (75.0)	13 (25.0)	52	
Sex	Male	29 (69.0)	13 (31.0)	42	1
	Female	22 (68.8)	10 (31.2)	32	
Family history of febrile seizure	Present	4 (40.0)	6 (60.0)	10	0.061
	Absent	47 (73.4)	17 (26.6)	64	
Fever–seizure interval	<1 hour	12 (54.5)	10 (45.5)	22	0.103
	≥1 hour	39 (75.0)	13 (25.0)	52	
Anemia	Present	33 (63.5)	19 (36.5)	52	0.171
	Absent	18 (81.8)	4 (18.2)	22	
Seizure duration	≤5 minutes	49 (71.0)	20 (29.0)	69	0.17
	>5 minutes	2 (40.0)	3 (60.0)	5	
Type of seizure	Simple	46 (73.0)	17 (27.0)	63	0.085
	Complex	5 (45.5)	6 (54.5)	11	
Fever etiology	Viral	29 (64.4)	16 (35.6)	45	0.441
	Non-viral	22 (75.9)	7 (24.1)	29	

Table 7 presents the crude odds ratios for selected risk factors associated with recurrent febrile seizures among the 74 children studied. Children with age at first seizure ≤12 months had 2.5-fold higher odds of recurrence compared with those aged >12 months (OR 2.50, 95% CI: 0.91–6.85; p=0.103). A family history of febrile seizures was associated with higher odds of recurrence (OR 4.15, 95% CI: 1.12–15.35; p=0.061). Similarly, a fever–seizure interval <1 hour was associated with 2.5-fold higher odds of recurrence (OR 2.50, 95% CI: 0.91–6.85; p=0.103). Children with anemia had higher odds of recurrence (OR 2.59, 95% CI: 0.79–8.49; p=0.171), while a seizure duration >5 minutes was associated with an OR of 3.68 (95% CI: 0.57–23.70; p=0.170). Complex febrile seizures were also associated with increased odds of recurrence compared with simple seizures (OR 3.25, 95% CI: 0.92–11.46; p=0.085). Although several factors showed elevated crude odds ratios, none reached conventional statistical significance at p<0.05, as reflected by the confidence intervals crossing 1.0.

Table 7: Crude Odds Ratio for Selected Risk Factors of Recurrent Febrile Seizures (N = 74)

Risk factor	Category	Crude OR	95% CI	p-value
Age at first seizure	≤12 months vs >12 months	2.5	0.91–6.85	0.103
Family history	Present vs absent	4.15	1.12–15.35	0.061
Fever–seizure interval	<1 hour vs ≥1 hour	2.5	0.91–6.85	0.103
Anemia	Present vs absent	2.59	0.79–8.49	0.171
Seizure duration	>5 min vs ≤5 min	3.68	0.57–23.70	0.17
Complex seizure	Complex vs simple	3.25	0.92–11.46	0.085

Discussion

In the current study, febrile seizures (FS) were more frequently found in younger children with the highest number of FS in the 6 to 18 months age group (52.7%). This age distribution is compatible with the known age distribution of febrile seizures with the highest incidence in the second year of life. Other epidemiological studies have also shown that the incidence of febrile seizure is focused in early childhood, consistent with early infancy and early toddlerhood being a time of vulnerability [7-9]. The

male to female ratio of the present cohort was near 1.3:1 in a slight preponderance of males (56.8%) which was similar to the findings of Naik et al. from Kashmir [10]. The relatively small sex difference in our study suggests that febrile seizures might happen slightly more often in males, but that by itself sex is not likely to be an important factor in recurrence, because the rate of recurrence was nearly identical in males and females (31.0% vs. 31.2%, p=1.000)".

Simple febrile seizures were the most common (85.1%) and complex febrile seizures were less common (14.9%). This pattern agrees with previous reports showing that simple febrile seizures substantially outnumber complex seizures. Ojha et al. found simple and complex febrile seizures in about 80% and 20% of the children respectively, which is in the same general range as the present one [11]. This group had generalized seizures in 95.9% of children, with 4.1% developing focal seizures. This finding is in line with studies that report generalized, especially generalized tonic-clonic, seizures to be the typical clinical manifestation of febrile seizures [12,13]. The high proportion of simple and generalized seizures also fits well with the generally good clinical profile of FS. The vast majority of seizures were short-lasting (93.2% ≤5 minutes) and 1.4% were ≥ 30 minutes. In complex cases, the most common atypical feature was recurrence in less than 24 hours, followed by duration and focality. The clinical relevance of these findings is that children who have more complex features might be those that need to be watched more closely.

68.9% of children had a first episode, while 31.1% had recurrent febrile seizures. Hence, the recurrence proportion is comparable to the average recurrence rate of 30-40% previously reported in the literature [14]. The recurrence rate reported by Fallah and Karbasi was 37%, which is similar to the 31.1% that was seen in this study [15]. In addition, recurrence was typically limited to the first recurrence: 56.5% of recurrences had one episode, with smaller percentages having two or more episodes. The recurrence pattern is thus consistent with the observation that recurrence is relatively common following an initial febrile seizure but with each successive episode, recurrence becomes less common.

In the current study, several well-known clinical risk factors had higher recurrence rates, but not to the level of statistical significance. Those who had their first seizure by 12 months had a higher risk of recurrence than children >12 months (45.5% vs 25.0%, OR 2.50, 95% CI 0.91–6.85; p=0.103). Such a direction of association is in line with the previous evidence that younger age at first febrile seizure (especially early childhood) is an important predictor of recurrence [4,16]. Likewise, seizures within one hour of fever were associated with recurrence in 45.5% compared to 25.0% of those at one hour or more after fever (OR 2.50, 95% CI 0.91–6.85; p=0.103). Earlier seizure after fever onset has been reported as a risk factor for recurrence previously [3,12,16] especially if duration of fever preceding the seizure is short. The lack of statistical significance in the present study may be partly due to the small number of recurrent cases and the small size of the sample.

One of the most observed associations was that of family history. Sixty percent of those with a positive family history and 26.6% of those without a positive family history experienced recurrence, giving a crude OR of 4.15 (95% CI 1.12–15.35; p=0.061). Family history of febrile seizures is an important factor in the recurrence of febrile seizures and previous studies have reported a wide variation in reported family history of febrile seizures across different populations [17,18]. Rich et al. also outlined familial factors among the determinants of febrile seizure susceptibility and recurrence [16]. However, these findings should be interpreted with caution as the p value did not reach the arbitrarily set significance level, and the confidence interval was large. Also, the association might be influenced by an underestimate of previous febrile seizures in family members as reported by parents.

There was also a clinically significant association of recurrence of complex febrile seizures. The crude OR was 3.25 (0.92–11.46; p=0.085), with over half of children with complex seizures experiencing recurrence (54.5%) compared with 27.0% with simple seizures. While this association was not statistically significant, the trend in this association is consistent with the literature that suggests complex seizure features as possible indicators of a higher risk of recurrence [4]. Similarly, there was a higher recurrence rate in children with seizures > 5 minutes (60.0%) than in those with seizure ≤ 5 minutes (29.0%) (OR 3.68, 95% CI 0.57–23.70; p=0.170). The broad confidence interval indicates the few children who had long seizures and is a consequence of the imprecision of such a small number.

The major precipitating illness was viral fever (60.8%) followed by upper respiratory tract infection (21.6%) which is similar to the findings of Ojha et al., who also found viral and respiratory illness as common precipitating illnesses [11]. In the present study, however, the etiology of the fever was not significantly related to recurrence. Anemia was common (70.3% of children) and was more likely to recur in children with than in those without anemia (OR 2.59, 95% CI 0.79–8.49; p=0.171). Past research has yielded mixed findings on the association between FSA and IDA [19,20]. Therefore, the current results indicate that there may be a correlation with recurrence, but that anemia is not an independent risk factor. The results of this study generally show that the observed recurrence proportions were higher with younger age at the first seizure, positive family history, shorter fever–seizure interval,

complex seizure type, longer seizure duration, and anemia, but none of these had reached statistical significance. These data highlight the multifaceted nature of febrile seizure recurrence and the need for further large prospective studies to help define the independent effects of these factors.

Conclusion

The findings in this study indicate that febrile seizures tend to occur mainly in early childhood and are mostly generalized (simple), short (mostly < 5 minutes) and mainly associated with viral infection (most common precipitating cause of fever). While most children had a first febrile seizure, a large number had multiple febrile seizures with more recurrence following the first. More complex seizure features, younger age at first seizure, shorter fever – seizure interval, positive family history, anemia and longer seizure duration were associated with higher proportions or increased likelihood of recurrence, but these factors were not statistically significant in the present sample. The results indicate that careful clinical evaluation of children who are present with febrile seizures is important, especially for the identification of familial and clinical features that may be associated with an increased risk of febrile seizures recurrence. Recognizing complex features, following up appropriately after other febrile seizures and providing timely parental counselling may help improve clinical management and decrease anxiety associated with recurrent febrile seizures. Further investigation of independent predictors of recurrence in children presenting to tertiary-care hospitals could be done in larger prospective studies.

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