# Study Of Febrile Seizure In Pediatric Patients

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**Abstract:** Background: Febrile seizures are among the leading cause of pediatric emergency hospital admission and affect 2% to 5% of pediatric population1,2 and are by far the most common type of seizure in childhood. Various risk factors are said to play a role in aetiology of FS are gender, developmental delay, maternal history of smoking, family history, bacterial and viral infections, certain vaccinations and iron deficiency, low serum sodium at the time of presentation. Preventive measure to remove such risk factor could lead to lower the incidence of febrile seizure. Objective: To study occurrence of predictive risk factors like gender, age, low birth weight in children with febrile seizure. To study fever and seizure pattern in above children. To observe positive family history pertaining to febrile seizure. Material And Methods: An observational prospective study was conducted in the tertiary care hospital over a 2 year period. Children aged 6 months to 60 months diagnosed as febrile seizure and admitted at pediatric ward were included in the study. A total of 69 patients were enrolled in the study. All information was collected from parents and indoor case sheets after taking verbal consent. Data was entered in Microsoft excel and analysis was carried out using SPSS version 21. Result: Gender wise a male predominance was seen. Younger age group is a risk factor. Majority of children (92.8%) presented with simple FS with seizure duration less than 5 minutes. Majority (82.6 %) had fever for < 24 hour prior to FS. Positive family history of FS is observed in 20.2% children. Conclusion: Identification of predictive risk factor will help clinician to educate and counsel parents regarding seizure recurrence, prophylactic use of antipyretic and measures during seizure activity.

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**Key Words:** Febrile Seizure, Risk Factors, Male

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**Introduction:** Febrile seizures are seizures that occur between the ages of 6 and 60 month (peak 12-18 month) with a temperature of 38°C (100.4°F) or higher, that are not the result of CNS infection or any metabolic imbalance, and that occur in the absence of a history of prior afebrile seizures. Between the ages of 6 months and 3 years, when febrile seizures are most common, both organization and myelination of brain are in progressive process. Since prenatal factors and adverse events in early pregnancy may predispose to febrile seizures, it is possible that abnormal neuronal proliferation and migration might be contributory events, but there is no pathological evidence to confirm this possibility.

A simple febrile seizure is a primary generalized, usually tonic-clonic, attack associated with fever, lasting for a maximum of 15 min, and not recurrent within a 24-hr period[3]. A complex febrile seizure is more prolonged (>15 min), and/or is focal, and/or recurs within 24 hr[3]. Febrile status epilepticus is a febrile seizure lasting longer than 30 min. Between 2% and 5% of neurologically healthy infants and children experience at least one, usually simple, febrile seizure. There are no long-term adverse effects of having one or more simple febrile seizures.

Complex febrile seizures may have an approximately 2-fold long-term increase in mortality rates, as compared with the general population.

**Material & Methods:** The study included 69 cases that were belonging to the age group of 6 – 59 months. These patients were diagnosed as febrile seizure and admitted at pediatric ward. They were treated and investigated as per standard protocol. All information was gathered from parents and indoor case sheet after taking verbal consent. A detailed history was elicited from parents including demographic data, socioeconomic status, birth history with special focus on family history. Other details including Fever detail, seizure detail were recorded and

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entered in specially prepared proforma. Details of associated symptoms and nutritional status was recorded taking help from case sheet. All the information was enrolled in excel spread sheet and analyzed with SPSS v.21. Mann Whitney U test was used and p value <0.05 was considered as significant at 95% confidence Interval.

**Results:** The present study is designed to observe predictable risk factor for FS under heading of Demographic factors, socioeconomic factors, Nutritional factors, positive family history and positive past history.

In demographic factor gender and age group are studied. Pertaining to demographic factors, gender wise male to female ratio is found 1.65:1. Male children (62.3%) are more commonly affected than female (37.7%).

Male preponderance is observed in the present study. Age group wise Majority of the children (65.2 %) belongs to age group of < 2 years (6 to 12 months - 31.9%, 13 to 24 months – 33.3%). As mentioned in literature present study findings correlate with lower age group being a risk factor.

**Figure 1: Gender Wise Distribution Of Patients**

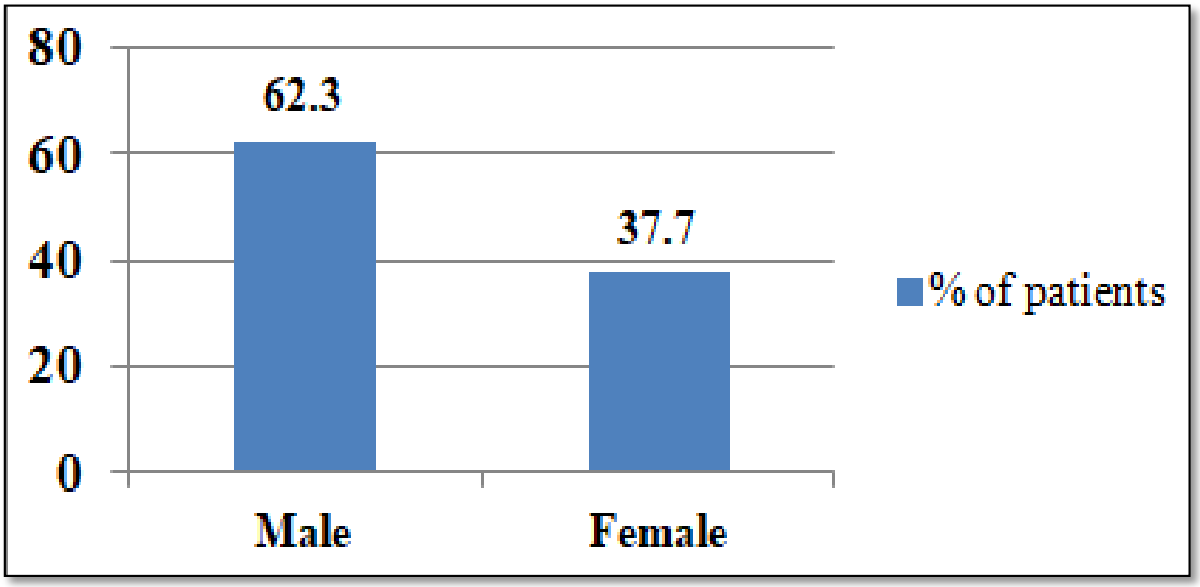
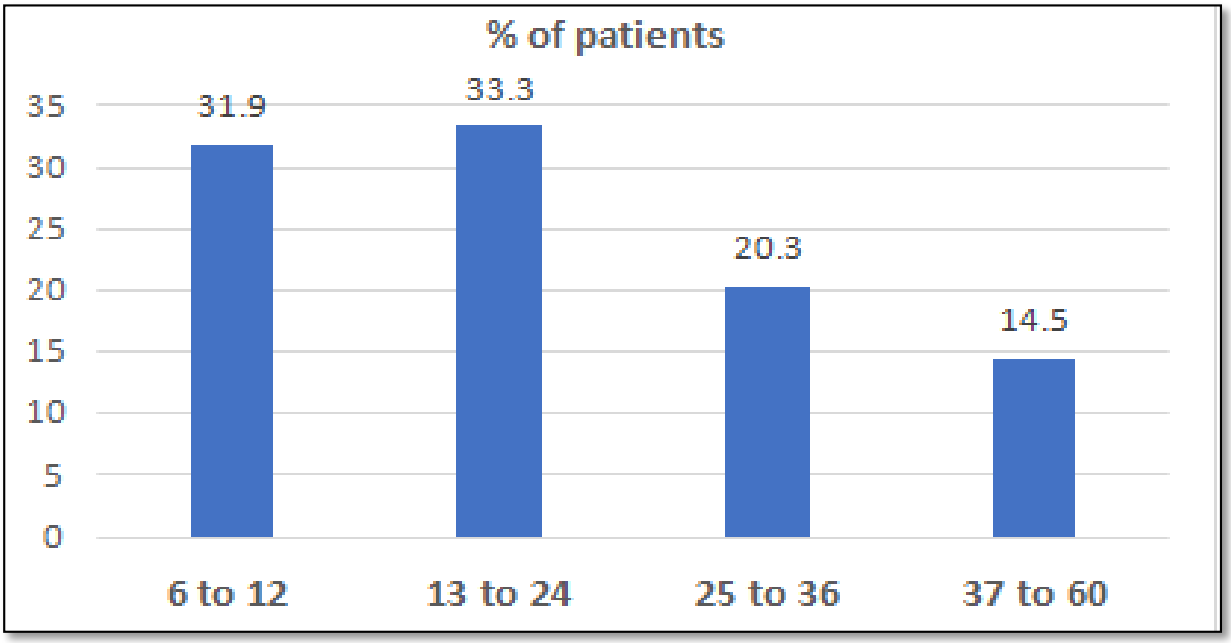



**Figure 2: Age Group Wise Distribution Of Patients (N=69)**




Observing educational and occupational status of parents. Majority of children belong to lower socio economical class. Majority of children (92.8%) presented with simple FS with seizure duration of less than 5 minutes. Majority (91.3%) has generalized tonic clonic type of seizure.

**Table 1: Type Of Febrile Seizure - Distribution Of Patients According To Type Of Febrile Seizure**

| Type Of Febrile Seizure | No.(N=69) | % Of Patients | R Biswas et al[4] | Bidabadi et al[5] | Renuka et al[6] |
|---|---|---|---|---|---|
| Simple | 64 | 92.8 | 90% | 88% | 85.3 % |
| Complex | 05 | 07.2 | 10% | 12% | 14.7 % |

**Table 2: Type Of Seizure**

| Type Seizure | No.(N=69) | % Of Patients | Shreshtha et al7 |
|---|---|---|---|
| Generalized Tonic | 06 | 8.7 | 27.2 % |
| Generalized Tonic Clonic | 63 | 91.3 | 71.8% |
| Focal Type | 0 | 0 | 0 % |

Maximum number of children (47.8%) had recorded low grade fever (100-101 F). Suggesting low grade fever as a predictive risk factor.

Majority (82.6 %) had fever for < 24 hour prior to FS. It is observed in all cases seizure attack occurs within 4 hours of fever spike.

**Figure 3: Co-Relation Of Interval Between Fever Spike And Seizure**

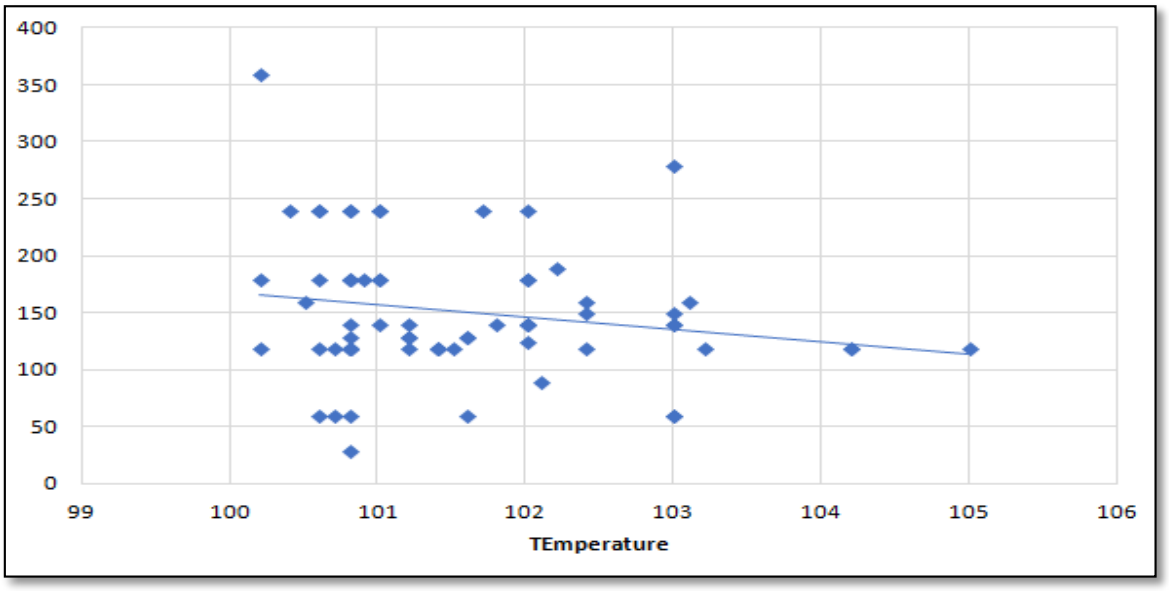



**Table 3: Associated Symptoms**

| Associated Symptoms | No.(N=38) | % Of Patients | R Biswas et al[4] | Daoud et al[8] | Bidabadi et al[5] |
|---|---|---|---|---|---|
| Cough And/Or Cold | 25 | 65.8% | 80 % | 57.33 % | 60.5 % |
| Frequency Of Stool/Vomiting | 7 | 18.4 % | 12.5 % | 34.67 % | 21 % |
| Rash | 1 | 2.6% | 7.5 % | 8% | 18.5 % |
| Ear Discharge | 3 | 7.9% | | | |
| Other | 2 | 5.3% | | | |

No correlation was identified between grading of temperature and causation of specific type of FS.

No co-relation was identified between grading of temperature and interval between fever spike and seizure. Positive past history of FS is observed in 18.8 % children.

Among children with recurrence of FS, Patient who has simple FS at present, Majority (90%) of them had same type of FS in Past.

Patient who has complex FS at present, all of them (100%) had same type of FS in past.

Thus it is observed that there is statistically significant association between type of seizure in case of recurrence ($p<0.05$).

**Table 4: Positive Past History**

| Past History | | No. (N=69) | % Of Patients |
|---|---|---|---|
| Past History Of Seizure | Yes | 13 | 18.8 |
| | No | 56 | 81.2 |
| Type Of Seizure In Past (N=13) | Simple | 09 | 69.2 |
| | Complex | 04 | 30.8 |

**Table 5: Correlation Of Type Of FS In Case Of Recurrence**

| Type of FS | | Past | | | |
|---|---|---|---|---|---|
| | | Simple | | Complex | |
| | | No | % | No | % |
| At Present | Simple | 9 | 90 | 1 | 10 |
| | Complex | 0 | 0 | 3 | 100 |
| Yate's $\chi 2$=8.77, df= 1, yate's p value=0.02 | | | | | |

Majority of children belong to normal birth weight category (72.5%) and majority of children are full term (95.7%). Thus, gestational age and birth weight doesn't seem to be predictive risk factor in present study. All the children are immunized in one or either way or 79.7 % are completely immunized and 20.3 % partially immunized. Positive family history of FS is observed in 20.2% children. Among children with recurrence 76.9% has positive family history.

Among patient with recurrence of FS, type of seizure and family history are identified as significant risk factor.

**Table 6: Positive Family History For Febrile Seizure**

| Family History | | No. (N=69) | % | Ravi Bhatia et al[9] | Shreshtha et al[7] |
|---|---|---|---|---|---|
| Febrile Seizure To Any Family Member | Yes | 14 | 20.2 | 29 % | 11.6 % |
| | No | 61 | 79.8 | 71% | 88.4 % |
| What Is Relation Of That Member With Child? | Father | 01 | 7.1 | - | - |
| | Mother | 02 | 14.3 | - | - |
| | Grandfather | 01 | 7.1 | - | - |
| | Sibling | 10 | 71.4 | - | - |
| Positive Sibling History | Yes | 10 | 14.5 | - | - |
| | No | 57 | 82.6 | - | - |
| | NA | 02 | 2.9 | - | - |

**Discussion:** In gender distribution of patients we observed that 62.3% are male and 37.7% are female giving a male to female ratio is 1.65:1. In study conducted by Ramesh et al[10] 71.8 % were males and 28.2 % were females and male to female ratio was 2.54:1. In study conducted by R Biswas et al[4] 60 % were males and 40 % were females and male to female ratio was 1.5:1.

Highest incidence of FS was found in child in age group between 13 to 24 months that is 33.3% followed by 31.9% in 6-12 month age group.

Calculated Mean age is 24.93 month with SD 18.09. In the similar study conducted by Ramesh et al[10] incidences in age group of 6 months to 12 months is higher which is 32.9% than the percentage of children between the other age groups as 13-18 months, 19-24 months, 25-30 months, 30-60 months which are 8.2%, 20%, 12.9%, 24.7% respectively. Study conducted by R Biswas et al[4] had 90 % simple FS 10 % had complex FS. Study conducted by Bidabadi et al[5] had 88% simple FS and 12% complex FS. Study conducted by Renuka et al[6] had 85.3 % simple FS and 14.7 % complex FS. Comparable to other study, Present study had shown similar finding.

Maximum number of patients were presented with simple febrile seizures.

In the study conducted by Shreshtha et al[7], it was found that majority of the children (71.8%) had generalized tonic clonic seizure. Comparable to other studies, present study had shown that generalized tonic clonic type of seizure are seen in maximum number of patients. In present study it is concluded that amongst 69 children, 57

children (82.6%) developed FS before 24 hours from the onset of fever. Rest of them, 12 (17.4%) had experienced FS after 24 hours of the onset of fever. Studies have shown that Duration of fever less than 24 hours has strong association with FS and similar observations are confirmed in present study.

Upper respiratory infection is observed predisposing for FS in multiple studies. In present study URTI confirmed as a risk factor being most common causation of fever. In the study conducted by R Biswas et al[4], upper respiratory tract infection (80 %) was the most common underlying illness, followed by gastroenteritis (12.5 %).

The risk of recurrence is influenced by both the age of the child and the type of FS. About one-third of children of FS are at risk of recurrence.

Risk factors for recurrence include family history of FS, less than 18 months of age and temperature lower than 40.0°C[11]. Patients who have complex FS at present, all of them (100%) had same in past. After evaluating correlation between them it is observed that there is statistically significant association ($p<0.05$) between type of seizure in case of recurrence.

However, we observed maximum number of patient falling into age group more than 2 year. In present study, family history for FS was present in 14 (20.2%) children. Similar study conducted by Ravi Bhatia et al[9] found 29% children with positive family history. Similar study conducted by R Biswas et al[4] found 20 % children with positive family history. Similar study conducted by Shreshtha et al[7] found 11.6 children with positive family history. Children with positive family history of seizure are more prone to having recurrent FS.

It is also studied that children with positive family history of FS are at higher risk of developing epilepsy. Studies by Nelson and K.B and Ellenberg J.H, has shown that children with FS who have positive family history of the same were observed with 3-fold increase in the rate of developing epilepsy, as compared with no family history of FS[12,13].

Family history statistically significant in children group of recurrence. Among 13 patients with recurrent FS group 10 (76.9%) were having positive family history. Thus, family history is a significant risk factor for recurrence of FS in present study.

**Conclusion:** Male gender, children age group 1-2-year, past history of FS, family history of FS, URTI, low grade fever and fever <24 hour were found as prevalent predictive factors in present study.

Children with predictive risk factors for FS should be evaluated closely and follow up regularly for early recognization of epilepsy and early intervention of AEDs. Identification of predictive risk factor will help clinician to educate and counsel parents regarding seizure recurrence, prophylactic use of antipyretic and measures during seizure activity as well as benign nature of illness which might reduce parental anxiety during further episodes of FS. Preventive measure to remove risk factors could lead to lower the incidence of FS.

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