

Original Article

DOI: <https://doi.org/10.47648/jswmc2025v15-02-124>

Pattern of Infections in children presented with Simple Febrile Seizure

Amin R¹, Haque R², Uddin MS³, Shohel M⁴, Jui JR⁵, Ami IA⁶

Abstract

Background: Febrile seizures are the most important convulsive disorder among the children below 5 year of age. It occurs 1 in every 25 children in the general population. Among them Simple Febrile seizure is approximately 70%– 80% of cases. Infection is an important contributing factor for the recurrence of febrile seizures. This study is aimed to observe the pattern of infections in children with simple febrile seizure.

Objective: To find out the pattern of infections in children presented with simple febrile seizure.

Materials and methods: It was a prospective cross sectional study conducted in the Department of Pediatrics, Sylhet Women's Medical College Hospital from April 2024 to September 2024. A child of 6-60 Months of age with Simple Febrile seizure was included in this study. Patients were enrolled according to inclusion and exclusion criteria data was collected thorough history, clinical examination and investigation of a patient of febrile seizure. Data were analyzed using statistical package for social science (SPSS) windows version 25.

Results: In this study of 90 subjects, most participants were younger than 24 months (55.5%), with a nearly equal gender distribution between males (57.7%) and females (42.3%). Most common presentation of febrile seizures during admission were fever, convulsions (100%) & cough (44.4%). Pneumonia was the commonest infection in this study 25 (57.8%) followed by 15 (16.8%) bronchiolitis, 7 (7.8%) tonsillitis, 10 (11.1%) Pharyngitis, 10 (11.1%) UTI, (6.6%, 3.3%) sinusitis and otitis media, (6.7%, 8.9%) HFMD & Diarrhea. 7.8% showing growth of Staphylococcus aureus on blood culture.

Conclusion: Infections contribute to be as an important factor for febrile seizure. Pneumonia and bronchiolitis are the most common form of infections in simple febrile seizure. This study observed foremost common pattern of infections in febrile seizure, it'll give proper guidance to physicians to counsel and treat the patients accordingly

Received date:
05 Feb. 2025

Accepted date:
27 May 2025

Key word: Children, infections, pattern, simple febrile Seizure

How to cite this article: Amin R, Haque R, Uddin MS, Shohel M, Jui JR, Ami IA. Pattern of infectious in children presented with simple febrile seizure. Journal of Sylhet Women's Medical College. 2025 July; 15(02):42-47. <https://doi.org/10.47648/jswmc2025v15-02-124>

JSWMC 2025 [15(02)] P: 42-47

Introduction

Seizures are the most common pediatric neurological disorders.

1. Dr. Ruhul Amin, Assistant Professor, Dept. of Pediatrics, Sylhet Women's Medical College Hospital
2. Dr. Rashedul Haque, Professor, Dept. of Paediatrics, Sylhet Women's Medical College Hospital
3. Dr. Md Shahabuddin, Associate Professor, Dept. of Paediatrics, Sylhet Women's Medical College Hospital
4. Dr. Mohammad Shohel, Junior Consultant, Dept. of Paediatrics, Sylhet MAG Osmani Medical College, Sylhet
5. Dr. Joysree Roy Jui, Assistant Registrar, Dept. of Paediatrics, Sylhet Women's Medical College Hospital
6. Dr. Israth Ahmod Ami, Indoor Medical Office, Dept. of Paediatrics, Sylhet Women's Medical College Hospital

Corresponding author: Dr. Ruhul Amin, MBBS, DCH, MCPS, FCPS., Assistant Professor, Department of Pediatrics, Sylhet Women's Medical College, Mirbhojta, Sylhet.,

Email: ruhulrumi37@gmail.com

Febrile seizures are the most important convulsive disorder among the children below 5 year of age¹. Febrile seizures usually occur between ages of 6 and 60 mo (peak 12-18 mo) with a temperature of 38⁰c (100.4⁰F) 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 illness.² It occurs 1 in every 25 children in the general population.³ Febrile seizures are further divided into simple and complex FS. Simple Febrile seizure is defined as a generalized seizure lasting

for <15 min that does not recur within 24 hours and Complex Febrile seizure is defined as a seizure that is focal, is prolonged (≥ 15 minutes), or recurs within 24 hours. Occurrence of Simple Febrile seizure is approximately 70%– 80% of cases.^{4,5} One-third of children with febrile seizures will develop seizure recurrence. There are several risk factors responsible for seizure recurrence is an issue of interest for physicians.² These are the seizures that are generally benign, with rare long-term sequelae, there is much to be learned about their pathophysiology and risk factors.⁶ Infections are the most common cause of the febrile illnesses associated with febrile seizure.⁵ Several Viral infections are documented in up to 80% of febrile seizures.⁷ There is association of febrile seizures with Upper Respiratory Tract Infections (URTIs) and Gastroenteritis commonly.^{8,9} Patients with Simple Febrile seizure have increased susceptibility to bacterial infections and various infections may resulting recurrence.^{10,11,12} Several studies have done regarding infections in relapsing Simple Febrile seizure separately.^{1,3,6,8}

Materials and methods: This cross-sectional study was conducted in the Department of Pediatrics, Sylhet Women's Medical College Hospital from April 2024 to September 2024. Total 90 sample was taken. All cases of febrile seizure and children with simple febrile seizure were included. Complex febrile seizure, febrile seizure other than simple variety, febrile seizure with critically ill patients and children with meningitis, encephalitis was excluded. This study was performed among children with Febrile seizure after fulfill the inclusion and exclusion criteria. The study was carried out after explaining the procedure in details and getting informed written consent from the patient's guardian/attendants. Febrile seizure due to RTI like URTI (pharyngitis, tonsillitis, sinusitis, otitis media, common cold) and LRTI (pneumonia, bronchiolitis), diarrhea, Urinary tract infections, was evaluated by proper history, examination and relevant investigations to search the pattern of infections. Following investigations were carried out to find out the pattern of infections responsible for febrile seizure according to clinical profile: throat swab

gram staining and culture for pharyngitis, tonsillitis, chest X-ray, X-ray PNS, Nasopharyngeal swab for virus PCR, CBC and blood C/S and urine R/M/E, NS1 for dengue, Stool R/M/E, C/S. All patients with febrile seizure due to infections were managed and follow up by hospital protocol. All data were collected in structured questionnaire. After collection, data editing and clearing was done manually and prepared for data entry and analysis by using SPSS (statistical package for social science) version 25.

Results: In our study populations, children under 24 months of age were (55.5%) with a smaller proportion between 24-48 months (33.3%) and 11.1% older than 48 months. The mean age was approximately 22 months (Table 02). Gender distributions were 57.7% male and 42.3% female (Fig 01). All subjects exhibited fever and convulsions, which are expected in febrile seizures. The majority were conscious during episodes (90%). In this study we found the commonest symptoms were fever and convulsion (100%), cough (44.4%), diarrhea (19.1%), and throat pain (18.9%), Urinary symptoms (11.1%). A family history of febrile seizures was noted in 31.1% of cases. Less frequent symptoms were headache, ear discharge, and skin infections (Table 3). Blood cultures were performed in 16.6% of cases, with 7.8% showing growth of *Staphylococcus aureus* (Table 4). Radiological diagnosis reveals pneumonia (27.8%), bronchiolitis (16.8%), (6.6%) sinusitis (Table 5). So overall pattern of infections among the study populations were 25 (57.8%) were pneumonia followed by 15 (16.8%) bronchiolitis, 7 (7.8%) tonsillitis, 10 (11.1%) Pharyngitis, UTI, (6.6%, 3.3%) sinusitis and otitis media, (6.7%, 8.9%) Hand Foot Mouth disease (HFMD), Diarrhea.

Table 1: Frequency of infections of study population (n=90)

Characteristics	Frequency	Percentage (%)
Pneumonia	25	27.8
Bronchiolitis	15	16.8
Pharyngitis	10	11.1
Tonsillitis	7	7.8
Sinusitis	6	6.6
Otitis media	3	3.3
Hand foot mouth disease	6	6.7
Diarrhea	8	8.9
Urinary tract infections	10	11.1

Table 2: Demographic characteristics of study population (n=90)

Characteristics	Number	Percentage (%)
Age in months		
< 24 months	50	55.5
24-48 months	30	33.3
>48-60 months	10	11.1
Mean $\pm$ SD (months)	23.09 $\pm$ 14.96	

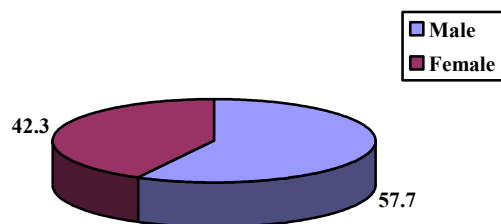


Fig. 1: Sex distribution of study populations (n=90)

Table – 3: Clinical feature of the study Population (n=90)

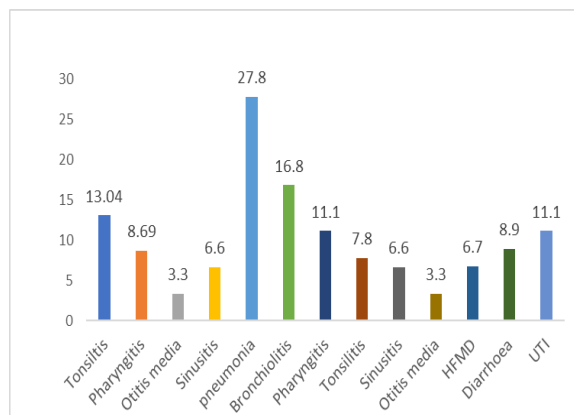
Variants	Number	Percentage
Symptoms		
Fever		
Yes	90	100
No	0	00
Convulsion		
Yes	90	100
No	0	00
Family history		
Yes	28	31.1
No	62	68.9
Cough		
Yes	40	44.4
No	50	45.6
Throat pain		
Yes	17	18.9
No	73	81.1
Urinary symptoms		
Yes	10	11.1
No	80	88.9
Ear discharge		
Yes	3	3.3
No	87	96.7
Headache		
Yes	8	8.8
No	82	91.2
Diarrhea		
Yes	18	19.1
No	62	80.9
Signs		
Conscious		
Yes	90	100.00
No	0	00
Skin infection		
Yes	6	6.7
No	83	93.3
Lung finding		
Yes	40	44.4
No	50	55.6
Throat infections		
Yes	17	18.9
No	73	81.1
Dehydration		
Yes	18	19.1
No	72	80.9

Table 4: Pathogens isolated in study populations (n=90)

	Frequency	Percentage
Throat swab culture	5	5.5
No growth	4	4.4
Growth (Streptococcus)	1	1.1
Blood culture	15	16.6
No growth	8	8.9
Growth (Streptococcus)	7	7.8
Urine culture	8	8.9
No growth	5	5.5
Growth (E. coli)	3	3.3

Table – 5: Radiological diagnosis of study populations (n=90)

	Frequency	Percentage
Pneumonia	25	27.8
Bronchiolitis	15	16.8
sinusitis	6	6.6



The study shows in **figure II** that pattern of infections among majority study populations are 25 (57.8%) were pneumonia followed by 15 (16.8%) bronchiolitis, 7 (7.8%) tonsillitis, 10 (11.1%) Pharyngitis, UTI, (6.6%, 3.3%) sinusitis and otitis media, (6.7%, 8.9%) HFMD, Diarrhea.

Discussion:

Febrile seizures are the important cause of convulsion among the children aged 6 month to 59 month. There are several Infections responsible for recurrence of febrile seizure. This study evaluated the pattern of infections in children presented with simple febrile seizure. In this study showed that maximum patients (55.5%) were <24 months of age followed by 33.3% were 24-44 months and only 11.1% were >48 months and mean age was 23.09 ± 14.96 months this is similar to the report by Esegbe et al.¹³ and Onyearugha et al.¹⁴ Mean age of onset of febrile convulsion among the study participant is 23.09 ± 14.96 months this observation is consistent with previous report.^{14,15,16}

This study showed male were predominant (57.7%) and female were (42.3%). This finding is at consistent with other studies^{13,17-20}. Sharwat, et al., also report male gender to be significantly associated with a risk of a febrile seizure.²¹

In this study shows the clinical profile of the study subjects showed several significant findings, particularly fever and convulsions (100%), cough (44.4%), throat pain (18.9%), diarrhea (19.1%), urinary symptoms (11.1%). Less prominent symptoms are ear discharge, headache, and skin infections. 31.1% of participants had family history of febrile seizure. These findings were consistent with other studies.¹⁶⁻²² Kumari, et al.¹³ reported a positive family of history of febrile seizures in 30 %of patients. Shankar P et al also reported a family history in around 30% children.^{24,25}

This study shows most important infections among majority study populations are 25 (57.8%) were pneumonia followed by 15(16.8%) bronchiolitis. This spectrum of infections in the present study were different from other studies.^{3,17} The study showed upper respiratory infections were the most important risk factors in febrile seizure. Other infections such as 7 (7.8%) tonsillitis, 10(11.1%) Pharyngitis, UTI, (6.6%,3.3%) sinusitis and otitis media, (6.7%,8.9%) HFMD, Diarrhea observed in this study which was well agreement with other studies.¹⁶⁻²²

The study showed streptococci were 7.8% in blood & 4.34% were in throat swab culture, E.coli was 3.3% in urine culture which were

similar to reported figures from previous studies^{22, 26-28}.

Conclusion:

Infections contribute to be as an important factor for febrile seizure. Pneumonia and bronchiolitis are the most common form of infections in simple febrile seizure. This study observed foremost common pattern of infections in febrile seizure, it'll give proper guidance to physicians to counsel and treat the patients accordingly.

Limitations:

- The sample size of the study was small.
- The study period was short.
- The study was carried out in single center.
- This study did not isolate the viral pathogens

Recommendations:

In every case of febrile seizure care, counsel and prompt treatment must be adopted not to suffer from various pattern of infections for prevention of recurrence of febrile seizures.

Further studies should be undertaken by including large number of patients

A thorough search for viral isolation to identify viral source of infections as a casual factor for febrile seizures.

Reference

1. Begum F, Islam AKMK, Mobarak R, Islam MS, Nahar N. Identification and observation clinical finding of febrile convulsion (FC) among admitted children. A study in Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh. *International Journal of Medical and Health Research* 2019;5(6):110-115.
2. Mohamad A, Mikati, Dmitry T, Kevin MR. Febrile seizures. In: Kliegman RM, St Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM, editors. *Nelson Textbook of Pediatrics*. 22nd ed. Philadelphia: Elsevier, 2025. Pp 3595.
3. Worawit k, Kamornwan K, Orawan L. Clinical characteristics of febrile seizures and risk factors of its recurrence in Chiang Mai University Hospital. *Neurology Asia* 2017; 22(3) : 203 – 08.
4. Ji YH, Seung BH. Pathogenetic and etiologic considerations of febrile seizures. *Clin Exp Pediatr*. 2023;66(2):46-53.
5. Kursat BC, Mustafa C, Yasemin K, Sedat I, Ozan K, Aysima O et al. Viral etiological causes of febrile seizures for respiratory pathogens (EFES Study). *Hum Vaccin Immunother* 2019 ; 15 :496-02.
6. Rana S, Jim B, Michael F. A Review of Febrile Seizures: Recent Advances in Understanding of Febrile Seizure Pathophysiology and Commonly Implicated Viral Triggers. *Frontiers in paediatrics* 2022. 1753-57.
7. Brian C, Virginia W. Relationship between five common viruses and febrile seizure in children. *Arch Dis Child*. (2007) 92:589– 93
8. Do HH, Su YK, Na ML, Dae YY, Sin WY, et al. Seasonal distribution of febrile seizure and the relationship with respiratory and enteric viruses in Korean children based on nationwide registry data. *Seizure*. 2019); 73:9– 13.
9. Jan H, Van Z, Reinier A, Mullaart MD, George FB et al. Recurrence of febrile seizures in the respiratory season is associated with influenza A. *J Pediatr*. 2004; 145:800–5.
10. Wesly E, Chuck C. Febrile seizure: A review. *J Am Coll Emerg physicians Open*. 2022; 3(4):e12769.
11. Teran CG, G, Medows M, Wong SH, Rodriguege, L, Varghese R. Febrile seizure: current role of Laboratory Investigation and Source of the Fever in the Diagnostic Approach. 2012; 28 (6) : 493- 97.
12. Aslan M. Evaluation of patients presenting with first febrile seizure. *Cureus*. 2021 Jul;13 (7). e16151.
13. Eseigbe EE, Adama SJ, and Eseigbe P. Febrile seizures in Kaduna, north western Nigeria". *Nigerian Medical Journal* .2012; 53:140-44.
14. Onyearugha C N, Okoronkwo N C, Onyemachi PEN. Febrile Seizures at a Tertiary Paediatric Health Facility in South-East Nigeria. *Acta Scientific Paediatrics* 2019; 29: 47-51.
15. Mohammad AM, Dmitry T. Focal Seizures. In: Kliegman RM, St Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM, editors. *Nelson Textbook of Pediatrics*. 22nd ed. Philadelphia: Elsevier, Inc. 2025; 3599.
16. Sharawat IK, Singh J, Dawman L, Singh A. Evaluation of Risk Factors Associated with

- First Episode Febrile Seizure. J Clin Diagn Res. 2016;10 (5):SC10–SC13.
17. Hasanpour Ounaji S.H., Ghofrani M, Taheri Derakhsh NT., Ziaei A.R. Determining the Risk Factors of Recurrent Febrile Seizure in Children Referring to Hazrat-E-Ali Asghar Childrens Hospital. Razi Journal of Medical Sciences (Journal of Iran University Of Medical Sciences) 2009 (16);65: 46-53.
 18. Abaskhanian A, Vahid Shahi K, Parvinnejad N. The Association between Iron Deficiency and the First Episode of Febrile Seizure. J Babol Univ Med Sci. 2009;11(3):32–6
 19. Habib Z, Akram S, Ibrahim S, Hasan B Febrile seizures: factors affecting risk of recurrence in Pakistani children presenting at the Aga Khan University Hospital. J Pak Med Assoc. 2003; 53(1):11-7.
 20. Pant D, Nepal A, Prajapati A, Shrestha S, Pokhrel B. Study of demography risk factors of simple and complex febrile seizure and associated infection in children at tertiary care center. Journal of Patan Academy of Health Sciences. 2023 May 16;10 (1):53-60.
 21. Sharawat IK, Singh J, Dawman L, Singh A. Evaluation of risk factors associated with first episode febrile seizure. Journal of clinical and diagnostic research. 2016; 10(5):SC10–3.
 22. Awariwar M, Panda SN. Febrile seizures in children and it's association with bacterial infection - a hospital based study. International Journal of Contemporary Medical Research 2019; 6 (10):J1-J5.
 23. Kumari PL, Rajamohanan K, Krishnan ASA. Risk Factors of First Episode Simple Febrile Seizures in Children Aged 6 Month to 5 Year: A Case Control Study. Indian Pediatrics. 2022; 59 (11):871–4.
 24. Shankar P, Mahamud S. Clinical, epidemiological and laboratory characteristics of children with febrile seizures. International Journal of Contemporary Pediatrics. 2020;7 (7):1598.
 25. Pokhrel RP, Bhurtel R, Malla KK, Shah LK. Study of febrile seizure among hospitalized children of a tertiary center of Nepal: A descriptive cross-sectional study. J Nepal Med Assoc. 2021 Jun;59(238):526–30
 26. Castellazzi ML, La Vecchia A, Scali M, Agostoni C, Di Pietro G, Milani GP. Clinical and laboratory parameters associated with febrile seizure recurrence within the first 24 h: a ten-year cohort study. Frontiers in Pediatrics. 2024 Mar 4; 12: 1373848.
 27. Alp EK, Elmacı AM. The association between serum sodium levels and febrile seizures recurrence: is the degree of hyponatremia a risk factor? J Pediatr Neurol. (2022) 20:024–7.
 28. Teran CG, Medows M, Wong SH, Rodriguez L, Varghese R. Febrile Seizure: current role of the laboratory investigation and source of the fever in the diagnostic approach. Pediatr Emerg care. 2012;28:493-7.