THE PLANET

Original Article

Clinical Characteristics and Presentation Patterns of Pediatric Seizures: A Cross Sectional Study at a Tertiary Care Hospital

Abu Bakkir Siddique[1*], Afsar Ahammed[2], Saiful Islam[3], Halima Akter Tripty[4]

ARTICLE INFO

Received: 9 June 2026
Accepted: 15 June 2026
Published Online: 19 June 2026

DOI: 10.5281/zenodo.20760818

Volume: 9, Number: 4, Page: 191-194

e-ISSN: 2789-5912
ISSN: 2617-0817

*Corresponding author

ABSTRACT

Background: Seizures frequently occur in children, particularly those under 3 years old, and stem from unusual brain activity that impacts awareness and movement. Factors encompass infections, fever, metabolic problems, and perinatal damage. Diagnosis is mainly clinical, augmented by EEG and imaging. This research analyzes the clinical characteristics and presentation of pediatric seizures at a tertiary care hospital in Bangladesh. **Methods & Materials:** This cross-sectional study was conducted in the Department of Emergency, Observation & Referral (EOR) of Bangladesh Shishu Hospital & Institute from March 2025 to February 2026 and involved 55 children (0–14 years) experiencing new or recurring seizures. Information regarding sociodemographic traits, clinical attributes, seizure classification, and causes was gathered and assessed through descriptive statistics. Ethical consent and informed approval were secured. **Results:** In a group of 55 children, the majority were aged 1–5 years (43.6%), with a higher number of males (58.2%) and an average age of 4.8 ± 3.2 years. Fever (65.5%) was the most prevalent symptom. Generalized tonic–clonic seizures were more common (67.3%), with the majority lasting less than 15 minutes (70.9%), whereas 29.1% were extended. Laboratory anomalies included hyponatremia (30.9%), hypocalcemia (20%), anemia (34.5%), and elevated CRP (40%). Febrile seizures (63.6%) were the primary reason, with CNS infections (16.4%) and metabolic factors (10.9%) following. **Conclusion:** Pediatric seizures occurred most frequently in young children, particularly in boys aged 1–5 years. Febrile seizures were the primary cause, with the generalized tonic–clonic type being the most common. Timely diagnosis and swift intervention are crucial for better outcome.

Keywords: *Seizures, Clinical Characteristics, Pediatrics, Febrile seizure.*

1. *Assistant Professor, Department of Emergency, Observation & Referral, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh (ORCID: 0009-0007-4077-8588)*
2. *Associate Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh (ORCID: 0000-0002-1910-613)*
3. *Registrar, Department of Measles ICU, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh (ORCID: 0000-0001-9330-1758)*
4. *Registrar, Emergency, observation and Referral Department, Bangladesh shishu hospital and Institute, Dhaka, Bangladesh (ORCID: 0009-0007-5614-6278)*

INTRODUCTION

A seizure is a short, involuntary alteration in consciousness, behavior, movement, sensation, or autonomic function resulting from sudden, excessive, and synchronized electrical activity in brain neurons [1]. It occurs frequently in children and can arise from various factors. Approximately 4–10% of children will have at least one seizure by the time they reach 16, with the peak occurrence occurring before the age of 3. They are the most common and frequently concerning neurological issue in children [2]. Seizures represent one of the most frequent neurological emergencies in children and pose significant clinical and psychosocial challenges. In addition to the risk of recurrence and underlying pathology, affected children often experience comorbid conditions such as attention-deficit/hyperactivity disorder (ADHD), learning disabilities, anxiety, and depression, which can adversely impact cognitive and emotional development [3,4].

Seizures in children may occur in different temporal patterns, including diurnal and nocturnal types, with sleep playing an important role in seizure threshold and frequency [5,6]. Pediatric seizures are caused by febrile illness, CNS infections (meningitis, encephalitis), metabolic disturbances (hypoglycemia, electrolyte imbalance), head trauma, structural brain abnormalities, genetic epilepsy syndromes, and toxic exposures [7,8].

Common signs of a seizure consist of loss of consciousness, difficulty breathing, paleness or blueness of the skin, frothing at the mouth, rolling eyes, a fixed gaze, and either generalized or localized limb jerking. After a seizure, children can be sleepy, disoriented, or grumpy but typically return to normal within approximately 30 minutes [9,10].

The diagnosis of pediatric seizures primarily relies on detailed clinical history and physical examination, supported by investigations such as electroencephalography (EEG), neuroimaging (MRI), and relevant laboratory tests, including blood glucose, electrolytes, and infection markers. Additional investigations such as lumbar puncture and genetic testing may be indicated in selected cases [11,12]. Acute management focuses on stabilization of airway, breathing, and circulation, prompt correction of metabolic abnormalities, and administration of benzodiazepines as first-line therapy, followed by second-line anticonvulsants in refractory cases [13].

Previous studies have shown that generalized tonic–clonic seizures are the most common presentation among hospitalized children, often associated with altered consciousness and postictal somnolence [14]. Etiological factors frequently include central nervous system infections, metabolic abnormalities, and structural brain lesions, with poorer outcomes observed in children with underlying neurological impairment [15]. In Bangladesh, similar patterns have been reported, where generalized and focal seizures are commonly associated with perinatal insults, infections, and head trauma, often accompanied by EEG abnormalities and neuroimaging findings [16].

Although there are a few hospital-based studies in Bangladesh, comprehensive and recent data on the clinical features and presentation patterns of pediatric seizures, such as types, risk factors, and diagnostic

profiles in tertiary care environments, remains limited. This study intends to evaluate the clinical traits and presentation patterns of pediatric seizures in a tertiary care hospital situated in Bangladesh.

METHODS & MATERIALS

This was a hospital-based cross-sectional descriptive study conducted at Department of Emergency, Observation & Referral of Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh, over a period of 12 months from March 2025 to February 2026. The study aimed to assess the clinical characteristics and presentation patterns of pediatric seizures. A total of 55 pediatric patients aged 0–14 years presenting with seizures in the inpatient and emergency departments during the study period were included using a purposive sampling technique. Both new-onset and recurrent seizure cases were enrolled, while patients with incomplete records, seizures due to known brain tumors under treatment, or traumatic brain injury-related seizures were excluded. Data were collected using a pre-designed structured case record form based on caregiver interviews, clinical examination, hospital records, and relevant laboratory and radiological investigations. Variables included sociodemographic characteristics, clinical presentation, seizure type and duration, associated symptoms, laboratory parameters, and etiological diagnosis. Laboratory investigations such as blood glucose, serum electrolytes, complete blood count, and C-reactive protein were performed in all or selected cases, while EEG and neuroimaging (CT/MRI) were done when indicated. Data were checked, coded, and analyzed using appropriate statistical methods and presented in frequency, percentage, mean, and standard deviation. Ethical approval was obtained from the Institutional Review Board of Bangladesh Shishu Hospital & Institute, and informed consent was taken from parents or legal guardians of all participants, ensuring confidentiality and anonymity throughout the study.

RESULTS

Table I shows total of 55 pediatric patients presenting with seizures were included in this study. The majority of the children (43.6%) belonged to the 1–5 years age group, followed by 23.6% in the 6–10 years group. Infants under 1 year constituted 18.2% of cases, while children older than 10 years accounted for 14.6%. The mean age of the participants was 4.8 ± 3.2 years. There was a male predominance, with males comprising 58.2% of the study population compared to 41.8% females.

Table 1
Sociodemographic Characteristics of the Study Population (*n* = 55).

Variable	Frequency (n)	Percentage (%)
Age Group		
<1 year	10	18.2
1–5 years	24	43.6
6–10 years	13	23.6
>10 years	8	14.6
Mean age (years)	4.8 ± 3.2	
Sex		
Male	32	58.2
Female	23	41.8

Table II presents fever was the most common presenting symptom, observed in 65.5% of cases. Other frequent symptoms included vomiting (38.2%), impaired consciousness (36.4%), lethargy (32.7%), and generalized weakness (30.9%). Refusal to feed was noted in 25.5% of patients, while headache and diarrhea were less commonly reported, present in 16.4% and 12.7% of cases, respectively.

Table II
Clinical Presentation of Patients (*n* = 55).

Clinical Feature	Frequency (n)	Percentage (%)
Fever	36	65.5
Vomiting	21	38.2
Lethargy	18	32.7
Refusal to feed	14	25.5
Generalized weakness	17	30.9
Headache	9	16.4
Impaired consciousness	20	36.4
Diarrhea	7	12.7

Table III shows generalized tonic–clonic seizures were the most common type, accounting for 67.3% of cases, followed by focal seizures (21.8%) and complex seizures (10.9%). Regarding seizure duration, the majority (70.9%) experienced seizures lasting less than 15 minutes, while 29.1% had seizures lasting 15 minutes or longer. Prolonged seizures were observed in 29.1% of patients. Recurrent febrile seizures were present in 20.0% of cases, and 23.6% of patients had a prior history of anticonvulsant use.

Table III
Seizure Characteristics (*n* = 55).

Variable	Frequency (n)	Percentage (%)
Type of Seizure		
Generalized tonic-clonic	37	67.3
Focal seizure	12	21.8
Complex seizure	6	10.9
Duration of Seizure		
<15 minutes	39	70.9
≥15 minutes	16	29.1
Prolonged seizure		
Yes	16	29.1
No	39	70.9
Recurrent febrile seizure		
Yes	11	20.0
No	44	80.0
History of anticonvulsant use		
Yes	13	23.6
No	42	76.4

Table IV presents the mean random blood sugar level was 96.4 ± 18.2 mg/dL. The mean serum sodium level was 134.8 ± 4.6 mmol/L, with hyponatremia observed in 30.9% of patients. The mean serum potassium and calcium levels were 4.1 ± 0.5 mmol/L and 8.6 ± 0.7 mg/dL, respectively, with hypocalcemia present in 20.0% of cases. The mean hemoglobin level was 10.8 ± 1.4 g/dL, and anemia was identified in 34.5% of patients. The mean total white blood cell count was 11,200 ± 3,500/mm³, and raised C-reactive protein (CRP) levels were found in 40.0% of cases.

Table IV
Laboratory Findings (*n* = 55).

Parameter	Mean ± SD / Frequency	Percentage (%)
RBS (mg/dL)	96.4 ± 18.2	
Serum Sodium (mmol/L)	134.8 ± 4.6	
Hyponatremia (<135)	17	30.9
Serum Potassium (mmol/L)	4.1 ± 0.5	
Serum Calcium (mg/dL)	8.6 ± 0.7	
Hypocalcemia	11	20.0
Hemoglobin (g/dL)	10.8 ± 1.4	
Anemia	19	34.5
Total WBC count (/mm³)	11,200 ± 3,500	
Raised CRP	22	40.0

Table V shows febrile seizures were the most common underlying diagnosis, accounting for 63.6% of cases. Central nervous system (CNS) infections, including meningitis and encephalitis, were identified in 16.4% of patients. Metabolic causes such as hypoglycemia and electrolyte imbalance accounted for 10.9% of cases. Structural brain abnormalities were present in 5.5% of patients, while 3.6% remained idiopathic or of unknown etiology.

Table V
Etiology / Underlying Diagnosis of Seizures (*n* = 55).

Etiology / Diagnosis	Frequency (n)	Percentage (%)
Febrile seizure	35	63.6
CNS infection (meningitis / encephalitis)	9	16.4
Metabolic causes (hypoglycemia / electrolyte imbalance)	6	10.9
Structural brain abnormalities	3	5.5
Unknown / idiopathic	2	3.6
Total	55	100

DISCUSSION

In this study, the majority of seizures happened in males aged 1–5 years, consistent with Chisti et al., who similarly found that younger children under five had a higher prevalence of seizures, especially in relation to infections. The recurring trend indicates that early childhood is a critical phase for seizures, probably because of heightened vulnerability to infections and immature neurological development [17].

In this research, fever was the prevalent symptom, succeeded by vomiting, altered consciousness, and lethargy. Comparable results were noted by Talha A. et al., who recognized fever as the main characteristic of febrile seizures in children in Dhaka, Bangladesh. This indicates that fever-associated symptoms are the primary clinical manifestation of pediatric seizures in this context [18].

In this study, generalized tonic–clonic seizures were the most prevalent and typically short-lived. Abath et al. reported similar results, noting that generalized seizure types are the most common presentation among children in tertiary care hospitals in Bangladesh, with the majority of instances presenting acute, brief

episodes. This indicates that generalized seizures continue to be the predominant clinical pattern in pediatric patients in this context [19].

This research found that frequent laboratory irregularities were hyponatremia, hypocalcemia, anemia, and elevated CRP. In the same way, Mahamuduzzaman et al. noted common electrolyte imbalances and increased inflammatory markers in pediatric patients with febrile seizures in Bangladesh. These results underscore the significance of metabolic and infectious elements in childhood seizures and the necessity of regular laboratory evaluations [20].

In this research, febrile seizures were the leading cause, followed by CNS infections and metabolic conditions. Likewise, Jahan and Begum noted that the majority of pediatric seizures in Bangladesh result from acute symptomatic and febrile reasons, whereas structural and idiopathic causes are less common. This suggests that infections and metabolic issues continue to be the primary causes of seizures in children [21].

Overall, pediatric seizures were mainly associated with fever and infections, emphasizing the need for prompt diagnosis and treatment of underlying preventable factors in young children.

CONCLUSION

In this study, pediatric seizures were most prevalent in children aged 1 to 5 years, showing a higher occurrence in males. Fever was the primary presenting symptom, and generalized tonic-clonic seizures were the most common type, typically of brief duration. Febrile seizures were the main cause, followed by CNS infections and metabolic issues. The existence of notable lab abnormalities underscores the necessity for swift assessment. Prompt identification, proper assessment, and prompt treatment are crucial to enhance results in children experiencing seizures.

REFERENCES

1. Friedman MJ, Sharieff GQ. Seizures in children. Pediatric Clinics. 2006 Apr 1;53(2):257-77.
2. Adhikari S, Sathian B, Koirala DP, Rao KS. Profile of children admitted with seizures in a tertiary care hospital of Western Nepal. BMC pediatrics. 2013 Mar 27;13(1):43.
3. Raspall-Chaure M, Neville BG, Scott RC. The medical management of the epilepsies in children: conceptual and practical considerations. The Lancet Neurology. 2008 Jan 1;7(1):57-69.
4. Baker GA, Hargis E, Hsih MM, Mounfield H, Arzimanoglou A, Glauser T, Pellock J, Lund S. Perceived impact of epilepsy in teenagers and young adults: an international survey. Epilepsy & Behavior. 2008 Apr 1;12(3):395-401.
5. Kotagal P, Yardi N. The relationship between sleep and epilepsy. InSeminars in pediatric neurology 2008 Jun 1 (Vol. 15, No. 2, pp. 42-49). WB Saunders.
6. Loddenkemper T, Vendrame M, Zarowski M, Gregas M, Alexopoulos AV, Wyllie E, Kothare SV. Circadian patterns of pediatric seizures. Neurology. 2011 Jan 11;76(2):145-53.
7. Berg AT, Scheffer IE. New concepts in classification of the epilepsies: entering the 21st century. Epilepsia. 2011 Jun;52(6):1058-62.
8. CHO JI, KIM DW, JANG HO, MOON JS, NAM SY, LEE CG. A clinical study on the etiologies of acute seizures in children who visited emergency department. Korean Journal of Pediatrics. 2004:1312-8.
9. Paul SP, Blaikley S, Chinthapalli R. Clinical update: febrile convulsion in childhood. Community Practitioner. 2012 Jul 1;85(7):36-9.
10. National Collaborating Centre for Women's and Children's Health (UK. Feverish illness in children: assessment and initial management in children younger than 5 years.
11. Minardi C, Minacapelli R, Valastro P, Vasile F, Pitino S, Pavone P, Astuto M, Murabito P. Epilepsy in children: from diagnosis to treatment with focus on emergency. Journal of clinical medicine. 2019 Jan 2;8(1):39.
12. Sartori S, Nosadini M, Tessarin G, Boniver C, Frigo AC, Toldo I, Bressan S, Da Dalt L. First-ever convulsive seizures in children presenting to the emergency department: risk factors for seizure recurrence and diagnosis of epilepsy. Developmental Medicine & Child Neurology. 2019 Jan;61(1):82-90.
13. Kazl C, LaJoie J. Emergency seizure management. Current Problems in Pediatric and Adolescent Health Care. 2020 Nov 1;50(11):100892.
14. Mwipopo EE, Akhatar S, Fan P, Zhao D. Profile and clinical characterization of seizures in hospitalized children. The Pan African Medical Journal. 2016 Aug 16;24:313.
15. Soni V, Singhi P, Saini AG, Malhi P, Ratho RK, Mishra B, Singhi SC. Clinical profile and neurodevelopmental outcome of new-onset acute symptomatic seizures in children. Seizure. 2017 Aug 1;50:130-6.
16. Salam A, Quddus MR, Sheikh MS, Azim MA, Hussain ME. Clinico-Demographic Characteristics and Different Diagnostic Findings of Epilepsy Patients in a Specialized Hospital Outside Dhaka in Bangladesh. Journal of National Institute of Neurosciences Bangladesh. 2016;2(1):3-9.
17. Chisti MJ, Sarker SA, Shahunja KM, Shahid AS, Hasan MI, Nuzhat S, Kabir MF, Afroze F, Alam T, Shahrin L, Ahmed T. Seizure in children under five presenting with pneumonia in a critical care ward in Bangladesh: prevalence, associated factors, and outcome. The Pediatric Infectious Disease Journal. 2021 May 1;40(5):389-93.
18. TALHA A. Clinical profile of febrile seizure in children: a study in a tertiary care hospital, Dhaka, Bangladesh. Md Nurul Absar et al; Sch J App Med Sci, Nov, 2020; 8 (11): 2672-2676. 2020 Jan 1.
19. Abath CB, Saha NC, Hoque SA, Islam A, Chowdhury YS, Begum MS, Kanjiker TS, Yuskaitis CJ, Harini C, Alam MB, Mohammed QD. Clinical characteristics of children with infantile epileptic spasms syndrome from a tertiary-care hospital in Dhaka, Bangladesh. Heliyon. 2023 Mar 1;9(3).
20. Mahamuduzzaman AS, Rahman MA, Ullah MS, Khan MF, Tabassum S, Sonia UQ, Saleha R. Clinical and Laboratory Presentations of Children with First Time Febrile Seizure: Findings from a Tertiary Level Hospital in Bangladesh. Sch J App Med Sci. 2022 Dec;12:2103-9.
21. Jahan A, Begum D. Seizure Outcome in Children with Infantile Spasm: Seizure in infantile spasm. Bangladesh Medical Research Council Bulletin. 2021;47(3):244-9.