

Seizure Rate of Control and Associated Factors in Pediatric Neurology Clinic, Addis Ababa, Ethiopia in 2019

Ahmed Ibrahim Nawd^{1*}, Awokech Berihun², Tewodros Getinet³

¹Department of Pediatrics and Child Health, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

²Department of Pediatrics and Child Health, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

³Department of Epidemiology and Public Health, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

***Corresponding Author:** Dr. Ahmed Ibrahim Nawd, Department of Pediatrics and Child Health, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia; Email: anawd2003@yahoo.com; Phone: +254710150393

<https://doi.org/10.58624/SVOAPD.2026.05.034>

Received: October 01, 2026

Published: October 26, 2026

Citation: Nawd AI, Berihun A, Getinet T. Seizure Rate of Control and Associated Factors in Pediatric Neurology Clinic, Addis Ababa, Ethiopia in 2019. *SVOA Paediatrics* 2026, 5:5, 234-243. doi: 10.58624/SVOAPD.2026.05.034

Abstract

Background: Epilepsy is a common neurological disorder of childhood, and failure to achieve seizure control can impair brain development and psychosocial well-being. We found no published data on seizure types and the rate of seizure control among Ethiopian children. This study determined the rate of seizure control and associated factors among children attending the pediatric neurology clinic of St. Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa, Ethiopia.

Methods: A prospective, institution-based cross-sectional study enrolled 264 children with seizure disorders attending neurology follow-up from February 1 to July 30, 2019. Convenience sampling and a pretested, interviewer-administered questionnaire were used after written parental consent. Data were analyzed with SPSS version 25 using descriptive statistics and binary and multiple logistic regression (95% confidence interval; $p < 0.05$). Uncontrolled seizures were defined as one or more seizures within a month.

Results: Of 264 children, 178 (67%) were male and 138 (52%) lived in urban areas; the mean age was 88 months, and 1–5 years was the commonest age group (36%). Generalized-onset tonic-clonic seizures were the most frequent type (70.8%), followed by mixed seizures (15.2%). Seizures were controlled in 160 children (60.6%). Suboptimal antiepileptic drug (AED) dosing was found in 68% of poorly controlled and 7.5% of well-controlled children. MRI was done in 51.5% of children and was normal in 70%. In multiple logistic regression, poor control was associated with suboptimal drug dosing (AOR 31.7; 95% CI 15.10–67.42; $p < 0.001$), positive family history of seizures (AOR 3.19; 95% CI 1.45–9.26; $p = 0.006$) and coexisting central nervous system illness (AOR 2.20; 95% CI 0.86–5.21; $p = 0.049$). Age, sex, residence, parental education, household income, EEG and MRI findings were not associated with seizure control.

Conclusions: Only three in five children achieved seizure control, and suboptimal AED dosing was highly prevalent among those with poor control. Institutional guidelines for AED optimization, adherence to ILAE indications for MRI, and further research into the reasons for poor drug optimization are needed.

Keywords: Seizure control; Pediatric neurology; Epilepsy; Antiepileptic drug optimization; Ethiopia

1. Introduction

Seizures and epilepsy have a considerable impact on society and on the affected individual. The burden is not limited to high medical cost: epilepsy can also have a devastating effect on brain development and intellect, and affected children are at risk of psychosocial problems because of the cultural stigma that continues to be associated with the condition [1].

A seizure is a transient occurrence of signs and/or symptoms resulting from abnormal excessive or synchronous neuronal activity in the brain, whereas epilepsy is a disorder of the brain characterized by an enduring predisposition to generate seizures, together with its neurobiologic, cognitive, psychologic and social consequences [1]. Seizures are classified by the International League Against Epilepsy (ILAE) 2017 scheme into focal onset, generalized onset and unknown onset [2].

Approximately 4–10% of children experience at least one seizure (febrile or afebrile) in the first 16 years of life. The cumulative lifetime incidence of epilepsy is about 3%, more than half of cases start in childhood, and the annual prevalence is 0.5–1.0% [1,3]. Epilepsy affects approximately 50 million people worldwide, of whom about 80% live in developing regions. The annual incidence ranges from 50 to 70 cases per 100,000 in industrialized countries and reaches up to 190 per 100,000 in developing countries. In Ethiopia, the annual incidence has been reported as 64 per 100,000 inhabitants, with the pediatric age group accounting for 22.9% of cases [4]. Around 80–90% of people with epilepsy in developing countries have difficulty accessing appropriate treatment because of diagnostic difficulties, inefficient and unevenly distributed health-care systems, cost of treatment, cultural attitudes, economic problems, and the quantitative and qualitative inadequacy of antiepileptic drugs (AEDs).

Reported rates of seizure control vary between settings. In a study of adult outpatients in Gondar, Ethiopia, generalized tonic-clonic seizures were the commonest type (72.9%), monotherapy accounted for 80.35% of treatment, dual therapy and triple therapy for 16.37% and 3.28%, respectively, phenobarbitone (62.47%) and carbamazepine (17.91%) were the most prescribed AEDs, and 82.4% of patients had well-controlled seizures over the preceding three months [5]. At a tertiary hospital in Eastern Nepal, good seizure control was achieved in 80% of children; generalized-onset seizures accounted for 78%, focal-onset for 15% and mixed or unclassified types for 7%, and frequent seizures at onset, remote symptomatic etiology and the need for polytherapy were associated with poor control [6]. In rural south India, control rates over four successive years were 58–66% among drug-compliant patients with 30 or fewer lifetime generalized tonic-clonic seizures, compared with 6–16% among non-compliant patients with more than 30 such seizures; adverse effects, mainly gingival hyperplasia, were reported in 43% of those on phenytoin [7].

Predictors of seizure control in children have been examined in many studies. Clinical neurologic abnormalities were associated with poor outcome in studies from India ($n = 100$) and Nepal ($n = 429$) [8,9], and a positive family history of seizures was associated with poorer control in a study of 106 patients in London and in a Saudi Arabian study [10,11].

At SPHMMC, the pediatric neurology clinic is the second busiest follow-up clinic, with an average of 230 patients seen per month, approximately 25% of all follow-up visits. Despite this, there is a knowledge gap on the types of seizures and the rate of seizure control in our clinic, and we found no published research on pediatric seizure types and rate of control in Ethiopia. This study therefore aimed to determine the rate of seizure control and the factors associated with it among children attending the SPHMMC pediatric neurology follow-up clinic, to help physicians achieve better seizure control in this age group. Specifically, we aimed to quantify the rate of seizure control in the SPHMMC neurology follow-up clinic and to assess the factors affecting seizure control among these children.

2. Materials and Methods

2.1 Study setting and period

The study was conducted at SPHMMC, located on Swaziland Street, Gullele Sub-city, Addis Ababa, Ethiopia. Established in 1961 in collaboration with the German Evangelical Church as a source of medical care for underserved populations, it is the second largest hospital in the country, with a catchment population of more than 5 million, 392 beds and an annual average of 200,000 patients, and approximately 75% of patients receive services free of charge. It is a teaching hospital whose pediatrics department provides outpatient, emergency and inpatient services, including a neonatal intensive care unit. The pediatric follow-up clinics see an average of 900 patients per month, of whom about 230 (25%) attend the neurology follow-up clinic, the second highest patient burden. The study period was from October 1, 2018 to August 30, 2019, and data were collected from February 1 to July 30, 2019.

2.2 Study design and population

An institution-based, prospective cross-sectional study was conducted. The source population was all patients attending the SPHMMC pediatric neurology follow-up clinic during the data-collection period, and the study population was all children with a seizure disorder attending the clinic during that period. All pediatric patients with a seizure disorder were included, and there were no exclusion criteria.

2.3 Sample size and sampling

The sample size was calculated using the single population proportion formula, assuming a seizure-control prevalence of 80% (from the 2016 study in Nepal [6]), a 95% confidence level ($Z = 1.96$) and a 5% margin of error, giving 246 participants. After adding 10% for non-response, 271 participants were required. During data collection 270 eligible patients were found and recruitment was stopped; six were excluded because of non-response, leaving 264 patients for analysis. Convenience sampling was used, taking all patients who attended during the study period.

2.4 Data collection and quality control

Data were collected by general practitioners through exit interviews after written informed consent was obtained from the parents or caregivers. A pretested, standard questionnaire with closed-ended questions, prepared in English and Amharic, captured the parents' social background, seizure types, AEDs taken together with adherence and availability, and seizure control. The principal investigator reviewed the completed forms for completeness and accuracy at the end of each neurology clinic day and checked that the prescribed AEDs were available in the hospital pharmacy stock. Questionnaires were coded, checked for completeness, and entered into SPSS version 25, and the data were cleaned for outliers, missing values and inconsistencies before analysis.

2.5 Study variables and operational definitions

The dependent variable was seizure control (controlled versus uncontrolled). The independent variables were age, sex, residence, educational level of both parents, family size, monthly household income, family history of seizure, seizure type, age at onset, symptom duration before starting AEDs, duration of AED treatment, neurologic co-morbidities, number and dose of AEDs, compliance, types of AEDs used, AED escalation protocol, and EEG and MRI findings.

A seizure and epilepsy were defined according to the ILAE: epilepsy is a disease of the brain defined by at least two unprovoked (or reflex) seizures occurring more than 24 hours apart, or the diagnosis of an epilepsy syndrome [12]. Uncontrolled seizures were defined as one or more seizures within a month [12]. Non-compliance was defined as any deviation from the dosage or frequency of drugs prescribed by the treating physician [12]. Neurologic co-morbidities were defined as clinically diagnosed or imaging-confirmed diseases affecting the central nervous system [6]. Suboptimal drug dosing (improper escalation) was defined as AED escalation deviating from the schedule recommended in standard textbooks [13].

2.6 Data analysis

Frequency tables, graphs and descriptive summaries were used to describe the participants. Bivariate analysis was performed using simple binary logistic regression, and variables with $p \leq 0.20$ were entered into multiple binary logistic regression. A 95% confidence interval and a p -value < 0.05 were used to declare statistical significance.

2.7 Ethical considerations

The proposal was reviewed by the Institutional Review Board of SPHMMC, and written ethical clearance was granted on January 22, 2019 (reference number pm23/113). Written informed consent was obtained from all participants' parents or caregivers. Privacy and confidentiality were protected by using codes and identification numbers on both the questionnaires and the electronic data.

2.8 Dissemination of findings

The findings will be submitted to the Department of Pediatrics and Child Health of SPHMMC and presented to the management team of the neurology clinic so that they can be used to improve the care of children with seizure disorders. They are also being published openly so that peers can use them as a reference for treating pediatric seizure patients.

3. Results

3.1 Socio-demographic characteristics

A total of 264 patients were enrolled: 178 (67%) were male and 86 (33%) female, a ratio of 2:1. The mean age was 88 months; the commonest age group was 1–5 years, 94 (36%), followed by adolescents, 83 (31%). Of the participants, 138 (52%) came from urban areas and 126 (48%) from rural areas, and the commonest family size was four to six members, 146 (55%). Thirty fathers (11%) and 65 mothers (25%) had no formal education. The commonest monthly household income range was 2,700–8,478 ETB(17-52\$), in 155 (58.7%) households, followed by less than 2,700 ETB(17\$) in 81 (30.7%). The commonest educational level was up to secondary school for both fathers, 113 (43%), and mothers, 83 (31%) (Table 1).

Table 1. Socio-demographic characteristics of patients attending the SPHMMC Pediatric Neurology Clinic, 2019 (N = 264).

Variable	Frequency (%)
Sex	
Male	178 (67)
Female	86 (33)
Age group	
Infant	10 (4)
1–5 years	94 (36)
5–10 years	77 (29)
Adolescent	83 (31)
Family size	
One to three	48 (18)
Four to six	146 (55)
Above six	70 (27)
Residence	
Urban	138 (52)
Rural	126 (48)
Father's education	
Uneducated	30 (11)
Educated	234 (89)
Mother's education	
Uneducated	65 (25)
Educated	199 (75)

3.2 Seizure types, antiepileptic drugs and co-morbidities

The commonest seizure type was generalized-onset tonic-clonic, 187 (70.8%), followed by mixed seizures, 40 (15.2%), focal-onset seizures, 10 (3.8%), and non-motor (absence) seizures, 7 (2.7%) (Table 2).

Table 2. Types of seizure in patients attending the SPHMMC Pediatric Neurology Clinic, 2019 (N = 264)

Seizure type	Frequency (%)
Generalized-onset tonic-clonic	187 (70.8)
Mixed	40 (15.2)
Focal onset	10 (3.8)
Generalized-onset tonic	7 (2.7)
Non-motor (absence)	7 (2.7)
Generalized-onset myoclonic	4 (1.5)
Generalized-onset atonic	4 (1.5)
Infantile spasms	2 (0.8)
Focal to bilateral tonic-clonic	2 (0.8)
Febrile seizure	1 (0.4)
Total	264 (100)

The commonest AED was phenytoin, 128 (48.5%), followed by phenobarbitone, 33 (12.5%), valproate, 30 (11.4%) and carbamazepine, 6 (2.3%). The commonest combinations were phenytoin with phenobarbitone, 26 (9.8%), and phenytoin with valproate, 13 (4.9%) (Table 3). The principal investigator confirmed that these drugs were available in stock.

Table 3. Antiepileptic drugs used by patients attending the SPHMMC Pediatric Neurology Clinic, 2019 (N = 264)

AED regimen	Frequency (%)
Monotherapy	
Phenytoin	128 (48.5)
Phenobarbitone	33 (12.5)
Valproate	30 (11.4)
Carbamazepine	6 (2.3)
Polytherapy	
Phenytoin + phenobarbitone	26 (9.8)
Phenytoin + valproate	13 (4.9)
Phenobarbitone + valproate	8 (3.0)
Phenobarbitone + valproate + carbamazepine	8 (3.0)
Other combinations†	12 (4.5)
Total	264 (100)

†Phenytoin + clonazepam (3); valproate + carbamazepine (2); valproate + clonazepam (2); and one each of phenytoin + carbamazepine, phenobarbitone + clonazepam, phenobarbitone + carbamazepine, lamotrigine + valproate, and lamotrigine + phenobarbitone + phenytoin.

Neurologic co-morbidities, assessed clinically and from neuroimaging records, were present in 39 (14.7%) of the 264 children. Cerebral palsy was the commonest, 19 (48.7%), followed by brain infarction, 3 (7.7%); the remainder are shown in Table 4.

Table 4. Neurologic co-morbidities among patients attending the SPHMMC Pediatric Neurology Clinic, 2019 (n = 39).

Co-morbidity	Frequency (%)
Cerebral palsy	19 (48.7)
Brain infarction	3 (7.7)
Brain atrophy	2 (5.1)
Hematoma	2 (5.1)
Hydrocephalus	2 (5.1)
Kernicterus	2 (5.1)
Post-meningitis sequelae	2 (5.1)
Other‡	7 (17.9)
Total	39 (100)

‡One case each of attention deficit hyperactivity disorder, autism spectrum disorder, colpocephaly, intracranial space-occupying lesion, meningomyelocele, mumps encephalitis and porencephaly.

3.3 Seizure control and investigations

Seizures were controlled in 160 children (60.6%); half of these had good control for more than 6 months, and 15% had reached 2 years of control and were being tapered off treatment. Of the 104 children (39.4%) with uncontrolled seizures, 71 (68%) were male and 33 (32%) female; the 1–5 year and adolescent age groups each accounted for 33 (32%), and 56 (54%) were from urban and 48 (46%) from rural areas.

An EEG was done in 256 children (97%) and was abnormal in 128 (50%); generalized spikes were the commonest finding, 111 (87%), followed by slow waves, 11 (8%), and focal discharges, 6 (5%). An MRI was done in 136 children (51.5%) and was normal in 70% and abnormal in 30%. Compliance with AEDs was 96%; forgetfulness was the commonest reason for non-compliance, followed by drug availability.

Among the 104 children with uncontrolled seizures, 73 (70%) were still on monotherapy, and 71 (68%) were receiving suboptimal doses, with slow escalation taking more than 6 months to reach the maximum dose or delayed change to polytherapy after the maximum dose of the first drug was reached. Suboptimal dosing was also found in 12 (7.5%) of the children with good control.

3.4 Factors associated with seizure control

In bivariate analysis, family size above three, need for polytherapy, poor drug optimization, family history of seizure and coexisting neurologic co-morbidity had $p \leq 0.20$ and were entered into multiple logistic regression. Three factors remained associated with poor seizure control: suboptimal drug dosing (AOR 31.70; 95% CI 15.10–67.42; $p < 0.001$), positive family history of seizure (AOR 3.19; 95% CI 1.45–9.26; $p = 0.006$) and coexisting neurologic co-morbidity (AOR 2.20; 95% CI 0.86–5.21; $p = 0.049$). No association was found with age, sex, residence, parental education, household income, or EEG and MRI findings (Table 5).

Table 5. Factors associated with seizure control among patients attending the SPHMMC Pediatric Neurology Clinic, 2019.

Variable	Controlled (n)	Uncontrolled (n)	COR	AOR (95% CI)	P-value
Sex					
Male	107	71	1.09	1.43	0.549
Female	53	33	1	1	–
Age group					
Infant	4	6	2.00	2.35	0.213
Early childhood	61	33	0.84	1.00	0.621
Late childhood	45	32	1	1.10	0.933
Adolescent	50	33	1.07	1.50	0.613
Residence					
Urban	82	56	1	1	–
Rural	78	48	1.14	0.82	0.562
Family size					
Below three	33	12	0.89	0.91	–
Above three	126	90	1.57	1.19	0.702
AED regimen					
Polytherapy	32	31	1.66	0.577	0.157
Monotherapy	127	74	1	1	–
Family history of seizure					
Present	14	18	2.14	3.19 (1.45–9.26)	0.006*
Absent	146	86	1	1	–
Drug dosage					
Optimal	147	31	1	1	–
Suboptimal	12	71	28.00	31.70 (15.10–67.42)	<0.001*
EEG					
Normal	81	53	1	1	–
Abnormal	78	50	1.05	0.73	0.377
Not done	6	2	–	–	–
MRI					
Normal	55	40	1	1	–
Abnormal	19	22	0.618	0.825	0.163
Not done	86	42	–	–	–
Neurologic co-morbidity					
Present	18	21	2.00	2.20 (0.86–5.21)	0.049*
Absent	142	83	1	1	–

COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval; 1 = reference category;

*statistically significant at $p < 0.05$.

4. Discussion

This study found a seizure-control rate of 60.6% among children attending the SPHMMC pediatric neurology clinic. This is lower than the 80% reported among 256 children at a tertiary hospital in Nepal [6] and the 82.4% reported among adults in Gondar [5]. Our findings suggest that this gap is largely explained by poor drug optimization, which leaves room for improvement in our clinic. Our rate is closer to the 58–66% control reported over successive years among drug-compliant patients in rural south India [7].

Suboptimal AED dosing was by far the strongest factor associated with poor control (AOR 31.7) and was found in 68% of poorly controlled compared with 7.5% of well-controlled children. The confidence interval for this estimate is wide (15.10–67.42), so the size of the effect should be interpreted with caution, but the direction and strength of the association are clear. Poor drug optimization was the most distressing finding of the study, and it makes appropriate AED escalation the most important next step in the management of children with seizure disorders in our setting.

Coexisting neurologic co-morbidity was also associated with poor control, in keeping with studies from India and Nepal that found clinical neurologic abnormalities to be a poor prognostic factor [8,9]. However, the confidence interval for this association included 1 (0.86–5.21) despite a p-value of 0.049, so it should be interpreted cautiously. Neurologic co-morbidity was present in 14.7% of our patients, most often cerebral palsy, and these children warrant closer follow-up and stricter management.

A positive family history of seizure was likewise associated with poor control, as in the study from London and the Saudi Arabian study [10,11], which supports a genetic contribution to seizure etiology [14]. Family history should therefore be asked about routinely and families counseled accordingly.

The seizure-type profile of our patients, with generalized-onset tonic-clonic seizures the commonest (70.8%), followed by mixed (15.2%) and focal-onset seizures (3.8%), is similar to that reported in Nepal and in earlier Ethiopian studies [4–6], indicating that our study population is comparable in this respect, although focal-onset seizures were less frequent in our series (3.8%) than in Nepal (15%) [6]. In contrast to the Nepalese study [6], we found no association between seizure control and early onset of seizures, male sex, parental education, or EEG and MRI findings, suggesting that our study population differs in these respects. An EEG was done in 97% of the children and was abnormal in half of them, most often showing generalized spikes, but EEG findings did not distinguish children with controlled from those with uncontrolled seizures.

MRI was done in 51.5% of the children and was normal in 70%. Our MRI ordering rate is high relative to the ILAE imaging indications [15], which were met in only about 10% of patients, explaining the high proportion of normal results. Revising the MRI ordering criteria could avoid unnecessary use of this resource.

Compliance with AEDs, assessed by interview, was high (96%), and the commonest reasons for non-compliance were forgetfulness and drug availability. Because the prescribed drugs were also confirmed to be in stock, the poor control observed appears to be more closely linked to how AEDs were titrated than to patient adherence or drug supply.

Regarding treatment patterns, phenytoin, phenobarbitone, valproate and carbamazepine accounted for nearly all prescriptions, about three-quarters of the children were on monotherapy, and roughly a quarter received two or more AEDs. A similar predominance of monotherapy (80.35%) and of older AEDs was reported among adults in Gondar [5]. Notably, 70% of the children with uncontrolled seizures were still on monotherapy, consistent with delayed escalation or delayed change to polytherapy once the maximum dose of the first drug had been reached.

The study has several strengths: data were collected prospectively, the sample was relatively large for a single clinic, drug availability was verified, and, to our knowledge, it provides the first data on seizure types and control among Ethiopian children. Its findings have practical implications for our clinic: an institutional guideline for AED titration, further training in seizure management, review of drug optimization at every follow-up visit, routine enquiry about family history, closer follow-up of children with neurologic co-morbidity, and ordering of MRI according to ILAE indications could together improve seizure control and reduce unnecessary imaging, and the present findings provide a baseline against which the effect of such measures can be monitored.

Limitations

First, a cohort design that followed patients for two years to assess control and cure rates would have been better than a cross-sectional design. Second, the study was conducted at a tertiary referral hospital to which difficult-to-control seizures are referred, which may have confounded the results; its single-center, convenience-sampled design also limits generalizability. Third, serum AED levels were not measured, so therapeutic ranges and bioavailability in our population could not be assessed. Fourth, seizure classifications were not reviewed by a pediatric neurologist.

5. Conclusions

Seizure control in the SPHMMC pediatric neurology clinic is poor, at 60.6%. Suboptimal AED dosing is highly prevalent and is strongly associated with poor control, as are a positive family history of seizure and neurologic co-morbidity, and the rate of normal MRI findings is high. We recommend developing an institutional guideline for AED optimization, giving further training in seizure management, escalating AEDs according to guidelines with a drug-optimization check at every follow-up visit, and ordering MRI in line with ILAE indications. Further research is needed to explore the reasons for poor drug optimization and to improve seizure control in our setting.

Declarations

Ethics approval and consent to participate

Ethical clearance was granted by the Institutional Review Board of St. Paul's Hospital Millennium Medical College on January 22, 2019 (reference number pm23/113). Written informed consent was obtained from the parents or caregivers of all participants, and all patient data were anonymized.

Author Contributions

Dr A.I.N. conceived and designed the study, collected the data, and drafted the manuscript. Dr A.B. supervised the study and reviewed the manuscript. T.G. contributed to the statistical analysis and interpretation. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

Conflict of Interest

The authors declare no conflict of interest.

Funding

This research was mostly funded out of pocket by Dr Ahmed Ibrahim.

Acknowledgement

The authors thank the Department of Pediatrics and Child Health of St. Paul's Hospital Millennium Medical College for the opportunity and support, the co-advisors for their guidance, the general practitioners who collected the data, and the children and caregivers who participated in the study.

References

1. Kliegman RM, St Geme JW, Blum NJ, Mikati MA, Hani AJ. *Nelson Textbook of Pediatrics*. 20th ed. 2015:2823-2829.
2. Suleiman J, Wright S, Gill D, et al. Autoantibodies to neuronal antigens in children with new-onset seizures classified according to the revised ILAE organization of seizures and epilepsies. *Epilepsia*. 2013;54(12):2091-2100.
3. McAbee GN, Wark JE. A practical approach to uncomplicated seizures in children. *Am Fam Physician*. 2000;62(5):1109-1116.
4. Tekle-Haimanot R, Forsgren L, Ekstedt J. Incidence of epilepsy in rural central Ethiopia. *Epilepsia*. 1997;38(5):541-546.

5. Birru EM, Shafi M, Geta M. Drug therapy of epileptic seizures among adult epileptic outpatients of University of Gondar referral and teaching hospital, Gondar, North West Ethiopia. *Neuropsychiatr Dis Treat*. 2016;12:3213.
6. Poudel P, Chitlangia M, Pokharel R. Predictors of seizure control in children managed at tertiary hospital of Eastern Nepal. *Iran J Child Neurol*. 2016.
7. Mani KS, Rangan G, Srinivas HV, Srinivas VS, Subbakrishna DK. Epilepsy control with phenytoin and phenobarbitone in rural south India. *Lancet*. 2001;357(9265):1316-1320.
8. Chawla S, Aneja S, Kashyap R, Mallika V. Etiology and clinical predictors of intractable epilepsy. *Pediatr Neurol*. 2002;27:186-191.
9. Lohani S, Devkota UP, Rajbhandari H. Predictors of unfavourable seizure outcome in patients with epilepsy in Nepal. *Can J Neurol Sci*. 2010;37:76-80.
10. Elwes RDC, Johnson AL, Shorvon SD, Reynolds EH. The prognosis for seizure control in newly diagnosed epilepsy. *N Engl J Med*. 1984;311:944-947.
11. Babbitt FA. *Seizure*. 2013;22(7):542-547.
12. Berg AT, Berkovic SF, Brodie MJ, et al. Revised terminology and concepts for organization of seizures and epilepsies: report of the ILAE Commission on Classification and Terminology, 2005-2009. *Epilepsia*. 2010;51(4):676-685.
13. Kliegman RM, St Geme JW, Blum NJ, Mikati MA, Tchapyjnikov D. *Nelson Textbook of Pediatrics*. 21st ed. Chapter 611.6.
14. Salzmann A, Moulard B, Crespel A, Baldy-Moulinier M, Buresi C, Malafosse A. GABA receptor 1 polymorphism . *Epilepsia*. 2005;46:931-933.
15. Gaillard WD, Chiron C, Cross JH, Harvey AS, Kuzniecky R. Guidelines for imaging infants and children with recent-onset epilepsy. *Epilepsia*. 2009;50(9):2147-2153.

Copyright: © 2026 All rights reserved by Nawd AI and other associated authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.