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Original Research Article

A Prospective Observational Study of Patients Admitted with Seizures in Tertiary Care Hospital

Bharvi Ninama[1], Kishorkumar Chauhan[2], Krishnakumari Baleva[3]

[1]Senior Resident, Department of General Medicine, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India

[2]Third Year Resident Doctor, Department of General Medicine, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India

[3]Third Year Resident Doctor, Department of General Medicine, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India

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Corresponding Author: Bharvi Ninama

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Abstract:

Background: Seizures constitute a frequent neurological manifestation linked with various causative factors like epilepsy, cerebrovascular pathology, infections involving the central nervous system and metabolic problems. Timely diagnosis and management are crucial for avoiding any further complications.

Objectives: To analyze the demographic profile, clinical features, etiology, diagnostic workup, and hospital course of patients with seizures admitted in a tertiary care hospital.

Materials and Methods: This hospital-based, prospective, and observational study was carried out in the department of general medicine in a tertiary care hospital of Ahmedabad during January 2024 to January 2025. A total of 100 patients with age more than 18 years old having seizures were included in the study based on convenience sampling method. Information regarding their demographic data, clinical features, neurological examination findings, laboratory tests, and neuroimaging was collected with the help of a pre-designed form.

Results: The results showed that the majority of the population was aged between 41 to 50 years, accounting for 30%. Male patients comprised the highest percentage (58%) of the studied population. Focal seizures were the commonest type of seizures at 52%, followed by generalized seizures, which were 38%. Cerebrovascular disease was the most common reported etiology (25%), followed by CNS infection at 18%. Electrolyte disturbances and MRI findings were noted.

Conclusion: Thorough clinical evaluation and proper investigations are needed in order to establish causes of seizures. Earlier detection and appropriate interventions might lead to better patient outcomes.

Keywords: Seizures, Epilepsy, Etiology, Clinical Presentation, Neuro-Imaging, Tertiary Care Hospital.

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Introduction

Seizures are one of the most common neurological emergencies that involve episodes of abnormal, excessive, or synchronous electrical discharges from the neurons within the brain [1]. They manifest themselves through altered levels of consciousness, motor phenomena, sensory abnormalities, changes in behavior, or even autonomic phenomena. They can happen in people of any age and are caused by underlying illnesses such as epilepsy, cerebrovascular disorders, central nervous system infections, metabolic disorders, trauma to the head, or intracranial lesions [2].

Assessment, correct diagnosis, and proper treatment of seizure admission cases are essential to prevent complications from occurring and also avoid any future occurrence of the seizures [3]. Seizures that persist or occur repetitively without recovery of consciousness in between is a serious condition known as status epilepticus and should be immediately attended to. Some of the complications that may occur from seizures include aspiration, injuries, hypoxia of the brain, and deteriorating neurological state. It is therefore necessary to have early detection of the cause of the seizures to ensure proper management of the case [4,5].

The causes of seizures may differ among various populations depending on such factors as the age of the patient, past history, socio-economic conditions, nutritional states, infections and access to health care. Seizure causes in developing countries like India include infections, metabolic conditions, stroke, epilepsy, and neurological disorders among

others [6]. Assessment, laboratory tests, neuroimaging, and electroencephalography are important tools used in the diagnosis of the cause of seizures. Knowledge about the demographic and clinical features of seizure admissions will help in determining the possible causes and management of such conditions [7].

Hospitals that offer tertiary care have advanced facilities which are used for the diagnosis and treatment of complex seizures. It will be possible to obtain vital information concerning the age and gender, presentation, causes, associated morbidities, management, and hospital outcomes in patients who present with seizures through the study of such patients in hospitals [8,9]. This information is critical in helping to understand the nature of such cases locally, enhance emergency medicine, and improve the allocation of health care resources. In addition, hospital-based research can help in identifying factors that result in complications, long stays in hospitals, and even deaths among patients with seizures [10,11].

Consequently, the purpose of the current study is to investigate the patients with seizures that present in a hospital that offers tertiary care in relation to their demographics, clinical features, causes, management, and outcomes.

Methodology

Study Setting: This hospital-based prospective observational study was conducted in the Department of General Medicine at tertiary care hospital, Ahmedabad.

Type of Study: Hospital-based prospective observational study

Study Duration: The study was conducted for a period of 12 months from January 2024 to January 2025.

Study Population: Patients presenting with seizures and admitted to the General Medicine ward or attending the OPD at tertiary care hospital, Ahmedabad, were included based on inclusion criteria and after obtaining written informed consent.

Study Disclosures: This study did not involve administration of any drugs, new treatment modalities, alternative therapies, or diagnostic kits outside standard care.

Sampling and Sample Size: A time-bound study using convenient sampling was conducted after obtaining institutional ethics approval. A sample size of 100 patients was considered.

Inclusion Criteria:

Patients aged > 18 years

Patients presenting with a seizure episode or history of seizures

Patients willing to give written informed consent

Exclusion Criteria:

Patients with known progressive neurological disorders (e.g., advanced neurodegenerative diseases) that independently affect seizure presentation.

Patients with severe systemic illnesses (malignancy, renal/hepatic failure, thyroid disorders, tuberculosis) that could confound seizure evaluation

Patients unwilling to participate.

Study Tools: Pre-structured proforma designed to record demographic, clinical, and investigative data.

Method of Data Collection: After Ethical Committee approval, informed written consent was obtained from each patient at enrolment. Data were collected through a structured and pre-tested proforma, including:

Demographic information: Age, sex, occupation, socioeconomic status

Clinical history: Seizure type, duration and frequency, precipitating factors, comorbidities, history of previous episodes, medications

Neurological examination: Consciousness level, focal deficits, postictal features

Investigations: Laboratory tests, imaging studies. Standard care was provided to all patients as per hospital protocols.

Diagnostic Criteria for Seizures: Seizures were diagnosed based on clinical history corroborated by witnesses, neurological examination, and supportive investigations (neuroimaging). Classification followed the International League Against Epilepsy (ILAE) guidelines into focal, generalized, and unknown onset seizures.

Investigations:

1. Complete blood count
2. Serum electrolytes, blood glucose, renal and liver function tests
3. Serum calcium, magnesium, and other metabolic parameters as indicated
4. MRI Brain with epileptical protocol.
5. Urine routine/microscopy and other investigations based on suspected etiology

Statistical Analysis: Data was entered and cleaned using MS Excel and analysed with SPSS-25. Quantitative variables were expressed as mean ± SD or median ± IQR. Qualitative variables were expressed as percentages and proportions. Appropriate statistical tests were used to infer

association between 2 variables and a p value of < 0.05 was considered statistically significant.

Ethical Considerations: The study protocol was approved by the Institutional Ethical Committee. Written informed consent was obtained from all participants. Patient information was kept confidential, participation was voluntary, and no additional risk was posed by inclusion in the study.

Results

Figure 1 shows based on age-wise distribution, it could be found that the most number of patients having seizures were in the age range of 41-50 years, accounting for 30%, while the other age groups were of 31-40 years accounting for 22%- and 51-60-years accounting for 18%. The age groups of 18-30 years and 61-70 years both had 12% of the patients.

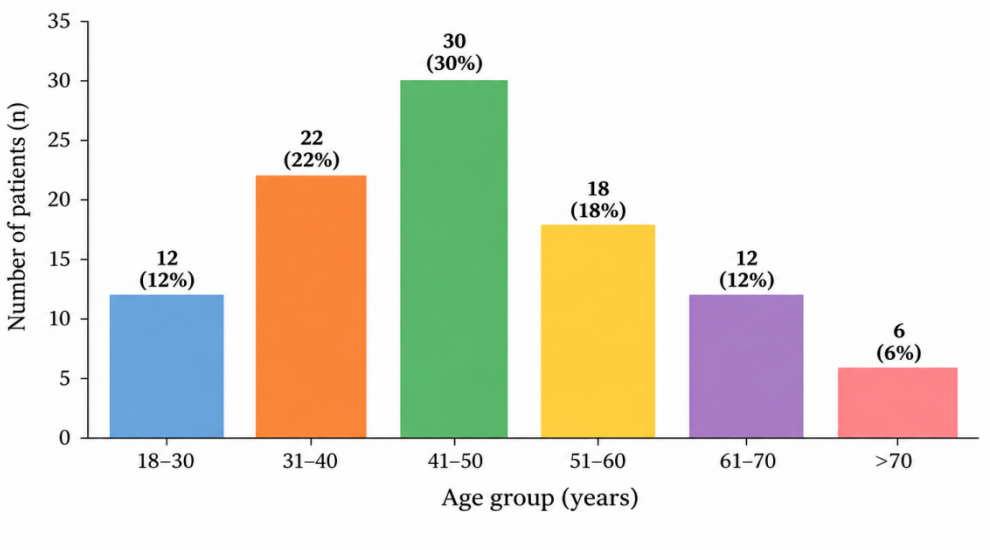


Figure 1: Age-Wise Distribution of Patients Admitted with Seizures (n = 100)

As is seen from Figure 2, focal seizures were the most prevalent form of seizures (52%), whereas generalized seizures occurred in 38% of patients. Unknown onset was seen in 10% of patients under study. This means that focal seizures were the most prevalent form of seizures among 100 patients under study.

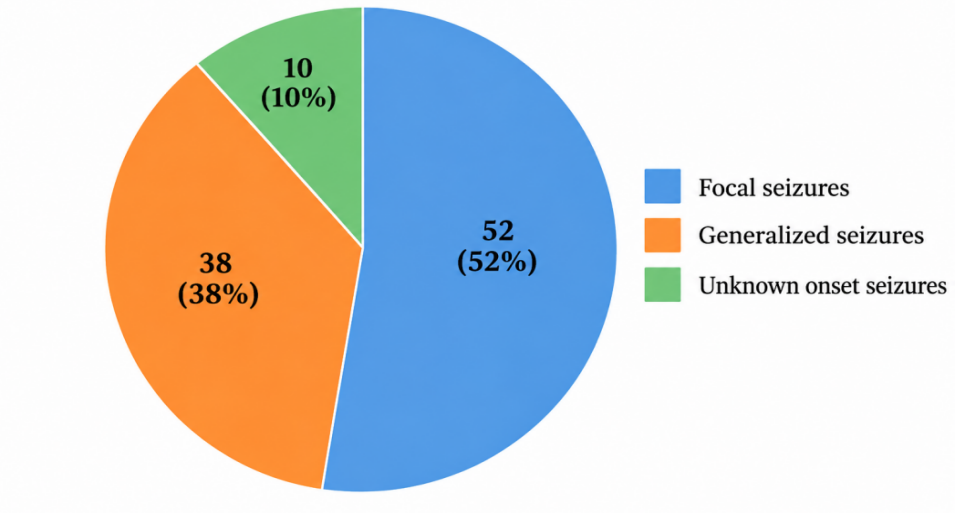


Figure 2: Distribution of Patients According to Type of Seizure (Focal, Generalized, and Unknown Onset) (n = 100)

Figure 3 shows that the cerebrovascular disease was the highest etiology of seizures, representing 25%, whereas central nervous system infection ranked second with 18% and known epilepsy ranked third with 15%. Metabolic problems (12%) and head trauma (10%) were also reported. Intracranial mass lesions (8%), structural brain disease (7%), and others (5%) were also less frequently cited.

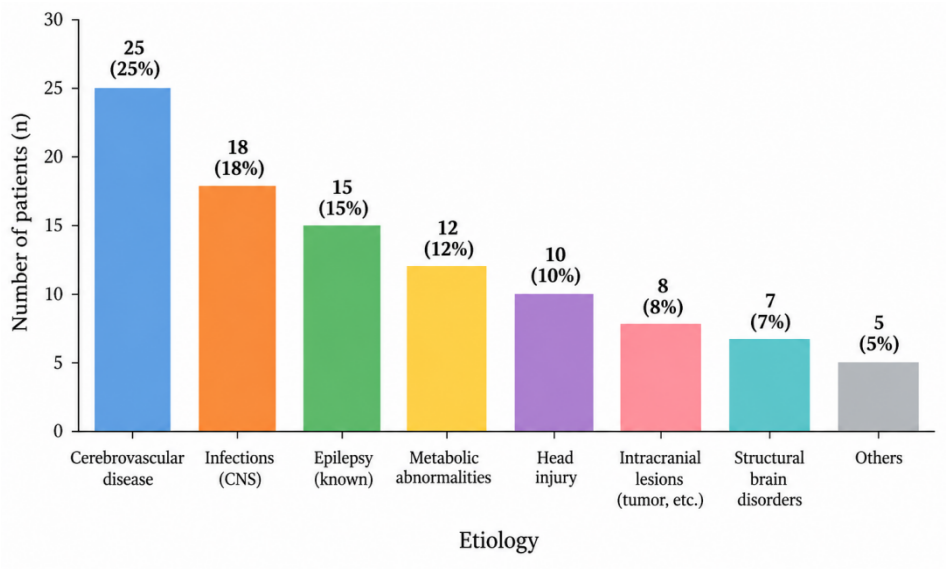


Figure 3: Distribution of Patients According to the Etiology of Seizures (n = 100)

Table 1 shows 41-50 year-olds comprised the highest age category (30%) followed by 31–40-year-olds (22%). Males were 58% of the subjects while 42% were females. The medium socioeconomic status was the most common (47%). Occupation and socioeconomic status should correspond to the scales used in this research.

Table 1: Sociodemographic Characteristics of Patients Admitted with Seizures

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–30	12	12
	31–40	22	22
	41–50	30	30
	51–60	18	18
	61–70	12	12
	>70	6	6
Sex	Male	58	58
	Female	42	42
Occupation	Employed / self-employed	36	36
	Homemaker	24	24
	Agriculture / manual work	18	18
	Student	8	8
	Unemployed / retired / other	14	14
Socioeconomic status	Lower	38	38
	Middle	47	47
	Upper	15	15

Table 2 shows that focal seizures were the most common type (52%), followed by generalized seizures (38%). Recurrent attacks were present in 56% of patients, while a history of seizures was recorded in 40%. Postictal symptoms were observed in 62%, and duration of attack and its precipitants need to be confirmed from the case history.

As per Table 3 below, abnormalities were seen the most often in serum electrolytes (26%), then in blood glucose (22%) and calcium/magnesium (18%). On MRI brain, an abnormality was found in 45%, while 55% had no abnormalities noted. The above percentages are just for example. Denominators of each test are to be reported since not all investigations would have been done on all 100 patients.

Table 2: Clinical Profile and Characteristics of Seizure Episodes Among the Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Seizure type	Focal	52	52
	Generalized	38	38
	Unknown onset	10	10
Duration of episode	<5 minutes	68	68
	≥5 minutes	12	12
	Not documented / unclear	20	20
Frequency at presentation	Single episode	44	44
	Recurrent episodes	56	56
Previous seizure history	Yes	40	40
	No	60	60
Precipitating factors identified	Yes	35	35
	Not identified	65	65
Comorbidities	At least one comorbidity	42	42
	No documented comorbidity	58	58
Postictal features	Present	62	62
	Absent / not documented	38	38

Table 3: Laboratory and Neuroimaging Findings Among Patients Admitted with Seizures

Investigation	Finding	Frequency (n)	Percentage (%)
Complete blood count	Within reference range	62	62
	Abnormal	38	38
Blood glucose	Within reference range	78	78
	Abnormal	22	22
Serum electrolytes	Within reference range	74	74
	Abnormal	26	26
Serum calcium / magnesium	Within reference range	82	82
	Abnormal	18	18
Renal function tests	Within reference range	88	88
	Abnormal	12	12
Liver function tests	Within reference range	90	90
	Abnormal	10	10
MRI brain	No significant abnormality detected	55	55
	Abnormal finding detected	45	45

Table 4 shows that the 83 patients left the hospital improved, while 17 either had an adverse event or needed to be transferred to a higher level of care. Adverse hospital outcome incidence differed among different causative groups with higher numbers noted in patients with cerebrovascular disorders and those having infections of the CNS. An association claim needs statistical analyses of the actual data set by a proper test (e.g., chi-square or Fisher's exact test) and presentation of the p-value.

Table 4: Association Between Clinical Characteristics, Etiology, and Hospital Outcomes Among Patients with Seizures

Characteristic	Category	Discharged improved (n)	Complication / higher-care need (n)	Total (n)
Etiology	Cerebrovascular disease	20	5	25
	CNS infection	13	5	18
	Known epilepsy	15	0	15
	Metabolic abnormality	10	2	12
	Head injury	8	2	10
	Intracranial lesion	6	2	8
	Structural brain disorder	6	1	7
	Other causes	5	0	5
Total		83	17	100

Discussion

The current study assessed the demographics, presentation, etiology, investigations, and hospital outcome of 100 adult patients with seizures in a tertiary care hospital. As illustrated in the findings, the 41-50 years old category comprised of the

majority (30%) of the patients, followed by 31-40 years old age group (22%). This is similar to what was observed in a prospective study on acute symptomatic seizures where the mean age of the patients was 44.33 years. This indicates that seizures are prevalent diseases among middle aged and elderly patients [12,13]. In addition, the current distribution of patients showed male preponderance (58%) which is similar to a hospital based study carried out in Karnataka where the males made up 60.7% of the patients.

In terms of seizure classification, 52% of the patients had focal seizures, followed by 38% who had generalized seizures and 10% whose seizure onset was not known. Previously, different studies have been conducted where various results have been obtained [14,15]. In one prospective study involving 138 patients with acute symptomatic seizures, generalized tonic clonic seizures were common (70.2%) followed by focal seizures (10.1%).

Cerebrovascular disease was the first common etiological factor cited in the results (25%), followed by infections of the central nervous system (18%) and known epilepsy (15%). This is consistent with earlier research that had found cerebrovascular accidents and neuroinfections as common causes of acute symptomatic seizures. One prospective study found the proportion of patients with cerebrovascular accidents to be 32.6%, while the same for neuroinfections was 26.8% [16]. An earlier Indian study also revealed stroke as the most common cause of adult seizures in 21% of cases [17].

Investigations in the laboratory and using neuroimaging techniques are necessary to detect the possible presence of metabolic disorders and any structural abnormalities in the brain. Electrolyte disturbances were found in 26% of patients, while 45% had abnormal MRI results. In a similar study done in adults with onset of seizures in Punjab, it was also highlighted that investigations of blood glucose, renal and liver function, serum electrolytes, calcium and magnesium, and neuroimaging results are necessary to diagnose the cause [18].

The hospital outcomes indicated that 83% of patients were discharged in improved condition, whereas 17% had complications. However, comparisons with previous studiy should be interpreted cautiously because differences in study populations, definitions of outcomes, and disease severity can influence results [19].

Conclusion

In conclusion, this study assessed the demographic profile, clinical features, etiology, investigation, and hospital outcomes of seizure patients at a tertiary care hospital. The results indicated the need to determine the cause of the seizures, which can be cerebrovascular disease, infection of the central nervous system, epilepsy, or metabolic disturbances. Clinical evaluation, laboratory investigation, and neuroimaging are important in making the diagnosis and ensuring proper management. Early diagnosis and treatment can help avoid complications. This study highlights the importance of thorough examination and proper treatment to improve the quality of care among seizure patients.

Limitations: This was a study carried out in a single tertiary health facility with a small number of patients being 100. There is also the challenge of limited study time which spans only 12 months. There is also the possibility of selection bias with convenience sampling. Incomplete clinical records and variations in investigations of the cases can lead to misinterpretation of results.

Recommendations: There is a need for multicenter studies using bigger samples of populations in order to find more representative patterns of seizures and their causes. Proper diagnostic process and timely neuroimaging should be advocated. Early detection of metabolic disturbances which are reversible and proper management of patients will improve the outcome of patients.

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