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# Pattern of Utilization of Antiepileptic Drugs in Epilepsy Patients in a Tertiary Care Private Teaching Hospital

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KEVWORDS	ABSTRACT
Anti-enileptic drugs	Introduction: Epilepsy not only hampers the quality of life of a patient but also its
<b>KEYWORDS</b> Anti-epileptic drugs; Epilepsy; Pattern of utilization	<ul> <li>Introduction: Epilepsy not only hampers the quality of life of a patient but also its treatment associated adverse effects decrease the successful outcomes. The present study aimed to analyze the pattern of utilization of antiepileptic drugs (AEDs) in epilepsy patients and to evaluate the treatment compliance among the epilepsy patients attending a tertiary care private teaching hospital in Rajasthan.</li> <li>Methodology: A cross sectional observational study was conducted on 150 patients at a tertiary care private teaching hospital, Jaipur, Rajasthan. The data was collected that included demographic data, disease details, and treatment details.</li> <li>Results: Majority of the study participants were male (67.3%) between the age range of 18 to 60 years (59.3%). Generalized tonic clonic seizure (GTCS) was the most common type of epilepsy (36%) followed by acute symptomatic seizure (16%), idiopathic generalized epilepsy (14.7%), and focal seizures (12.7%).</li> </ul>
	<b>Conclusion:</b> This research contributes valuable insights into the complex landscape
	of AED utilization in epilepsy patients within a tertiary care private teaching
	hospital.

### **INTRODUCTION**

Epilepsy is a chronic neurological disorder that shows a variable incidence of occurrence in different geographical areas of the world. Out of 70 million epileptic patients worldwide, around 12 million live in India.<sup>1</sup> Epilepsy impairs the quality of life of patients and sometimes can lead to death due to the life threatening emergence of status epilepticus. It also imposes a great economic burden on the family and society as most of the patients require long term treatment, sometimes lifelong. The overall epilepsy prevalence  $(3.0-11.9 \text{ per } 1,000 \text{ population})^2$  and incidence  $(0.2-0.6 \text{ per } 1,000 \text{ population per year})^3$  data from recent studies in India on general population are comparable to that of high-income countries (HICs) despite marked variations in population characteristics and study methodologies. There are many etiologic factors for epilepsy out of which

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neuroinfections, neurocysticercosis, trauma, and genetic factors are the leading causes.

According to ILAE<sup>4:</sup>, epilepsy is a disease of the brain defined by any of the following conditions: at least two unprovoked (or reflex) seizures occurring >24 hours apart; one unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years; diagnosis of an epilepsy syndrome.

Epilepsy not only hampers the quality of life of a patient but also its treatment associated adverse effects decrease the successful outcomes. Due to these adverse drug effects, the patient loses motivation for treatment and consequently, adherence to treatment is reduced and the incidence of refractoriness to AED's increases. Need of long term treatment with antiepileptic drugs (AEDs) creates a negative thinking in the patient's mind and it further deteriorates the success rate of controlling seizure frequency. Adverse drug effects associated with AEDs are both short term and long term. Few side effects may be tolerated at the cost of seizure remission while few are life threatening, requiring premature termination or withdrawal of the drug.

An adverse drug reaction (ADR) is defined (according to WHO 1972) as a response to a drug which is noxious and unintended and which occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease, or for the modifications of physiological function.

Antiepileptic drugs are the mainstay of treatment for epileptic patients and most of the drugs are highly effective in controlling seizure frequency. Although they do not cure the underlying illness but improves the quality of life by reducing seizure frequency, but these medication acts in a dual way in terms of good control of seizures while on the other side they are associated with adverse effects leading to premature termination of treatment, frequent change in medications, and less adherence to the treatment by the patient. At present there is no antiepileptic drug which is completely devoid of any side effects though older antiepileptics (developed before 1993) are associated with higher incidence of adverse drug reaction as compared to new generation antiepileptics.

As the side effect profile of a drug decreases, its potency and effectiveness also declines in a parallel manner. So, one drug may be highly effective but may possess high incidence of adverse drug reactions while on the other hand some other drugs may be safe in terms of side effect profile but may be less potent and less effective in controlling seizure frequency. Hence a clinician must balance both aspects of any drug to give optimum chance of seizure control with minimum possible side effects before starting treatment with a new drug.

The incidence of side effects in various populations varies according to the structure of the population, its genetic pool, and environmental factors. The present study aimed to analyze the pattern of utilization of antiepileptic drugs (AEDs) in epilepsy patients and to evaluate the treatment compliance among the epilepsy patients attending a tertiary care private teaching hospital in Rajasthan.

#### MATERIALS AND METHODS

A cross sectional observational study was conducted in the Departments of Neurology and Neurosurgery of a tertiary healthcare private teaching hospital, Jaipur over a period of one year. All diagnosed cases of epilepsy patients between 6-80 years of age and of either sex being treated with one or more anti-epileptic drugs (AED) were included in the study. Children below 5 years of age, patients with major neurologic disabilities such as mental retardation, aphasia, or motor deficits, and patients not willing to be part of the study or refusing to sign the informed consent form were excluded from the study. The sample size was estimated using convenience sampling.

Ethical approval was obtained from the Institutional Ethics Committee (IEC). All patients were explained clearly about the nature and purpose of study in the language they understand and written informed consent was obtained before enrolling them for the study. For pediatric

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patients, written informed consent was obtained from the parents and assent was obtained from the pediatric patient. The data was collected from a medical case sheet/or prescription given to the patients and recorded on a case record form (CRF) designed for study that includes: demographic data (age, gender, address, patient's education); disease details (seizure type, etiology and frequency, age of onset of seizure and duration, control of seizures, time since last seizure, family history of epilepsy, and presence of other comorbidities); and treatment details (details of antiepileptic drugs (AEDs) used for management of epilepsy including generic name, dose, frequency of administration, duration of therapy, treatment compliance, and past treatments).

Therapy given to these patients was classified into monotherapy i.e., patients receiving single AED for seizures and polytherapy i.e., patients receiving two or more drugs.

#### **Statistical Analysis**

Data retrieved from case record forms was entered in Microsoft Excel sheet and assessed for various parameters to find out study objectives. For the statistical analysis mean, percentages and standard deviation (SD) were calculated by using Microsoft Excel 2013.

#### RESULTS

A total of 150 study participants were enrolled in the study. The socio-demographic description of the study participants is depicted in table 1. Majority of the study participants were male (67.3%) between the age range of 18 to 60 years (59.3%). Generalized tonic clonic seizure (GTCS) was the most common type of epilepsy (36%) followed by acute symptomatic seizure (16%), idiopathic generalized epilepsy (14.7%), and focal seizures (12.7%).

	Parameter	Frequency	Percent
Age	< 18 years	48	32.0
	18 to 60 years	89	59.3
	>60 years	13	8.7
Gender	Male	101	67.3
	Female	49	32.7
Educational	Illiterate	4	2.7
Status	Primary	20	13.3
	Secondary	38	25.3
	Higher secondary	35	23.3
	Graduate	50	33.3
	Post-graduate	3	2
Residence	Rural	101	67.3
	Urban	49	32.7
Diagnosis	Diagnosis Focal Seizures		12.7
	GTCS	54	36
	JME	16	10.7
	Acute Symptomatic Seizure	24	16
	Febrile Seizures	2	1.3
	Atypical Febrile Seizures	1	0.7
	Absence Seizures	1	0.7
	Complex Partial Seizures	11	7.3
	Idiopathic Generalized Epilepsy	22	14.7

### Table 1: Socio-demographics description of the study population (n=150)

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The antiepileptic drugs (AEDs) prescribed in different types of epilepsies are depicted in table 2. The commonly prescribed AEDs were Sodium Valproate, Phenytoin, Carbamazepine, Phenobarbitone,

Levetiracetam, Clobazam, Lamotrigene, and

Figure 1 depicts the number of anti-epileptic drugs prescribed to the study participants. Monotherapy was prescribed to 24.7% study participants. The Lacosamide. The most common AED used in the management of GTCS, focal seizure, acute symptomatic seizure, idiopathic generalized seizure, and complex partial seizure was Levetiracetam followed by sodium valproate.

number of antiepileptics prescribed with respect to the type of epilepsy is depicted in figure 2.



Figure 1: Number of antiepileptic drugs prescribed.

Tabla 2.	Anti onilo	ntia drug	a procoribod	in different	types of a	niloncios ir	the study	norticipante	(n - 150)
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AED	Diagnosis								
	Focal Seizures	GTCS	JME	Acute Symptomatic Seizure	Febrile Seizures	Atypical Febrile Seizures	Absence Seizures	Complex Partial Seizures	Idiopathic Generalized Epilepsy
VALP	8	25	14	8	1	1	1	4	10
LEV	16	32	5	15	2	1	1	9	14
CBZ	3	4	0	5	1	0	0	2	13
CLBZ	5	24	10	4	1	0	0	4	11
PHTN	4	14	1	8	0	0	0	2	3
РНВ	0	4	0	2	0	0	0	0	2
LAMOTRIGINE	0	0	1	0	0	0	0	1	0
LACOSAMIDE	2	1	0	1	0	0	0	1	3

VALP: Valproate; LEV: Levetiracetam; CBZ: Carbamazepine; CLBZ: Clobazam; PHTN: Phenytoin; PHB: Phenobarbitone

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# Figure 2: Number of antiepileptic drugs prescribed with respect to type of epilepsy in the study participants.

Diagnosis	Defaulter	Non defaulter
Focal seizures	3	16
GTCS	7	47
JME	3	13
Acute Symptomatic	2	22
Febrile seizures	0	2
Atypical febrile seizures	0	1
Absence seizures	0	1
Complex partial seizures	2	9
Idiopathic generalized epilepsy	3	19

#### Table 3: Diagnosis-wise compliance of the study participants

#### DISCUSSION

The findings of this study shed light on the intricate patterns of antiepileptic drug (AED) utilization and the corresponding adverse effects observed in epilepsy patients within the confines of a tertiary care private teaching hospital. The present study was conducted on 150 patients of epilepsy who visited the tertiary care private teaching hospital during the study period. Majority of the study participants were male (67.3%) between the age range of 18 to 60 years (59.3%). Similar to our findings, Lekhsmi et al<sup>5</sup> also reported that male population (63.8%) was more prevalent to epilepsy than females.

Results of the present study showed that GTCS was the most common type of epilepsy in the study population followed by idiopathic generalized epilepsy and focal seizures. However, a study by Narwat et  $al^6$ , conducted

on 100 patients of seizures showed that idiopathic generalized epilepsy was commonest type of epilepsy (42%) and sodium valproate was the commonest drug prescribed (66.66%) followed by phenytoin (23.33%). Symptomatic epilepsy was the second commonest seizure (30%) and phenytoin (60%) was the commonest drug prescribed for it followed by sodium valproate (30%). Contrary to these findings, Levetiracetam was the most commonly prescribed antiepileptic drug in the present study followed by sodium

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valproate. SImilar to these findings, Guindro et. al<sup>7</sup> also found that newer antiepileptic drugs were more frequently prescribed. In their study, Oxcarbazapine topped the list of prescriptions followed by Clobazam and Levetircetam.

The present study revealed a diverse array of AEDs being prescribed within the patient cohort, indicative of the dynamic nature of epilepsy management. Our findings align with existing literature that emphasizes the importance of tailoring AED regimens to individual patient needs.<sup>8-11</sup> Factors such as seizure type, comorbidities, and patient-specific considerations contribute to the complexity of treatment decisions. The

commonly prescribed AEDs in the present study were Sodium Valproate, Phenytoin, Carbamazepine, Phenobarbitone, Levetiracetam, Clobazam,

Lamotrigene, and Lacosamide. Dual/ poly therapy was prescribed to nearly 75% of the study participants in the present study. Similar to our findings, Guindro et. al<sup>7</sup> also reported that two drug combination treatment was the commonest approach followed by monotherapy. Further investigation into the rationale behind specific drug choices may unveil prescriber preferences, patient responsiveness, and regional variations in clinical practice.

An in-depth examination of adverse effects associated with AEDs uncovered a spectrum of manifestations. Common side effects such as dizziness, fatigue, diplopia, ataxia, alopecia, gum hypertrophy, and cognitive disturbances were prevalent in the present study which were consistent with previous research. Further, this study delves into the impact of adverse effects on patient adherence and overall quality of life. Identifying and addressing these issues is crucial for optimizing therapeutic outcomes and ensuring patient satisfaction. Future research may explore strategies to minimize adverse effects through dose adjustments, combination therapies, or novel drug formulations.

The present study shows that non-adherence to treatment was less prevalent among the study population (13%) while the majority of the study participants were adherent to the prescribed treatment. Non-adherence to treatment is a potential concern, warranting a closer examination of contributing factors such as medication complexity, socioeconomic status, and patient education. Developing targeted educational interventions for patients and caregivers may enhance understanding, fostering a collaborative approach to treatment and mitigating the risk of non-adherence.

The observed patterns of AED utilization in the present study may help in understanding the perspectives of healthcare providers. Factors influencing prescription choices, including drug efficacy, safety profiles, and cost considerations, merit exploration. Collaborative efforts between neurologists, general practitioners, and other healthcare professionals are essential to establish evidence-based guidelines that facilitate consistent and optimal AED prescribing practices.

The implications of this study extend beyond academic discourse to directly impact clinical practice. By recognizing the multifaceted nature of AED utilization and adverse effects, healthcare providers can tailor treatment plans more effectively. Integration of patient-centered care, comprehensive education initiatives, and collaborative decision-making between healthcare providers and patients are crucial steps toward optimizing epilepsy management in real-world settings.

**Limitations:** Small sample size and the singlecenter nature of the study may limit the generalizability of results. Future research endeavors could encompass larger, multicenter studies to validate and extend these findings. Additionally, prospective studies may provide a more nuanced understanding of the dynamic interplay between AED utilization patterns, adverse effects, and long-term patient outcomes.

### CONCLUSION

In conclusion, this research contributes valuable insights into the complex landscape of AED utilization in epilepsy patients within a tertiary care private teaching hospital. By addressing the

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intricacies of treatment decision-making, patient adherence, and healthcare provider perspectives, this study provides a foundation for further research and offers tangible recommendations for enhancing the overall care and quality of life for individuals living with epilepsy.

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