

## Drug Utilization Pattern of Anti-Epileptic Drugs in Tertiary Care Hospital

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### Abstract

**Background:** Epilepsy is a chronic neurological disorder that requires therapy over prolonged period of time to keep patient seizure free. Although patients respond with monotherapy, refractory epileptic patients require polytherapy. Drug utilization studies provide insight to rational drug prescribing.

**Aim and Objective:** This study was designed to analyze and to study prescription pattern of antiepileptic drugs in patients with epilepsy in tertiary care hospital.

**Materials and Methods:** The present study was conducted in Department of Pharmacology, SKMC, Muzaffarpur, Bihar by collecting data from medical record department. Detailed data of patients diagnosed with epilepsy including demographic details, comorbidities, and allergies admitted during last 3 months in study pro forma were collected.

**Results:** A total of 150 patient's data were analyzed and it was found that male patients were most affected with epilepsy compared to females. Generalized tonic-clonic seizure (GTCS) was the most commonly diagnosed in majority of the patients. Levetiracetam (42.0%) was the most commonly prescribed drug as monotherapy, followed by phenytoin (12.66%), sodium valproate (8.66%), and carbamazepine (5.33%). The most common combination of drugs in polytherapy were levetiracetam and carbamazepine (13.33%), phenytoin with carbamazepine (7.33%), phenytoin with sodium valproate (6.66%), and phenytoin with lamotrigine (4.0%).

**Conclusion:** The higher incidence of epilepsy is noted in males of all ages. GTCS was the most common type of epilepsy diagnosed and majority of the patients were prescribed with monotherapy. As it is a retrospective study, there were several limitations in the study such as quality of life of patients, compliance to the drugs, adverse reactions to the drugs were not assessed. Hence, further prospective studies with more sample size should be conducted to assess various factors on drug utilization in epilepsy.

**Keywords:** Epilepsy; Antiepileptic Drugs; Prescription Pattern; Seizures

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## Introduction

Epilepsy is a chronic neurological disorder which is characterized by recurrent seizures. Seizure is clinical manifestation of abnormal synchronization and excessive excitation of population of cortical neurons. Epilepsy is recurrent seizures unprovoked by acute systemic or neurologic insults. Causes for epilepsy may be idiopathic, trauma, vascular malformations, tumors, degenerations, and infections.

In India, the overall prevalence of epilepsy is reported as 5.59–10/ 1000. Most of patients belong to low socio-economic class[1].

Epilepsy mainly occurs due to imbalance between excitatory and inhibitory neurotransmitters. Often there is increased excitatory neurotransmitter such as glutamate and decreased inhibitory neurotransmitter such as gamma-amino butyric acid (GABA). Therefore, the target site of drug could be these neurotransmitters, that is, either decrease release of glutamate or increase release of GABA. There are many drugs available among which phenytoin and carbamazepine were widely used. With the advent of new drugs such as levetiracetam, topiramate, gabapentin, vigabatrin, and lamotrigine recently it has been found that these newer drugs are widely used due to better tolerance and fewer adverse effects[2]. Epilepsy being a chronic disorder also adds on to economic burden to the patient and their families. Being chronic disorder, the patients are dependent on multiple drugs which lead to more exposure to adverse effects and drug interactions.

The greatest challenge to the prescribers here is choosing the antiepileptic drug depending on its pharmacological profile such as mechanism of action, dose,

efficacy, patient tolerability, cost effectiveness, comorbid conditions, minimal adverse effects, and interactions[3]. Drug utilization studies plays a key role in rational drug therapy also helps in designing protocols for management of epilepsy with minimal adverse effects to ultimately improve patient compliance, tolerability, and to keep patient seizure free[4]. Therefore, the present study aims to analyze various drug prescriptions in patients suffering from epilepsy.

## Materials and Methods

It is a retrospective study based on data collected from Medical Records Department. Prescriptions of all epileptic patients admitted to Sri Krishna Medical College and Hospital during last 3 months were collected in study pro forma and analyzed. Study pro forma included demographic details of patient, diagnosis, duration of disease, any comorbidities or allergies, and detailed treatment history including number of drugs prescribed, dosage form, and frequency.

## Ethics Committee Approval

The retrospective study has been conducted after the approval of institutional ethics committee, SKMCH, Muzaffarpur, Bihar.

## Statistical Analysis

The data obtained were analyzed using IBM SPSS v22.0.

## Results

In the present study, out of 150 patients, 30 (20%) patients were under 18 years of age (12 males and 18 females) and 120 (80%) patients were above 18 years of age (80 males and 40 females) Table 1.

**Table 1: Socio-demographic details**

Age	Males	Females	Total
<18 years	12	18	30
>18 years	80	40	120
Total	92	58	150

### Types of Epilepsy

Among all the patients, the most common type of epilepsy diagnosed in all the age groups was generalized tonic-clonic seizure (GTCS) contributing to 60%, 12% as

complex partial seizure, 10.66% as simple partial seizure, 7.33% as myoclonic seizure, 5.33% as secondary seizure to trauma and infections, and 4.66% as absence seizure Table 2.

**Table 2: Types of epilepsy**

Type of Epilepsy	Number	Percentage
Generalized tonic clonic seizures	90	60%
Complex partial seizures	18	12%
Simple partial seizures	16	10.66%
Myoclonic seizures	11	7.33%
Secondary seizures to trauma and infections	8	5.33%
Absence seizure	7	4.66%

**Table 3: Monotherapy versus Polytherapy**

Monotherapy	Number	Percentage
Levetiracetam	63	42.00%
Phenytoin	19	12.66%
Sodium valproate	12	8.66%
Carbamazepine	8	5.33%
Polytherapy	Number	Percentage
Levetiracetam+ Carbamazepine	20	13.33%
Phenytoin+ Carbamazepine	11	7.33%
Phenytoin+ Sodium valproate	10	6.66%
Phenytoin+ Lamotrigine	7	4.0%

### Commonly Prescribed Drugs

The most commonly prescribed drugs with all the age groups are levetiracetam, phenytoin, carbamazepine, sodium valproate, and lamotrigine.

### Comparison of Monotherapy and Polytherapy

The present study data of 150 patient's revealed that the majority of the patients were receiving monotherapy with various drugs contributing it to 68.65%. About 31.21% of our study patients received polytherapy with two or more drugs.

Levetiracetam (42%) is the most commonly prescribed drug as monotherapy, followed by phenytoin (12.66%), sodium valproate (8.66%), and carbamazepine (5.33%). The drugs prescribed for polytherapy are levetiracetam + carbamazepine (13.33%), phenytoin + carbamazepine (7.33%), phenytoin + sodium valproate (6.66%), phenytoin + lamotrigine, or oxcarbamazepine (4%) Table 3.

### Discussion

In the present study, the demographic data showed that male patients were most affected with epilepsy compared to females and it was similar to the study done by

Kuriakose *et al.*, 2014[5].GTCS (60%) was most commonly diagnosed in both sexes, followed by complex partial seizures (12%), simple partial seizure (10.66%), myoclonic seizure (7.33%), secondary seizure to trauma and infections (5.33%), and absence seizure (4.66%), which is comparable to the other study conducted by Pathak *et al*[6].

The approach to the epilepsy treatment is to make the patient seizure free, or to reduce the rate of recurrence and severity of the episodes. In our study, the conventional drugs such as phenytoin, sodium valproate, and carbamazepine along with newer antiepileptic's such as levetiracetam, lamotrigine, and oxcarbamazepine found to be prescribed. In the current study, 68.65% of patients were receiving monotherapy which was very similar to the study conducted by Rische *et al.*, 2015, which revealed 78.6% patients received monotherapy and from another study carried out by Lim *et al.*, 1997, found that 62.7% patients were kept on mono-therapy[7,8].

The majority of the patients have been prescribed with monotherapy as to minimize the risk of adverse drug reactions, drug interactions, dose related toxicity, compliance of the patients, and to avoid economic burden[9].

Levetiracetam (42%) constituted as most commonly prescribed drug as monotherapy, followed by phenytoin (12.66%), sodium valproate (8.66%), and carbamazepine (5.33%) which is similar to the study done by Lekshmi *et al.*, 2017[10].

Polytherapy prescriptions have few drawbacks such as risk of adverse drug reactions, noncompliance of the patients to the drugs, in some the quality of life will also be affected but it is unavoidable in certain group of patients who are not responding well to monotherapy. Levetiracetam and carbamazepine (13.33%) were most commonly prescribed drugs for polytherapy, followed by phenytoin with carbamazepine (7.33%),

phenytoin with sodium valproate (6.66%), and phenytoin with lamotrigine (4%)[11].

### Limitations of the Study

As it is a retrospective study, many factors have not been assessed such as quality of life with the ongoing treatment, family history, compliance of the patients, adverse events, and drug interactions. Therefore, further prospective studies with more sample size should be conducted to assess various factors on drug utilization in epilepsy.

### Conclusion

The present study on drug utilization in epilepsy in a tertiary care hospital showed that the higher incidence of epilepsy is noted in males of all ages. GTCS was the most common type of epilepsy diagnosed and majority of the patients were prescribed with monotherapy with both conventional and newer antiepileptic drugs. Levetiracetam was the most commonly prescribed drug as monotherapy and in polytherapy levetiracetam and carbamazepine combination was most commonly used. As there are no regulatory guidelines for the usage of antiepileptic drugs in India, the rationality of the prescription is variable. Proper guidelines should be framed to encourage the prevention of adverse drug reactions, minimizing the number of drugs per prescription and the drug prescribed should be justified.

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