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Original Research Article

Pharmacotherapy of Epilepsy in Adult Patients Attending a Tertiary Care Hospital: A Cross-Sectional Study

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Abstract

Background: Epilepsy is a chronic neurological disorder requiring long-term pharmacological treatment. Appropriate selection of antiepileptic drugs (AEDs) is essential for achieving seizure control while minimizing adverse effects. Drug utilization studies help evaluate prescribing patterns and optimize patient care.

Objectives: To study the pharmacotherapy of epilepsy and quality of life among adult patients attending a tertiary care hospital.

Materials and Methods: This cross-sectional study was conducted among 110 adult epilepsy patients receiving treatment at a tertiary care hospital. Data regarding demographic characteristics, seizure type, antiepileptic medications prescribed, treatment patterns, and adverse drug reactions were collected and analyzed using descriptive statistics.

Results: The mean age was 36.4±11 years, with a male preponderance (55.5%). Polytherapy (73.6%) was more common than monotherapy (26.4%); levetiracetam was the most frequently prescribed AED overall (63.6%). Impaired QOL (QOLIE-10 score >25) was present in 85% of patients, most marked in the social, memory, and work domains. Mean QOLIE-10 scores did not differ significantly by seizure type (generalized 30±2.5 vs partial 29.9±3.6; P=0.951), seizure frequency score band (P=0.665), or therapy type (monotherapy 29.9±4.3 vs. polytherapy 30.1±2.8; P=0.721).

Conclusion: Levetiracetam was the most commonly prescribed AED. Impaired quality of life was highly prevalent in this population and was not explained by seizure type, seizure frequency, or the number of AEDs used. This suggests QOL impairment in epilepsy is driven substantially by factors outside routine clinical and prescribing variables, and supports incorporating structured QOL screening into standard epilepsy follow-up regardless of apparent seizure control.

Keywords: Epilepsy, Antiepileptic Drugs, Pharmacotherapy, Drug Utilization, Quality of Life.

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Introduction

Epilepsy is one of the most prevalent neurological disorders worldwide, affecting nearly 50 million people. It is characterized by recurrent unprovoked seizures due to abnormal neuronal discharges in the brain. The World Health Organization estimates that nearly 50 million people are affected globally, with approximately 80% residing in low- and middle-income countries, where diagnostic delay, treatment gaps, and limited access to newer antiepileptic drugs (AEDs) remain substantial. [1]

The primary goal of epilepsy treatment is complete seizure control without causing significant adverse effects. Pharmacotherapy remains the cornerstone of epilepsy management, with antiepileptic drugs (AEDs) being the first-line treatment option for most patients. Over the past few decades, numerous AEDs have become available, providing clinicians with a wide range of therapeutic choices. The selection of an appropriate AED depends on factors such as seizure type, patient age, comorbidities, potential adverse effects, drug interactions, and cost considerations. [2] Traditional agents such as phenytoin, carbamazepine, phenobarbital, and sodium valproate have been used for decades, while newer drugs including levetiracetam, lamotrigine, topiramate, oxcarbazepine, and lacosamide are increasingly preferred because of favourable pharmacokinetics and fewer drug interactions. [3]

Monotherapy is generally recommended, as it reduces pill burden, improves adherence, and minimizes adverse effects, with 60–70% of patients achieving adequate seizure control. [4] However, refractory epilepsy often necessitates polytherapy. [5] Despite therapeutic advances, challenges persist due to drug resistance, adverse effects, and poor adherence, all of which negatively impact quality of life(QOL). [6]

Nowadays, seizure control alone is insufficient to define treatment success; QOL has emerged as a critical outcome measure in epilepsy care. [7] The QOLIE-10, a validated instrument, captures multidimensional aspects such as seizure worry, emotional wellbeing, cognition, social function, and overall life satisfaction, and is feasible for use in busy outpatient settings. [8] Drug utilization studies provide valuable insights into prescribing practices, adherence to guidelines, and opportunities for rationalizing therapy. In India, prescribing patterns vary across healthcare settings due to physician preferences, drug availability, and economic constraints. [9] While several studies have explored epidemiology and clinical outcomes, limited data exist on current pharmacotherapeutic practices in tertiary care hospitals, particularly with respect to their association with patient-centred outcomes such as QOL.

Hence the present study was undertaken to evaluate the pharmacotherapy of epilepsy among adult patients attending a tertiary care hospital, with special emphasis on prescribing patterns, monotherapy versus polytherapy, adverse drug reactions, and their association with health-related quality of life.

Materials and Methods: A cross-sectional, study was conducted in the Department of Neurology, PMSSY (Pradhan Mantri Swasthya Suraksha Yojana), Bangalore Medical College and Research Institute over a period of eighteen months. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants.

Study Population: Adult patients diagnosed with epilepsy and receiving antiepileptic treatment for at least six months were enrolled consecutively during the study period.

Inclusion Criteria

1. Patients aged 18 years or older.
2. Confirmed diagnosis of epilepsy.
3. On antiepileptic treatment for a minimum period of 6 months.
4. Willingness to participate in the study.

Exclusion Criteria

1. Patients on AEDs with non-epileptic conditions.
2. Patients not comprehending QOLIE-10 questionnaire.
3. Patients unwilling to provide consent.

Sample Size: A total of 110 eligible patients were included in the study.

Data Collection

Data were collected using a structured case record form. Information recorded included:

- Age and gender
- Duration of disease
- Antiepileptic medications prescribed
- Dosage and frequency
- Monotherapy or polytherapy status
- Adverse drug reactions
- Seizure control status
- HRQOL

Assessment of Pharmacotherapy: Prescribing patterns were analyzed based on:

- Number of AEDs prescribed per patient
- Most commonly prescribed AEDs
- Frequency of monotherapy and polytherapy
- Occurrence of adverse drug reactions
- QOLIE-10

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 25. Continuous variables (age, duration of epilepsy, QOLIE-10 score, number of AEDs per patient) were expressed as mean ± standard deviation. Categorical variables were expressed as frequencies and percentages. The chi-square test was used to compare seizure frequency distribution between the monotherapy and polytherapy groups. The independent-samples t-test was used to compare mean QOLIE-10 scores between two groups (seizure type: generalized vs. partial; therapy: monotherapy vs. polytherapy), and one-way ANOVA was used to compare mean QOLIE-10 scores across the three seizure-frequency score bands. A p-value <0.05 was considered statistically significant.

Results

A total of 110 eligible patients were enrolled in the study. The mean age of the study population was 36.4 ± 11.0 years with 55.5% males. Two-thirds of patients (65.5%) resided in urban areas. 53.6% were employed and of the unemployed group, roughly one-third attributed this to their epilepsy. The mean duration of epilepsy was 4.6±5.9 years. Just over half the patients (55.5%) reported 1–3 seizures per year, and 21.8% were seizure-free at the time of assessment. A majority of the patients (53.6%) were maintained on a combination of older and newer AEDs, while 24.5% were on newer agents alone and 21.8% on older agents alone. 81 (73.6%) received

polytherapy and 29 (26.4%) received monotherapy. The mean number of AEDs per patient was 2.4±1.23

Quality of Life

Quality of life was assessed using the QOLIE-10 questionnaire. Using a total score >25 as the threshold for impaired QOL, 85% had impaired QOL. Total QOLIE-10 scores ranged from 11 to 34, with a mean of 30.1±3.1. Impairment was most pronounced in the social, memory, and work domains; only 15% of patients had no difficulties across these three domains.

Mean QOLIE-10 scores did not differ significantly by seizure type (generalized vs. partial, P=0.951), by seizure frequency score band (P=0.665), or by therapy type (monotherapy vs. polytherapy, P=0.721). In other words, none of the three clinical/treatment variables tested was associated with QOL.

Table 1: Sociodemographic and Clinical Characteristics

Variable	Category	n	%
Age	Mean ± SD	36.4 ± 11.0 years	N/A
Gender	Male	61	55.5
	Female	49	44.5
Residence	Urban	72	65.5
	Rural	38	34.5
Education status	Primary school and below	65	59.1
	High school to PUC	19	17.3
	Degree and professional	26	23.6
Employment status	Unemployed	51	46.4
	Employed	59	53.6
Duration of epilepsy	Mean ± SD	4.6 ± 5.9 years	N/A
Seizure frequency	1–3 per year	61	55.5
	4–11 per year	19	17.3
	≥1 per month	6	5.5
	Absent (seizure-free)	24	21.8
AED Category	Newer AEDs	27	24.5
	Older AEDs	24	21.8
	Combined (older + newer)	59	53.6
Treatment Profile	Monotherapy	29	26.4
	Polytherapy	81	73.6

Table 2: Seizure Frequency among Treatment Group

Seizure Frequency	Monotherapy n (%)	Polytherapy n (%)	Significance
1–3 per year	16 (55.2)	43 (53.1)	$\chi^2 = 0.509$, df = 3 P = 0.917
4–11 per year	4 (13.8)	12 (14.8)	
≥1 per month	2 (6.9)	9 (11.1)	
Absent	7 (24.1)	17 (21.0)	

Seizure frequency distribution did not differ significantly between patients on monotherapy and those on polytherapy ($\chi^2 = 0.509$, df = 3, P = 0.917 not significant).

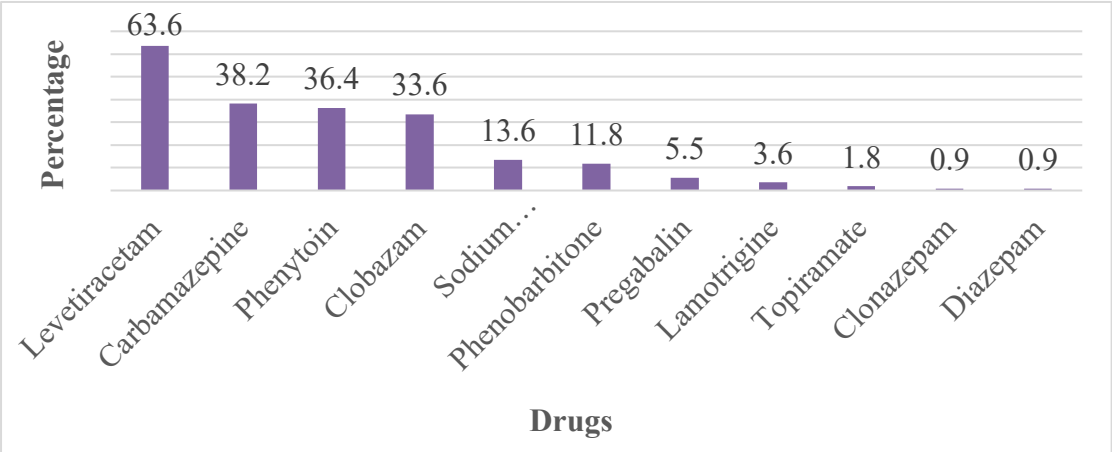

Figure 1: Prescription pattern of anti-epileptic drugs

Table 3: Association between QOLIE-10 score and clinical/treatment characteristics

Variable	Category	QOLIE-10 Mean±SD	Statistic	P-value
Seizure type	Generalized (n=27)	30.0 ± 2.5	t=0.062	0.951
	Partial (n=11)	29.9 ± 3.6		
Seizure frequency score	5-6 (1-11 seizures/year)	27.9 ± 3.1	F=0.410	0.665
	>6 (≥1 seizure/month)	27.1 ± 4.0		
	A (seizure-free)	28.0 ± 3.2		
Therapy	Monotherapy	29.9 ± 4.3	t=0.358	0.721
	Polytherapy	30.1 ± 2.8		

(Note: t represents the test statistic obtained from the independent-samples t-test used to compare the mean QOLIE-10 scores between two groups (generalized vs. partial seizures and monotherapy vs. polytherapy). F represents the F-statistic obtained from one-way ANOVA used to compare mean QOLIE-10 scores across the three seizure-frequency categories. A p-value <0.05 was considered statistically significant.)*

Table 4: Type of Epilepsy and Treatment Pattern (N=110)

Type of Epilepsy	n	Mono/Poly	Most frequently used AED(s)
Seizure disorder (non-ILAE)	30	13 / 17	Levetiracetam (17), Carbamazepine (16)
Scar epilepsy	20	4 / 16	Levetiracetam (16), Phenytoin (13)
GTCS	16	7 / 9	Phenytoin (8), Levetiracetam (7), Clobazam (7)
Focal seizures	13	1 / 12	Levetiracetam (9), Clobazam (7)
Epilepsy (unspecified)	8	0 / 8	Levetiracetam (7), Clobazam (5)
Idiopathic generalized epilepsy	7	0 / 7	Levetiracetam (5), Sodium Valproate (3), Lorazepam (3)
Remote symptomatic epilepsy	3	0 / 3	Lorazepam (3)
Epilepsia partialis continua	3	1 / 2	Sodium Valproate (2), Pregabalin (2)
Refractory epilepsy	2	1 / 1	Levetiracetam (2)
Post-traumatic epilepsy	2	1 / 1	Levetiracetam, Phenytoin, Sodium Valproate, Lorazepam (1 each)
Other syndromes*	6	1 / 5	Levetiracetam (4), Clobazam/Carbamazepine (3 each)

*Combines hemiconvulsion-hemiplegia-epilepsy syndrome, temporal lobe epilepsy, autoimmune epilepsy, progressive myoclonic epilepsy, juvenile myoclonic epilepsy, and catamenial epilepsy (1 patient each), since no single one of these syndromes had more than one case in this cohort.

Type of Epilepsy and Treatment Pattern: The most common diagnostic category was seizure disorder not meeting the formal ILAE definition of epilepsy[2] (27.3%), followed by generalized tonic-clonic seizures, scar epilepsy (18.2%), (GTCS, 14.5%), focal seizures (11.8%), idiopathic generalized epilepsy (6.4%), remote symptomatic epilepsy and epilepsia partial is continua (2.7% each), and progressive myoclonic epilepsy, refractory epilepsy, and post-traumatic epilepsy (1.8% each). Autoimmune epilepsy, hemiconvulsion-hemiplegia-epilepsy syndrome, temporal lobe epilepsy, and juvenile myoclonic epilepsy each accounted for 0.9% of cases.

Levetiracetam was the most frequently prescribed antiepileptic medication, used in 63.6% of patients, followed by carbamazepine (38.2%), phenytoin (36.4%), and clobazam (33.6%). Sodium valproate was prescribed in 13.6% of patients, while phenobarbitone accounted for 11.8%. The use of other antiepileptic medications was relatively infrequent, including pregabalin (5.5%), lamotrigine (3.6%), topiramate (1.8%), clonazepam (0.9%), and diazepam (0.9%).

Dizziness and somnolence were the most frequently reported adverse drug reactions. Most adverse events were mild and managed conservatively without treatment discontinuation.

Discussion

The study population predominantly comprised younger adults, with males comprising higher proportion than females (55.5% vs. 44.5%) a pattern commonly reported in Indian epilepsy cohorts. Urban residents accounted for 65.5% reflecting easier access to the tertiary care centre. More than half of the participants in both the monotherapy (55.2%) and polytherapy (53.1%) groups experienced 1–3 seizures per year, while approximately one-fifth of patients in each group were seizure-free. Although the majority of patients demonstrated relatively low seizure frequency, no statistically significant association was observed between treatment regimen (monotherapy versus polytherapy) and seizure frequency. These findings

suggest that a substantial proportion of the study population had relatively satisfactory seizure control, which may reflect effective epilepsy management in this tertiary care center. However, seizure frequency alone may not fully reflect the appropriateness of epilepsy management, as treatment outcomes are influenced by multiple clinical and patient-related factors.

Polytherapy (73.6%) was more common, consistent with previous reports. [3] The earlier initiation of polytherapy showed that the probability of seizure freedom on a single AED decline once the first agent proves only partially effective, particularly in severe or drug-resistant epilepsies. [4,5] Prescribing patterns for monotherapy versus polytherapy are known to vary considerably across healthcare settings, reflecting differences in drug availability, and prescribing practice.

Newer AEDs, namely levetiracetam (63.6%) and clobazam (33.6%), were the most frequently prescribed agents. Levetiracetam's broad-spectrum efficacy, twice-daily dosing, favourable tolerability, minimal drug interactions, and lack of need for serum-level monitoring likely explains its widespread use. [7] Clobazam is used frequently due to its non-sedating profile, tolerability, low cost, and efficacy across multiple seizure types. The prescription of lamotrigine, pregabalin, and topiramate were low and may be attributed to the higher cost and non-availability in the government pharmacy as these are not listed in the National List of Essential Medicines. The overall preference for newer AEDs, alone or in combination, reflects the narrower therapeutic index, greater interaction burden, and less favourable side-effect profile of older agents such as phenobarbitone, carbamazepine, phenytoin, and valproic acid. [11] Sodium valproate was used in 13.6% of patients with epilepsy. Given its known teratogenic risk in women of childbearing age it warrants caution. [12]

Polytherapy was observed in patients with certain types of epilepsy that are harder to treat—such as scar epilepsy, focal seizures, and remote symptomatic epilepsy. Polytherapy was present in half of the patients with generalized tonic-clonic seizures (GTCS) and seizure disorder while other half of patients received monotherapy. This reflects the general principle that focal and structurally related epilepsies respond less well to a single drug compared to idiopathic generalized epilepsies. [4, 5] The finding of monotherapy in half of the study cohort of GTCS and seizure disorder, is consistent with recommendations from the International League against Epilepsy and other clinical guidelines, which advocate initiating treatment with a single AED whenever feasible as it improves adherence, reduces adverse effects, and lowers healthcare costs. [9] The most common combination identified was levetiracetam with sodium valproate, a regimen frequently employed because of complementary mechanisms of action and acceptable tolerability. [10]

Levetiracetam was the most commonly prescribed drug across most epilepsy types, consistent with its broad effectiveness and good tolerability. [7] However, phenytoin was frequently used for GTCS and scar epilepsy, most likely because of its low cost and long-standing use in government hospital settings.

Adverse drug reactions were reported in approximately one-fourth of patients. Dizziness and somnolence were the most common complaints. These findings are consistent with previous studies evaluating AED safety profiles. Although most adverse effects were mild, these may negatively influence medication adherence and quality of life if not adequately addressed. [11,12]

The QOLIE-10 demonstrated the majority of patients had impaired QOL in this study, reflecting the compounding effects of work and social limitations and memory difficulties, along with social contributors such as stigma, limited family support, isolation, including seizure-related worry. Prior studies have identified female sex, lower education, and rural residence as correlates of poorer QOLIE-10 scores. This association was not observed in the present study.

The lack of a significant association between QOL and the clinical variables (seizure type, seizure frequency, and treatment with monotherapy versus polytherapy) assessed suggests that quality of life cannot be inferred solely from seizure characteristics or treatment regimen. Therefore, routine assessment of QOL may provide additional patient-centred information in the comprehensive management of epilepsy.

Thus, the results highlight the importance of individualized treatment decisions based on seizure characteristics, patient comorbidities, and medication tolerability. Continuous pharmacovigilance and periodic review of treatment regimens are essential for optimizing patient outcomes. A limitation of this study is its single-centre observational design, which may not represent prescribing practices across different healthcare settings. Overall, the findings suggest that current prescribing practices largely follow evidence-based recommendations, with increasing use of newer-generation AEDs.

Conclusion

In this cross-sectional study of adult patients with epilepsy at a tertiary care hospital, polytherapy was more common than monotherapy, and levetiracetam was the most frequently prescribed AED. Impaired quality of life was highly prevalent (85%) but was not significantly associated with seizure type, seizure frequency, or monotherapy versus polytherapy status. This indicates that QOL impairment in epilepsy cannot be inferred from seizure or prescribing characteristics, highlighting the importance of routine assessment of QOL as an integral part of epilepsy management.

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