

IMPROVING MENTAL HEALTH OUTCOMES IN EPILEPSY: THE EFFECT OF COUNSELLING ON DRUG-INDUCED COGNITIVE AND BEHAVIORAL CHANGES

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ABSTRACT

Objectives: The objective of the study was to assess the impact of patient counseling on cognitive impairment and behavioral adverse effects associated with antiepileptic drug (AED) therapy among emerging adults with epilepsy.

Methods: This prospective pre-post interventional study was conducted in the Department of Neurology at a tertiary care hospital in Kerala from May 2024 to October 2024. A total of 47 patients with epilepsy aged 18–29 years who were receiving AED therapy were included. The impact of patient counseling on cognitive impairment and behavioral adverse effects of AEDs was assessed using baseline and follow-up evaluations.

Results: Among the emerging adults with epilepsy, the mean age was approximately 20 years, and males constituted 68% of the study population. Levetiracetam was the most frequently prescribed AED, accounting for 47% of prescriptions. The mean cognitive impairment score decreased from 18.21±0.954 at baseline to 15.32±0.471 at the final follow-up. Similarly, the mean behavioral adverse-effect score decreased from 18.15±1.000 at baseline to 15.21±0.657 at follow-up. These findings indicate improvement in cognitive and behavioral outcomes following patient counseling.

Conclusion: Patient counseling appears to improve cognitive and behavioral outcomes in emerging adults receiving AED therapy. Strengthening communication between healthcare providers and patients may enhance treatment understanding, reduce adverse effects, and improve quality of life. Further studies with larger samples and comparative designs are needed to confirm these findings.

Keywords: Epilepsy, Antiepileptic drugs, Patient counseling, Cognitive impairment, Behavioral adverse effects.

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INTRODUCTION

Epilepsy is a chronic neurological disorder characterized by a persistent predisposition to generate recurrent unprovoked seizures resulting from abnormal electrical activity in the brain [1]. It is a major public health problem that affects individuals across all age groups, including adolescents and young adults. In addition to seizure occurrence, epilepsy can adversely influence education, employment, social relationships, and emotional well-being, thereby imposing a substantial psychosocial burden on affected individuals [2-4]. In India, epilepsy contributes significantly to the overall neurological disease burden, with millions of individuals estimated to be living with the condition [5,6].

The clinical presentation of epilepsy is heterogeneous, with considerable variation in seizure type, frequency, severity, and duration. Its etiology is multifactorial and may include genetic predisposition, structural brain lesions, infections, developmental abnormalities, metabolic disturbances, autoimmune conditions, and head injury, although in many patients the exact cause remains unidentified [7,8]. Beyond seizures, epilepsy is frequently associated with several neurological, psychological, and social comorbidities. Cognitive impairment, anxiety, depression, stigma, and reduced quality of life are common among patients with epilepsy and may arise from recurrent seizures, chronic drug therapy, and the social consequences of the disease [9]. Epilepsy may also predispose patients to complications such as falls, drowning, road traffic accidents, sleep disturbances, memory problems, psychological distress, and, in severe cases, suicidal ideation and behavior [10].

Antiepileptic drugs (AEDs) remain the mainstay of epilepsy management and are primarily used to achieve seizure control, reduce disease burden,

and improve long-term outcomes. However, despite their therapeutic benefits, these medications may be associated with cognitive and behavioral adverse effects that can affect daily functioning and treatment adherence [11,12]. Reduced attention, psychomotor slowing, memory impairment, irritability, mood changes, aggression, and hyperactivity have been reported with several AEDs. Although seizure reduction may partly offset these adverse effects, neuropsychological disturbances continue to be an important concern, particularly in emerging adults, who are in a critical developmental phase marked by academic, occupational, and psychosocial transitions [12,13]. Therefore, careful assessment of the cognitive and behavioral impact of antiepileptic therapy in this age group is clinically important.

Patient counseling is an essential supportive component of epilepsy care. Effective counseling can improve patients' understanding of the disease, enhance medication adherence, promote early recognition of adverse drug reactions, and encourage healthy lifestyle modifications such as adequate sleep, stress management, avoidance of alcohol or substance use, and regular follow-up. Pharmacists and other healthcare professionals play a valuable role in educating patients regarding treatment goals, medication use, possible interactions, and adverse effects, thereby contributing to better clinical outcomes and improved quality of life [13]. In this context, the present study was undertaken to evaluate the impact of patient counseling on cognitive impairment and behavioral adverse effects of AEDs among emerging adults with epilepsy.

METHODS

This prospective pre-post interventional study was conducted in the Department of Neurology at a tertiary care hospital in Palakkad district,

Kerala, from May 2024 to October 2024. The study was undertaken to evaluate the impact of patient counseling on cognitive impairment and behavioral adverse effects associated with AED therapy among emerging adults with epilepsy.

Patients with epilepsy aged 18–29 years who were receiving AED therapy and were willing to participate were considered eligible for the study. Patients diagnosed with other neurological disorders or psychiatric illnesses, as well as pregnant and lactating women, were excluded from the study. A total of 105 patients were screened during the study period. After applying the inclusion and exclusion criteria, 47 patients were included in the final analysis. The participant flow is shown in Fig. 1.

The primary objective of the study was to assess the cognitive and behavioral adverse effects of AEDs among emerging adults with epilepsy. The secondary objective was to evaluate the impact of patient counseling on these outcomes over follow-up.

Written informed consent was obtained from all participants before enrolment. A specifically designed data collection form was used to collect demographic details, medical history, social habits, family

history of epilepsy, dietary habits, and duration of disease, relevant laboratory investigations, and imaging findings from patient records.

A study-specific self-structured questionnaire was developed for the present study to assess cognitive and behavioral adverse effects in patients receiving AED therapy. The questionnaire was reviewed by an expert clinical psychologist and a neurologist for clarity, relevance, and face validity. It was translated with the assistance of a language expert to improve patient comprehension. However, formal psychometric validation, including assessment of construct validity and reliability, was not performed. Therefore, the psychometric properties of the questionnaire are not established. If you actually performed pilot testing, add this sentence: "The questionnaire was piloted on a small group of patients before the main study to assess clarity and comprehensibility."

The questionnaire consisted of two domains: Cognitive assessment and behavioral assessment. Each domain contained eight items. Each item was scored on a 5-point scale from 0 to 4, where 0 indicated "never" and 4 indicated "always." Thus, the total score for each domain ranged from 0 to 32. Scores of <16 were considered normal, scores of 16–26 indicated mild to moderate impairment, and scores of >26 indicated severe impairment.

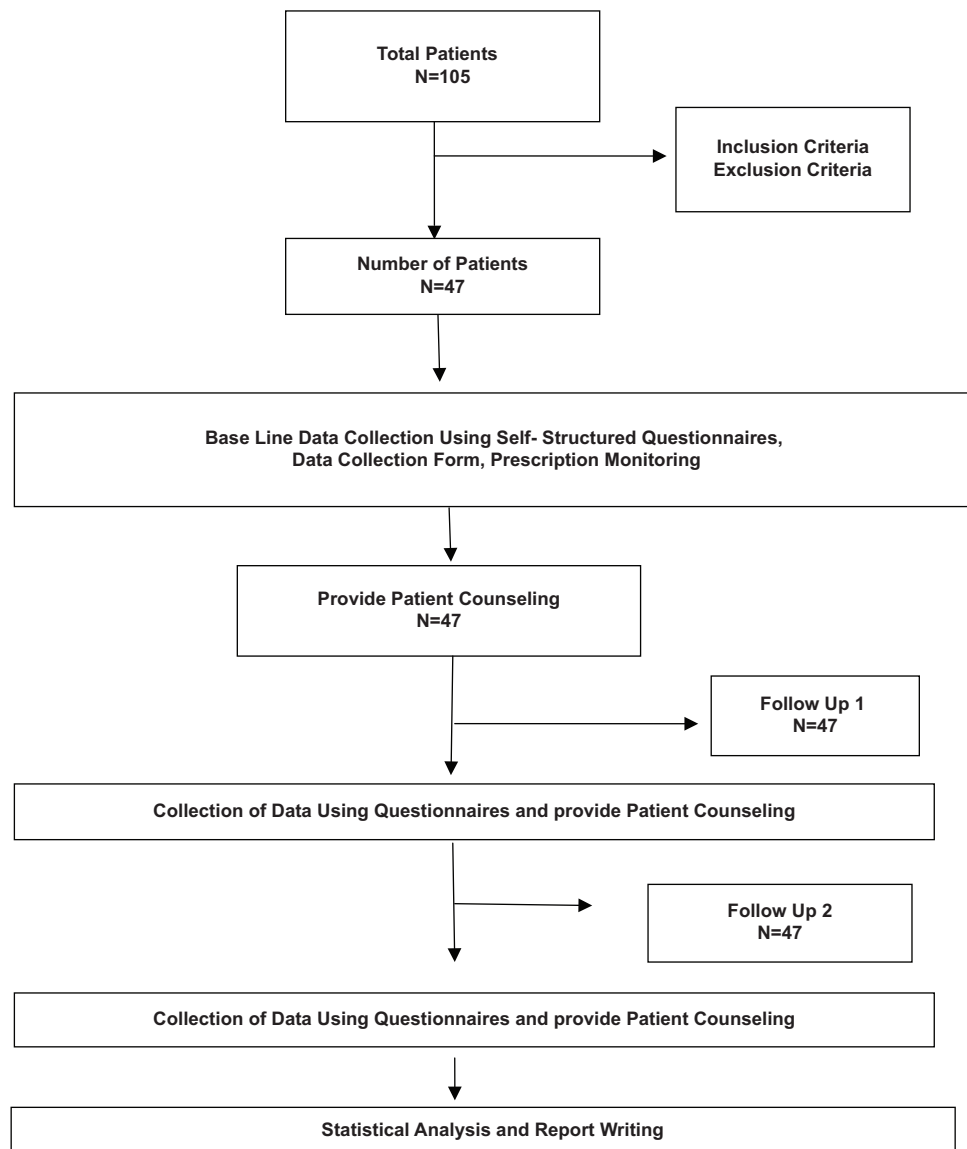


Fig. 1: Flow chart showing plan of work

At baseline, all 47 participants underwent assessment using the questionnaire. Following baseline assessment, patient counseling was provided with the aid of a patient information leaflet. The counseling focused on disease awareness, medication adherence, recognition of adverse effects, lifestyle modification, and the importance of regular follow-up. Follow-up assessments were performed at the end of the 3rd months and 6th months. During each follow-up visit, the same questionnaire was re-administered to evaluate changes in cognitive and behavioral adverse effects over time. Patient counseling was reinforced during follow-up visits. The prevalence and pattern of neuropsychological adverse effects were documented, and the impact of patient counseling was assessed by comparing baseline and follow-up scores.

Ethical considerations

Ethical approval for the study was obtained from the Institutional Human Ethics Committee of PKDAS Institute of Medical Sciences, Vaniyankulam, Palakkad, Kerala, India (Ref. No. IEC/11/95/24).

Statistical analysis

The collected data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) software version 21.0. Descriptive statistics were used to summarize demographic and clinical variables. Continuous variables were expressed as mean±standard deviation, and categorical variables were presented as frequency and percentage. Changes in total cognitive impairment and behavioral adverse-effect scores between baseline and follow-up assessments were analyzed using paired-sample t-test. A $p < 0.05$ was considered statistically significant.

RESULTS

A prospective observational study was carried out on 105 patients among 47 patients were selected based on inclusion and exclusion criteria.

Patient demographics and treatment characteristics are essential for personalized care, especially for the emerging adulthood stage (age in between 18 and 29). The transition from adolescent to adulthood, known as the emerging adulthood stage, is a pivotal phase marked by major physical, cognitive, and behavioral changes. In the present study, the sample of emerging adults with epilepsy the average age was approximately 20 years, with a higher prevalence in males (68%) compared to females (32%) (Table 1).

A majority, 38 (81%), had attained a degree-level education, followed by Higher Secondary 8 (17%). However, 3 (6%) were employed, and rest unemployed/students 44 (94%). 46 (98%) of patients resided in urban areas. Family History of epilepsy found in 19 (40%) patients. A higher proportion were non-smokers, 46 (98%), and not consumed alcohol 41 (87%).

In our findings, patients with history of epilepsy 1–5 years 24 (51%) were dominant and the occurrence of seizures depicts a highest percentage of Primary Generalized Seizure 14 (30%) Followed by Status Epilepticus 7 (15%), Secondary Generalized 7 (15%), Temporal lobe epilepsy 6 (13%), Juvenile Myoclonic 6 (13%), Tonic-Clonic 5 (11%), Partial Seizures 2 (4%) and 12 (26%) of the patient population were devoid of any co-morbid conditions 7 (15%). Cardiovascular comorbidity was mostly seen. AEDs were prescribed as both Monotherapy and Polytherapy. Out of 47 patients, polytherapy 25 (53%) was found to be superior to monotherapy 22 (47%) in controlling seizures. In this study, levetiracetam 22 (47%) was the most frequently prescribed AED Monotherapy, followed by Brivaracetam 22 (47%) and lacosamide 19 (40%) (Table 2).

The prevalence of neuropsychological side effects among 47 Epilepsy patients, 31 (66%) patients showed neuropsychological side effects and 16 (34%) did not show any side effects. Assessment of cognitive impairment in epileptic patients at baseline and follow-up II is shown

Table 1: Sociodemographics details of the study participants (n=47)

| Factors | No. of participants (n=47) | Percentage |
|--------------------|----------------------------|------------|
| Age | | |
| <24 years | 29 | 62 |
| ≥24 years | 18 | 38 |
| Sex | | |
| Male | 32 | 68 |
| Female | 15 | 32 |
| Educational levels | | |
| Lower primary | 0 | 0 |
| Upper primary | 0 | 0 |
| Higher secondary | 8 | 17 |
| Secondary | 1 | 2 |
| Degree | 38 | 81 |
| Occupation | | |
| Employed | 3 | 6 |
| Unemployed | 44 | 94 |
| Family history | | |
| Yes | 19 | 40 |
| No | 28 | 60 |
| Locality | | |
| Urban | 46 | 98 |
| Rural | 1 | 2 |
| Smoking habits | | |
| Smoker | 0 | 0 |
| Passive smoker | 1 | 2 |
| Former smoker | 0 | 0 |
| Never smoked | 46 | 98 |
| Alcohol | | |
| Frequent drinker | 1 | 2 |
| Occasional drinker | 5 | 11 |
| Never drink | 41 | 87 |

in Table 5. Assessment of behavioral side effects in epileptic patients at baseline and follow-up II is shown in Table 6.

AEDs are essential in managing epilepsy but are associated with various neuropsychological side effects. Drowsiness was the most frequently reported symptom, affecting 8 (26%) of patients, followed by Giddiness, which was seen in 6 (19%) of cases (Fig. 2). The relation between age and types of epilepsy was evaluated $p = 0.096$ (Table 3), and age and neuropsychological side effects $p = 0.001$ (Table 4).

Effect of patient counseling in cognitive impairment shows with a baseline mean score for cognitive impairment was 18.21 ± 0.954 , which significantly declined across follow-up periods: 16.81 ± 0.825 at follow-up 1, 15.98 ± 0.642 at follow-up 2 ($p = 0.000$) (Table 7).

Effect of patient counseling in behavioral side effects shows with a baseline mean score of 18.15 ± 1.000 , reducing to 17.09 ± 0.747 at follow-up 1, 16.40 ± 0.538 at follow-up 2 ($p = 0.000$) (Table 7).

DISCUSSION

The present prospective pre-post interventional study evaluated the cognitive and behavioral adverse effects of AEDs in emerging adults with epilepsy and assessed the impact of patient counseling on these outcomes. The major findings of the study were that most participants were young males, levetiracetam and brivaracetam were the most frequently prescribed AEDs, and both cognitive impairment scores and behavioral adverse-effect scores showed a progressive decline over follow-up after counseling. These findings suggest that structured patient counseling may have a beneficial role in improving neuropsychological outcomes in young adults receiving antiepileptic therapy.

In the present study, the mean age of the participants was 20.36 ± 2.62 years, and males constituted 68% of the study population. This male predominance is comparable to previous observations

Table 2: Clinical characteristic and treatment details of participants (n=47)

| Clinical characteristic | No. of participants (n=47) | | Percentage |
|--------------------------------|----------------------------|------------|------------|
| | No. of participants (n=47) | Percentage | |
| Duration of seizure | | | |
| 1-5 Years | 24 | 51 | |
| 5-10 Years | 8 | 17 | |
| >10 Years | 0 | 0 | |
| No history | 15 | 32 | |
| Seizure type | | | |
| Partial seizures | 2 | 4 | |
| Tonic-clonic | 5 | 11 | |
| Primary generalized | 14 | 30 | |
| Status epilepticus | 7 | 15 | |
| Secondary generalized | 7 | 15 | |
| Temporal lobe epilepsy | 6 | 13 | |
| Juvenile myoclonic | 6 | 13 | |
| Comorbid conditions | | | |
| Respiratory | 4 | 9 | |
| Gastrointestinal | 6 | 13 | |
| Nephrology | 5 | 11 | |
| Cardiovascular | 7 | 15 | |
| Endocrinic | 4 | 9 | |
| Muscular skeleton | 0 | 0 | |
| Neurology | 4 | 9 | |
| Other disease | 5 | 11 | |
| No disease | 12 | 26 | |
| Medications type | | | |
| Polytherapy | 25 | 53 | |
| Monotherapy | 22 | 47 | |
| AED treatment | | | |
| Levetiracetam | 22 | 47 | |
| Lobazam | 9 | 19 | |
| Brivaracetam | 22 | 47 | |
| Clobazam | 2 | 4 | |
| Valproic acid/Sodium Valproate | 6 | 13 | |
| Carbamazepine | 8 | 17 | |
| Lorazepam | 2 | 4 | |
| Phenytoin/Fosphenytoin | 0 | 0 | |
| Lacosamide | 19 | 40 | |
| Clonazepam | 5 | 11 | |

AED: Antiepileptic drug

Table 3: Associations between age and types of epilepsy (n=47)

| Type of seizures | Age | | p-value |
|------------------------|-----------|-----------|---------|
| | <24 years | ≥24 years | |
| Partial seizures | 2 | 0 | 0.096 |
| Tonic-clonic | 4 | 1 | |
| Primary generalized | 7 | 7 | |
| Status epilepticus | 4 | 3 | |
| Secondary generalized | 3 | 4 | |
| Temporal lobe epilepsy | 4 | 2 | |
| Juvenile myoclonic | 5 | 1 | |

p>0.05, Statistically not significant

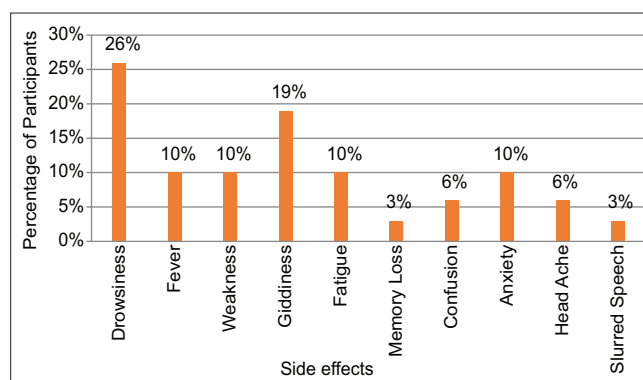
reported by Hopping *et al.* [15]. The predominance of young male patients in hospital-based epilepsy cohorts may reflect differential healthcare access, social visibility of seizures, or care-seeking behavior. Epilepsy during emerging adulthood is particularly important because it can interfere with higher education, employment, independence, and social integration. De Souza *et al.* highlighted that the unpredictable nature and social visibility of epilepsy often contribute to stigma, barriers to social acceptance, and poorer employment outcomes among affected individuals [16]. Thus, the burden of epilepsy in this age group extends beyond seizure control alone.

With respect to seizure type, primary generalized seizures were the

Table 4: Association of age and neuropsychological side effects (n=31)

| Neuropsychological side effects | Age | | p-value |
|---------------------------------|-----------|-----------|---------|
| | <24 years | ≥24 years | |
| Drowsiness | 5 | 3 | 0.001* |
| Fever | 2 | 1 | |
| Weakness | 2 | 1 | |
| Giddiness | 4 | 2 | |
| Fatigue | 3 | 0 | |
| Memory loss | 1 | 0 | |
| Confusion | 2 | 0 | |
| Anxiety | 2 | 1 | |
| Head ache | 2 | 0 | |
| Slurred speech | 1 | 0 | |

*p<0.05, Statistically significant

**Fig. 2: Pattern of neuropsychological side effects in epilepsy patients (n=47)**

most common in the present study, followed by secondary generalized seizures. Seizure patterns may vary across study settings depending on age distribution, referral trends, diagnostic classification, and underlying etiological factors. Hauser *et al.* reported that focal-onset seizures, including those evolving to bilateral tonic-clonic seizures, are common in adult populations [17]. Differences between studies may therefore reflect variations in case mix and classification practices rather than true epidemiological discordance.

The present study also showed that levetiracetam and brivaracetam were the most commonly prescribed AEDs. This pattern is in agreement with contemporary prescribing trends favoring newer antiseizure medications with broader efficacy, fewer drug interactions, and a comparatively better tolerability profile [18,19]. Both levetiracetam and brivaracetam act predominantly through binding to synaptic vesicle protein 2A, which is thought to contribute to their antiseizure efficacy. In addition, polytherapy was slightly more common than monotherapy in the present study. This finding is clinically plausible, as a substantial proportion of patients do not achieve complete seizure freedom with the first or second AED and may require combination therapy for better control [14,19].

Neuropsychological adverse effects remain an important concern during antiepileptic treatment, especially in younger patients who are in a critical period of cognitive, emotional, and social development. In the present study, drowsiness was the most frequently reported neuropsychological adverse effect. This observation is consistent with the central nervous system depressant action of many AEDs and with previous reports showing impaired alertness, fatigue, and reduced wakefulness among patients on chronic antiepileptic therapy [20]. Although seizure reduction is the primary therapeutic goal, treatment-related adverse effects such as drowsiness, poor concentration, psychomotor slowing, irritability, and mood changes may significantly

Table 5: Assessment of cognitive impairment in epileptic patients

| Cognitive impairment item | Baseline (n=47) | | | | | Follow-up II (n=47) | | | | | p-value |
|--|-----------------|----|----|----|----|---------------------|----|----|----|----|---------|
| | 1% | 2% | 3% | 4% | 5% | 1% | 2% | 3% | 4% | 5% | |
| Do you tend to forget people's name? | 9 | 17 | 19 | 23 | 32 | 0 | 17 | 34 | 26 | 23 | 0.197 |
| Do you find it harder to think clearly? | 13 | 19 | 19 | 21 | 28 | 17 | 23 | 21 | 13 | 26 | 0.267 |
| Do you have trouble focusing or concentrating? | 6 | 13 | 23 | 28 | 30 | 21 | 26 | 13 | 26 | 15 | <0.001* |
| Do you face difficulty putting thoughts into words? | 13 | 23 | 23 | 21 | 9 | 4 | 17 | 28 | 30 | 21 | 0.382 |
| Have you failed to handle your medication on your own? | 23 | 21 | 21 | 13 | 21 | 11 | 17 | 17 | 21 | 34 | 0.0989 |
| Do you have trouble with visual or spatial skills? | 0 | 4 | 11 | 6 | 79 | 4 | 13 | 21 | 32 | 30 | <0.001* |
| Are you experiencing memory problems? | 9 | 13 | 19 | 17 | 43 | 13 | 21 | 17 | 32 | 15 | <0.001* |
| Do you struggle with problem-solving or decision-making? | 17 | 21 | 15 | 23 | 23 | 4 | 11 | 32 | 26 | 28 | <0.001* |

*p<0.05, Statistically significant. Option 1-Always, 2-Frequently, 3-Sometimes, 4-Rarely, 5-Never

Table 6: Assessment of behavioral side effects in epileptic patients

| Behavioral side effect item | Baseline (n=47) (%) | | | | | Follow-up II (n=47) (%) | | | | | p-value |
|--|---------------------|----|----|----|----|-------------------------|----|----|----|----|---------|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | |
| Do AEDs affect your mood or energy levels? | 9 | 17 | 19 | 23 | 32 | 0 | 17 | 34 | 26 | 23 | 0.634 |
| Have you had hallucinations or odd sensations? | 13 | 23 | 23 | 21 | 19 | 4 | 17 | 28 | 30 | 21 | 0.0738 |
| Do you feel more anxious or depressed after taking anti-epileptic drugs? | 6 | 13 | 23 | 28 | 30 | 21 | 26 | 13 | 26 | 15 | <0.001* |
| Do you worry about hurting yourself during a seizure? | 23 | 21 | 21 | 13 | 21 | 11 | 17 | 17 | 21 | 34 | <0.001* |
| Do certain situations make your suicidal thoughts worse? | 13 | 19 | 19 | 21 | 28 | 17 | 23 | 21 | 13 | 26 | 0.672 |
| Did you ever think 'Nothing I do is right'? | 17 | 21 | 15 | 23 | 23 | 4 | 11 | 32 | 26 | 28 | 0.0327* |
| Does fear interfere with your responsibilities? | 9 | 13 | 19 | 17 | 43 | 13 | 21 | 17 | 32 | 17 | <0.001* |
| Do you think a lot about the possibility of having a seizure? | 0 | 4 | 11 | 6 | 79 | 4 | 13 | 21 | 32 | 30 | <0.001* |

*p<0.05, Statistically significant. Option 1-Always, 2-Frequently, 3-Sometimes, 4-Rarely, 5-Never. AED: Antiepileptic drug

Table 7: Effect of patient counseling in cognitive impairment and behavioral side effects score on various follow-ups

| Variable | Mean | Standard deviation | p-value |
|-------------------------|-------|--------------------|---------|
| Cognitive impairment | | | |
| Base line | 18.21 | 0.954 | 0.000* |
| Follow-up 1 | 16.81 | 0.825 | |
| Follow-up 2 | 15.98 | 0.642 | |
| Behavioral side effects | | | |
| Base line | 18.15 | 1.000 | 0.000* |
| Follow-up 1 | 17.09 | 0.747 | |
| Follow-up 2 | 16.40 | 0.538 | |

*p<0.05, Statistically significant

affect daily functioning, academic performance, and quality of life. These considerations highlight the importance of regular monitoring and individualized treatment planning.

The association between age and seizure type was not statistically significant in the present study. This finding suggests that seizure type in this cohort may not have been strongly influenced by age within the relatively narrow range of 18–29 years. Similar observations have been reported in studies indicating that seizure-related outcomes are shaped by multiple interacting factors rather than age alone [21]. In contrast, neuropsychological side effects were more frequently observed in the younger subgroup, particularly in patients aged below 24 years. This is a noteworthy finding, as younger individuals may be more vulnerable to cognitive and behavioral disturbances because of developmental, educational, and psychosocial demands during this life stage. This finding deserves further exploration in larger studies.

A central observation of the study was the improvement in cognitive scores over time after patient counseling. The mean cognitive impairment score declined significantly from 18.21 ± 0.954 at baseline to 15.98 ± 0.642 at the final follow-up. This finding suggests that structured counseling, combined with repeated assessment and reinforcement

during follow-up, may help patients better understand medication use, recognize adverse effects early, and adopt coping strategies that reduce the perceived burden of cognitive symptoms. Previous literature has shown that AEDs, particularly in polytherapy and prolonged use, can adversely affect attention, memory, processing speed, and executive function [22]. Counseling may not eliminate the pharmacological basis of such effects, but it can improve adherence, lifestyle regulation, self-monitoring, and compensatory behavioral strategies, thereby supporting better cognitive functioning in routine life.

Behavioral adverse effects also improved over the follow-up period in the present study. The mean behavioral score decreased from 18.15 ± 1.000 at baseline to 17.09 ± 0.747 at follow-up 1 and further to 16.40 ± 0.538 at follow-up 2, indicating a statistically significant and progressive improvement. Behavioral problems such as irritability, anxiety, depressed mood, aggression, and emotional instability are well-recognized concerns during antiepileptic therapy, especially with certain agents such as levetiracetam and clobazam in susceptible individuals. These adverse effects can impair interpersonal relationships, academic engagement, occupational functioning, and emotional well-being. The observed decline in behavioral scores in this study supports the value of counseling-based interventions, including psychoeducation, reassurance, behavioral guidance, and early recognition of mood and behavior changes. Similar supportive approaches have been emphasized in the literature as important non-pharmacological adjuncts in long-term epilepsy care [23,24].

The findings of this study should be interpreted in light of certain limitations. First, the sample size was relatively small, and the study was conducted at a single center, which may limit the generalizability of the findings. Second, the study did not include a control group, and therefore, the observed improvements cannot be attributed exclusively to counseling without caution. Third, the questionnaire used in this study was developed specifically for this research and, although reviewed by experts for clarity and face validity, did not undergo formal psychometric validation, reliability testing, or construct validation. This is an important methodological limitation and should be considered

while interpreting the results. In addition, variation in patient engagement with counseling sessions and differences in individual responsiveness may have influenced the observed outcomes.

Despite these limitations, the study provides useful preliminary evidence that patient counseling may contribute to improved cognitive and behavioral outcomes among emerging adults with epilepsy receiving AED therapy. A multidisciplinary approach involving neurologists, pharmacists, psychologists, and other healthcare professionals may help optimize seizure management while also addressing the neuropsychological burden of treatment. Larger multicentric controlled studies using standardized and psychometrically validated assessment tools are needed to confirm these findings and to identify the most effective counseling strategies for this vulnerable age group.

CONCLUSION

Cognitive and behavioral side effects are often associated with AEDs, affecting learning, educational attainment, and career progression. Most reported among these are irritability, mood swings, depression, and reduced social engagement. Phenobarbital, topiramate, and valproate are commonly associated with cognitive slowing and behavioral disturbances, whereas newer agents such as levetiracetam and lamotrigine may still cause mood or irritability-related changes. The relationship between medical care and psychological assistance for patients marked through patient counseling. Improved communication between patients and healthcare professionals can eventually improve patient quality of life. The long-term effect of patient counseling on cognitive and behavioral outcomes, and the comparison of the effectiveness of different counseling methods, might be done in future research.

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AUTHORS' CONTRIBUTIONS

Vineetha S contributed to study conceptualization, data collection, patient follow-up, data analysis, interpretation of results, and drafting of the manuscript. Hemalatha Selvaraj contributed to study design, supervision of the research process, critical revision of the manuscript for important intellectual content, and final approval of the version to be published. Davis Mnuel A contributed to data collection, literature review, data organization, and manuscript preparation. All authors read and approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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