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Research Article

Sleep and Psychiatric Evaluation in Refractory Versus Controlled Epilepsy

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Abstract

Background: Epilepsy, a prevalent neurological disorder affecting approximately 50 million people worldwide, is closely intertwined with sleep disturbances. These disturbances, often more profound in individuals with epilepsy, may arise from seizures, antiepileptic drugs (AEDs), or comorbid sleep disorders. Among epilepsy subtypes, refractory epilepsy—defined as failure of seizure control despite adequate AED therapy—may demonstrate greater sleep architecture disruption.

Objective: This study aimed to compare sleep abnormalities between patients with idiopathic drug-refractory epilepsy and those with well-controlled epilepsy using objective sleep assessment tools.

Methods: A comparative cross-sectional study was conducted on 90 adults with idiopathic epilepsy, divided into two groups: refractory epilepsy (n = 60) and controlled epilepsy (n = 30). An additional group of 20 healthy individuals served as controls. All participants underwent clinical evaluation, interictal EEG, psychiatric assessment using the Hamilton Anxiety Rating Scale (HAM-A) and Neurological Disorders Depression Inventory for Epilepsy (NDDI-E), and subjective sleep assessment using the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS).

Results: Patients with refractory epilepsy reported significantly more sleep-related complaints, including insomnia, excessive daytime sleepiness, and snoring, compared to those with controlled epilepsy. PSQI and ESS scores were markedly higher in the refractory group, reflecting poorer sleep quality and greater daytime drowsiness. Additionally, anxiety and depression scores were significantly elevated in the refractory group.

Conclusions: Sleep disturbances and psychiatric comorbidities are more prevalent and severe in patients with drug-refractory epilepsy compared to those with well-controlled epilepsy. Addressing these non-seizure-related factors may offer additional strategies for improving quality of life and seizure control in this challenging patient population.

Key Words: refractory epilepsy; controlled epilepsy; sleep quality; sleep disturbances; antiepileptic drugs; psychiatric comorbidities

Introduction

Epilepsy is a prevalent chronic neurological disorder affecting approximately 50 million individuals globally. It is characterized by recurrent, unprovoked seizures resulting from abnormal electrical discharges in the brain. Among its subtypes, refractory epilepsy—also known as drug-resistant epilepsy—poses a significant clinical challenge (1). These patients fail to achieve seizure control despite adequate trials of at least two appropriate antiepileptic drugs (AEDs), and are often burdened by increased morbidity, reduced quality of life, and higher risk of complications, including sudden unexpected death in epilepsy (SUDEP) (2, 3).

A growing body of research supports a bidirectional relationship between epilepsy and sleep. Epileptic seizures can disturb normal sleep cycles, and conversely, disrupted sleep may increase seizure frequency or intensity. Furthermore, AEDs can variably impact sleep quality—some promoting sleep while others cause fragmentation. Despite this established interplay, most previous studies have focused broadly on sleep disorders in epilepsy

patients, without stratifying individuals based on their response to treatment (4, 5).

There remains a significant gap in literature comparing sleep characteristics specifically between drug-refractory and well-controlled epilepsy patients. Such comparative assessments may help illuminate whether refractory epilepsy is associated with unique sleep-related challenges beyond those experienced in well-controlled cases (6, 7).

This study aims to bridge this gap by evaluating and comparing sleep-related complaints, subjective sleep quality, and related psychiatric comorbidities in patients with idiopathic drug-refractory epilepsy versus those with well-controlled epilepsy. The findings may help refine epilepsy management by addressing non-seizure-related contributors such as poor sleep and psychiatric distress that may compound disease burden in treatment-resistant cases.

Patients And Methods

This study was designed as a prospective cross-sectional analysis conducted at the Neurology Department of Mansoura University Hospital (MUH) between September 2017 and October 2019. Ethical approval was obtained from the Faculty of Medicine's Ethical Committee, Mansoura University. All participants provided written informed consent prior to participation.

Study Participants

A total of 90 adult patients (aged >18 years) diagnosed with idiopathic epilepsy were enrolled from the MUH outpatient neurology clinic. Diagnosis and classification of epilepsy were based on the criteria of the International League Against Epilepsy (ILAE).

Participants were divided into two groups:

- Refractory Epilepsy Group (n = 60): Patients who continued to experience seizures at a frequency greater than once per month for at least six months, despite adherence to optimal doses of two or more AEDs.
- Controlled Epilepsy Group (n = 30): Patients who had been seizure-free for a minimum of six months while on one or more AEDs.

A control group of 20 age- and sex-matched healthy individuals without epilepsy or any known sleep or psychiatric disorders was included for baseline comparison.

Exclusion Criteria

Patients were excluded if they had:

- Structural brain abnormalities
- Pseudo-refractory epilepsy (e.g., due to poor compliance or misdiagnosis)
- Neurological conditions affecting sleep (e.g., stroke, encephalitis)
- Medical illnesses that disturb sleep (e.g., thyroid disorders, respiratory disease)
- A primary sleep disorder preceding the onset of epilepsy
- Current use of medications known to significantly affect sleep architecture

Clinical and Neurological Assessment

All participants underwent detailed clinical history-taking and neurological examination. Epilepsy-specific variables such as age at onset, seizure type, duration, frequency, and number/type of AEDs used were documented.

Electroencephalographic (EEG) Evaluation

Interictal EEG was conducted for all epilepsy patients using a 21-channel Nihon Kohden system with electrodes applied according to the international 10–20 system. Recordings included activation procedures such as hyperventilation and photic stimulation.

Psychiatric Assessment

Psychiatric comorbidities were evaluated using:

- *Hamilton Anxiety Rating Scale (HAM-A):* To assess anxiety symptoms.
- *Neurological Disorders Depression Inventory for Epilepsy (NDDI-E):* A validated tool for screening depressive symptoms in epilepsy patients.

Subjective Sleep Assessment

Patients completed:

- ***Pittsburgh Sleep Quality Index (PSQI):*** To evaluate sleep quality over the past month; scores >5 indicated poor sleep quality.
- ***Epworth Sleepiness Scale (ESS):*** To assess daytime sleepiness; scores >10 indicated excessive daytime sleepiness (EDS).

Statistical analysis:

All data were entered, processed, and analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA, 2017). Qualitative data were summarized as frequencies and percentages, while quantitative variables were expressed as mean ± standard deviation (SD) for normally distributed data, or as median and interquartile range (IQR) for non-normally distributed data. The normality of data distribution was assessed using both the Kolmogorov–Smirnov and Shapiro–Wilk tests, with a p-value greater than 0.05 indicating normality. The presence of significant outliers or extreme values was examined using boxplots.

For comparison of qualitative variables, the Chi-square test or Fisher's exact test was applied as appropriate, with Monte Carlo significance used when needed. Bonferroni correction was applied to adjust p-values during multiple comparisons, and differences between column proportions were represented using letters (identical letters denoting non-significant differences and different letters denoting significant differences).

For quantitative data, comparisons between two groups were performed using the Independent-Samples t-test for normally distributed data or the Mann–Whitney U test for non-parametric data. For comparisons among more than two groups, one-way analysis of variance (ANOVA) or its non-parametric counterpart, the Kruskal–Wallis H test, was utilized. Post-hoc pairwise comparisons were conducted to identify specific intergroup differences, which were also represented by letter coding for clarity.

To assess associations between continuous variables, Pearson's correlation coefficient (r) was used for normally distributed data, whereas Spearman's rank-order correlation (ρ) was applied for non-parametric or ordinal data. Both correlation tests were used to evaluate the strength and direction of relationships, where r or ρ values ranged from -1 (perfect

negative correlation) to +1 (perfect positive correlation), and a value of 0 indicated no correlation.

Additionally, multivariate logistic regression analysis was performed to determine independent predictors and to construct a prediction model for the likelihood of specific clinical outcomes. Results were expressed as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). For all statistical tests applied, a p-value ≤ 0.05 was considered to indicate statistical significance.

Results

The results of the present study are demonstrated in the following tables.

Parameter	Group		Test of significance	P
	Healthy subjects (n=20)	Epilepsy patients' (n=90)		
Gender: - Male - Female	 9 (45%) 11 (55%)	 53 (58.9%) 37 (41.1%)	$\chi 2 = 4.181$	0.143
Age:	29.5 (23.5-33)	31.50 (23-36)	KW = -0.450	0.653
BMI:	26.4 (23.7-29.8)	28 (25-31)	KW = -1.201	0.230

Age: years, BMI: Body Mass Index (kg/m2)
Data expression: gender: frequency (percentage) - age and BMI: median (IQR).
P value: gender: Chi-Square test - age and BMI: Kruskal-Wallis test.

Table 1: Demographic data of studied groups:

Fifty-three male patients (58.9%) and 37 females (41.1%) with idiopathic epilepsy were enrolled in our study. In addition, 9 males (45%) and 11 females (55%) were included as a group of healthy subjects. This distribution of gender together with age and BMI between the 2 groups were of no statistical significance.

Variables	Cases (n=90)	
	Number	%
Epilepsy and seizure classification:		
Generalized epilepsy:		
-Generalized motor tonic clonic seizure:	81	90
-Generalized onset non motor typical absence seizures:	6	6.6
Focal epilepsy:		
-Focal onset aware motor clonic seizures:	4	4.4
-Focal onset non motor with impaired awareness seizures:	2	2.2
Epilepsy syndrome:		
-Juvenile myoclonic epilepsy:	13	14.4
Age at onset of epilepsy (years): Median (IQR)	14 (8-18)	
Duration of epilepsy (years): Median (IQR)	14 (10-20)	
Seizure control:		
Drug refractory:	60	66.7
Drug controlled:	30	33.3
Frequency of seizures/month: Median (IQR)		
Drug refractory:	3 (2-12)	
Drug controlled:	0	
Duration since last seizure: Median (IQR)		
Drug refractory:	7 (4-14) days	
Drug controlled:	1 (1-3) years	
Duration of intractability in the refractory epilepsy group: Median (IQR)	9 (7-13) years	
AEDs:		
Single:	4	4.4
Multiple:	86	95.6

Number of used AEDs: Median (min.-max.)	3 (1-5)	
Types of used AEDs:		
Levetiracetam,	74	82.2
Valproate,	70	77.8
Carbamazepine,	39	43.3
Lamotrigine,	31	34.4
Phenytoin,	11	12.2
Oxcarbazepine,	10	11.1
Clonazepam,	10	11.1
Zonisamide,	6	6.7
Topiramate,	4	4.4

IQR: Interquartile range, AEDs: antiepileptic drugs,
Data expression: frequency and percentage

Table 2: Clinical characteristics of epilepsy patients:

Generalized onset motor tonic clonic seizure was the most prevalent seizure type in our patients and Juvenile myoclonic epilepsy was the only epilepsy syndrome included. Those who suffered from refractory epilepsy represented 66.7 % (60 patients) while 33.3 % (30 patients) were controlled. 95.6% of the included patients were on poly-therapy of antiepileptic drugs. Different generations of AEDs were used by patients; levetiracetam, valproate and carbamazepine were the most commonly used.

Parameter	**Group**			**Test of significance**	**P**
	Healthy subjects (n=20)	**Drug Controlled epilepsy (n=30)**	**Drug Refractory Epilepsy (n=60)**		
Gender: - Male - Female	9 (45%) 11 (55%)	17 (56.7%) 13 (43.3%)	36 (60%) 24 (40%)	$\chi 2 = 4.178$	0.124
Age:	29.5(23.5-33)	33 (22.75-36.25)	29 (23-35)	KW = 0.79	0.675
BMI:	26.4 (23.7-29.8)	28 (26-29.8)	26.5 (24-31)	KW = 2.4	0.297

Age: years, BMI: Body Mass Index (kg/m2)
Data expression: gender: frequency (percentage) - age and BMI: median (IQR).
P value: gender: Chi-Square test - age and BMI: Kruskal-Wallis test.

Table 3: Demographic data of 3 studied groups:

Distribution of gender together with age and BMI among groups were of no statistical significance.

Parameter	**Group**		**Test of significance**	**P-value**
	Controlled (n=30)	**Refractory (n=60)**		
Age at onset of epilepsy Median (IQR)	15 (12-18)	12.5 (8-18)	U= 759 Z = -1.209	0.227
Duration of epilepsy Median (IQR)	14.5 (8-21)	14.5 (11-18)	U = 869 Z = -0.266	0.790
Timing of seizure:				
-Day:	15 (50%) a	32 (53.3%) a	$\chi^2 = 0.543$	0.797 (MC)
-Night:	2 (6.7%) a	2 (3.3%) a		
-Day & Night:	13 (43.3%) a	26 (43.3%) a		
Epilepsy and seizure classification:*				
Generalized epilepsy:			$\chi^2 = 9.243$	**0.042**
-Generalized onset motor tonic clonic seizures:	27 (90%) a	54 (90%) a		
-Generalized onset non motor typical absence seizures:	1 (3.3%) a	5 (8.3%) a		
Focal epilepsy:				
-Focal onset aware motor clonic seizures:	2 (6.7%) a	2 (3.3%) a		
-Focal onset non motor with impaired awareness seizures:	0 (0%) a	2 (3.3%) a		
Epilepsy syndromes:				

-Juvenile myoclonic epilepsy:	**0 (0%) a**	**13 (21.7%) b**		
Number of AEDs Median (min.-max.)	2 (1-3)	3 (2-5)	U = 355 Z = -5.078	**<0.0005**
Used AEDs:			χ^2 =	
Levetiracetam	23 (76.7%) a	51 (85%) a	0.950	0.330
Valproate	24 (80%) a	46 (76.7%) a	0.129	0.720
Carbamazepine,	11 (36.7%) a	28 (46.7%) a	0.814	0.367
Lamotrigine,	6 (20%) a	25 (41.7%) b	4.158	**0.041**
Phenytoin,	1 (3.3%) a	10 (16.7%) a	FET	0.092
Oxcarbazepine,	0 (0%) a	10 (16.7%) b	FET	**0.027**
Clonazepam,	0 (0%) a	10 (16.7%) b	FET	**0.027**
Zonisamide,	0 (0%) a	6 (10%) a	FET	0.173
Topiramate	0 (0%) a	4 (6.7%) a	FET	0.297

- *IQR: interquartile range, AEDs: antiepileptic drugs*
- *Data expression: timing and type of seizure: Frequency (percentage)*
- *P value: Z: Mann-Whitney U test, χ^2: Chi-Square test. MC = Monte Carlo significance, FET: Fisher's exact test*
- *a and b: Similar letters = insignificant difference, different letters = significant difference.*
- ** : According to the international league against epilepsy classification (ILAE), 2017* ***(Fisher, 2017)***

Table 4: Clinical characteristics of the drug controlled and drug refractory epilepsy groups':

There was no statistically significant difference in age at onset, duration of epilepsy or timing of seizures in the refractory vs. the controlled epilepsy group. As regard seizure type, generalized onset motor tonic clonic seizure type was the most prevalent seizure type in both groups of refractory and controlled epilepsy. Among the 13 patients suffered from JME, no one showed any evidence of being controlled on medications.

Valproate, levetiracetam and carbamazepine were the most commonly used drugs by the 2 groups. Patients with refractory epilepsy were taking more AEDs, as expected, compared to those with drug controlled epilepsy, a difference that achieved a statistical significance (P<0.0005). Lamotrigine, oxacarbazepine and clonazepam were more significantly used by patients with refractory epilepsy than those with controlled epilepsy.

Sleep complaint	Drug controlled epilepsy (N=30)	Drug refractory epilepsy (N=60)	p-value
Insomnia	6 (20%)	25 (41.7%)	**0.041**
Excessive daytime sleepiness	8 (26.7%)	38 (63.3%)	**0.01**
Snoring	8 (26.7%)	30 (50%)	**0.035**
Restless leg syndrome	0	0	
Parasomnia	0	0	

Table 5: Self-reported clinical sleep problems in the 2 epilepsy groups:

Subjective sleep complaints of insomnia, EDS and snoring were more significantly predominant with patients of refractory epilepsy. Those sleep complaints were reported by patients after diagnosis of epilepsy (patients with sleep complaints before having epilepsy were not enrolled in the study). None of the healthy subjects reported any sleep complaint.

Parameter	Group			Test of significance	P
	Healthy subjects (n=20)	Drug Controlled epilepsy (n=30)	Drug Refractory Epilepsy (n=60)		
PSQI	2.5 (1- 7)a	3 (2- 11)a	7 (2 - 20) b	KW = 26.5	**<0.0005**
ESS (>10)	1 (5%)a	5 (16.7%)a	34 (56.7%)b	χ2 = 24.220	**<0.0005**
HAM-A	7 (4 - 10)a	11 (4- 20)a	23 (10- 34)b	KW = 66.744	**<0.0005**
NDDI-E	8 (6 - 9)a	8 (6 - 12)a	11 (8 - 17)b	KW = 53.775	**<0.0005**

PSQI: Pittsburg Sleep Quality Index, ESS: Epworth Sleepiness Scale, HAM-A: Hamilton anxiety rating scale, NDDI-E: Neurological disorders depression inventory for epilepsy Data expression: PSQI, HAM-A, NDDI-E: median (min..-max.), ESS: frequency (percentage). P value: PSQI: Kruskal-Wallis test, ESS: Chi-Square test. a and b: Similar letters = insignificant difference, different letters = significant difference.

Table 6: Comparison of different clinical scores among the 3 groups:

Both epilepsy groups showed poor sleep quality and excessive daytime sleepiness (shown by high PSQI and ESS scores, respectively) rather than the group of healthy subjects. The severity of these sleep abnormalities was significantly higher in the refractory epilepsy group. Scores of HAM-

A and NDDI-E were also significantly higher with the group of refractory epilepsy.

Parameter	Number of AEDs	
	r_s	P
PSQI	0.252*	**0.017**
ESS	0.360**	**<0.0005**

*r_s: spearman correlation * : significant **: highly significant*

Table 7: Correlation of number of antiepileptic drugs (AEDs) with sleep parameters in all

As previously shown in table (7), number of AEDs was significantly higher in the refractory vs. the controlled epilepsy group. In this table, increased number of used AEDs was significantly associated with higher scores of PSQI and ESS scores indicating subjective poor subjective sleep quality and more likelihood of excessive daytime sleepiness respectively.

Variable	frequency of seizures		Duration since last seizure		Duration of epilepsy		Duration of intractability		Age at onset of epilepsy	
	r_s	P	r_s	P	r_s	P	r_s	P	r_s	P
PSQI	0.07	0.616	0.016	0.905	-0.115	0.392	0.104	0.456	0.118	0.370
ESS	0.304*	**0.018**	0.220	0.091	-0.211	0.807	0.179	0.194	0.145	0.127

*PSQI: Pittsburg sleep quality Index, ESS: Epworth Sleepiness Scale, *: significant, **: highly significant.*

Table 8: Correlation of different epilepsy characteristics with sleep parameters among refractory

In the refractory epilepsy group; increased seizure frequency was significantly associated with increased likelihood of excessive daytime sleepiness (as shown by higher scores of ESS). Duration since last seizure had only significant inverse correlation with the arousal index. None of duration of epilepsy, duration of intractability or age at onset of epilepsy had an impact on sleep profile of patients.

Variable	Duration since last seizure		Duration of epilepsy		Age at onset of epilepsy	
	r_s	P	r_s	P	r_s	P
PSQI	-0.419*	**0.021**	-0.178	0.375	0.178	0.140
ESS	-0.306	0.100	-0.381	0.052	0.087	0.649

Table 9: Correlation of different epilepsy characteristics with sleep parameters in the controlled epilepsy group:

*rs: spearman correlation * : significant **: highly significant*

Increased duration of seizure control was significantly associated with lower scores on PSQI indicating better subjective sleep quality.

Parameter	Refractory group				Controlled group			
	HAM-A		NDDI-E		HAM-A		NDDI-E	
	r_s	P	r_s	P	r_s	P	r_s	P
PSQI	-0.038	0.771	0.034	0.858	-0.197	0.297	-0.248	0.056
ESS	0.005	0.969	0.038	0.841	-0.144	0.448	-0.119	0.364

HAM-A: Hamilton Anxiety Scale, NDDI-E: Neurological disorders depression inventory for epilepsy, rs: spearman correlation

Table 10: Correlation between scores of psychiatric scales and sleep profile in the refractory versus controlled epilepsy groups:

In the refractory epilepsy group; scores of both HAM-A and NDDI-E were significantly inversely correlated with sleep efficiency and significantly positively correlated with sleep onset latency.

Discussion

Epilepsy affects nearly 50 million people globally, with 30–40% of patients remaining refractory to pharmacological treatment despite appropriate AED use (8). This persistent seizure activity is linked to several adverse outcomes, including cognitive, psychological, and social burdens (9). Sleep disturbances are closely intertwined with epilepsy, with early observations by Gowers (1885) highlighting the timing of seizures in relation to the sleep–wake cycle (10).

Sleep deprivation is known to lower seizure thresholds, while nocturnal seizures, AED side effects, and psychiatric comorbidities can disrupt sleep quality (11; 12; 13). This bidirectional relationship negatively impacts quality of life (14; 15). Although studies have explored sleep differences between epilepsy patients and healthy individuals (10; 16), direct comparisons between refractory and controlled epilepsy patients are limited (17).

Our study addressed this gap by evaluating 90 adult patients with idiopathic epilepsy, comparing 60 with drug-refractory epilepsy to 30 with controlled epilepsy, along with 20 healthy controls. Despite similarities in age, gender, and BMI, patients with refractory epilepsy used significantly more AEDs [3 (2–5) vs. 2 (1–3)], reflecting the complexity of achieving seizure control (18). Valproate, levetiracetam, and carbamazepine were the most frequently prescribed drugs, consistent with prior efficacy reports (19).

No significant difference was found in age at onset or epilepsy duration between groups, aligning with findings from Xue-Ping et al. (20), though

earlier onset has been suggested as a potential risk factor by Kalilani et al. (21). Psychiatric comorbidities were notably higher in refractory cases, as reflected by elevated HAM-A and NDDI-E scores, emphasizing the role of mental health in epilepsy management (22).

Sleep disorders such as insomnia, EDS, and OSAS were markedly more prevalent among epilepsy patients than the general population (23). These disturbances may worsen seizure control and reinforce the need for integrated care targeting both neurological and sleep-related outcomes.

Our study revealed that sleep disturbances were frequently reported in both drug-refractory and controlled epilepsy groups, but significantly more so in patients with refractory epilepsy. The most common complaint was excessive daytime sleepiness (EDS), affecting 63.3% of the refractory group compared to 26.7% of the controlled group ($p = 0.01$). This subjective complaint was supported by Epworth Sleepiness Scale (ESS) scores >10, which were significantly higher in the refractory group (56.7%) than the controlled (16.7%) and healthy groups (5%) ($p < 0.0005$). Notably, ESS scores positively correlated with the number of AEDs ($p < 0.0005$) and seizure frequency ($p = 0.018$), aligning with findings from Çilliler and Güven (24) and Zanzmera et al. (17).

Snoring and insomnia were also more prevalent among the refractory group (50% and 41.7%, respectively) compared to the controlled group (26.7% and 20%; $p = 0.035$ and $p = 0.041$). These complaints were corroborated by higher Pittsburgh Sleep Quality Index (PSQI) scores in the refractory group (median = 7) than both the controlled (median = 3) and healthy groups (median = 2.5) ($p < 0.0005$), consistent with Carrion et al. (25) and Ismayilova et al. (26).

Psychiatric comorbidities were also relevant. Although no direct correlation was found between anxiety/depression scores and subjective sleep measures (ESS/PSQI), significant associations emerged with objective sleep parameters. These findings highlight the underestimated role of psychiatric symptoms in disrupting sleep in refractory epilepsy

Limitations

Several limitations should be noted. The sample size was modest, and polytherapy among patients precluded isolating AED-specific effects on sleep or metabolism. Future studies with larger cohorts, stratified by epilepsy subtype and AED regimen, are essential to validate these findings.

Conclusion

This study demonstrates that patients with drug-refractory epilepsy experience significantly greater disruptions in sleep compared to those with controlled epilepsy. The results suggest that disturbed sleep may contribute to seizure intractability and is not merely a consequence of the disease. Moreover, the presence of psychiatric comorbidities further compounds the issue, indicating the need for holistic patient management. Our findings underscore the importance of addressing sleep and psychiatric health as integral components of epilepsy care.

List of Abbreviations

Abbreviation	*Full Term*
AEDs	Antiepileptic Drugs
BMI	Body Mass Index
CE	Controlled Epilepsy
EDS	Excessive Daytime Sleepiness
EEG	Electroencephalogram
ESS	Epworth Sleepiness Scale
HAM-A	Hamilton Anxiety Rating Scale
ILAE	International League Against Epilepsy
MRI	Magnetic Resonance Imaging
NDDI-E	Neurological Disorders Depression Inventory for Epilepsy
PSQI	Pittsburgh Sleep Quality Index
SUDEP	Sudden Unexpected Death in Epilepsy

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Author Contributions

All authors have reviewed and approved the final manuscript.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Confidentiality of Data

All collected data were anonymized and stored securely. Only the research team had access to patient data, which were used solely for research purposes under ethical approval and institutional guidelines.

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