PROCEEDINGS OF THE LATVIAN ACADEMY OF SCIENCES. Section B,
Vol. 80 (2026), No. 1/2 (760/761), pp. 21–27.

DOI: 10.2478/prolas-2026-0005

Original Paper

FACTORS AFFECTING INSOMNIA AND EXCESSIVE DAYTIME SLEEPINESS IN EPILEPSY PATIENTS

Monta Feldmane[1,4] and Normunds Sūna[2,3,4,#]

[1] Faculty of Medicine, Rīga Stradiņš University, 16 Dzirciema Str., Rīga, LV-1007, LATVIA

[2] Department of Neuromedicine and Neurosciences, Faculty of Medicine and Life Sciences, University of Latvia, 3 Jelgavas Str., Rīga, LV-1004, LATVIA

[3] Department of Infectology, Rīga Stradiņš University, 16 Dzirciema Str., Rīga, LV-1007, LATVIA

[4] Rīga East Clinical University Hospital, 2 Hipokrāta Str., Rīga, LV-1079, LATVIA

[#] Corresponding author, n.suuna@gmail.com

Communicated by Ilze Konrāde

*The aim of the study was to determine the prevalence of sleep disorders in patients with epilepsy (PWE), and to determine whether anxiety and epilepsy characteristics influence sleep disorders. A cross-sectional study involved 46 adult PWE (aged 21 to 73 years). Self-reported subjective sleep disturbance (SSD) was present in 72.0% of cases. Insomnia was found in 76.1% of PWE using the Athens Insomnia Scale (AIS). Excessive daytime sleepiness (EDS) was present in 32.6% of patients, according to the Epworth Sleepiness Scale (ESS). The Generalised Anxiety Disorder 7-item scale (GAD-7) revealed anxiety symptoms in 65.2% of PWE. An association was found between moderate to severe insomnia and epilepsy type (*p *= 0.038). Moderate to severe insomnia was present in 31% of respondents with focal epilepsy, compared with 66.7% of patients in the generalised epilepsy group and 75.0% in the unknown epilepsy group, indicating milder insomnia in focal epilepsy. SSD were more common in patients with seizure frequency more than once a year than in patients with seizures less than once a year (p = 0.001). A correlation was found between GAD-7 and ESS scores, Pearson's correlation coefficient = 0.478,* p *< 0.001. The proportion of patients who self-reported sleep disturbance (72.0%) was close to the prevalence of insomnia determined by the AIS (76.1%) (p = 0.81), showing that SSD in PWE has a high diagnostic value. It was found that the severity of insomnia varies in patients with different types of epilepsy.*

Keywords: *sleep disorders, anxiety, Epworth Sleepiness Scale, Athens Insomnia Scale.*

INTRODUCTION

Epilepsy affects more than 65 million people worldwide, according to the World Health Organisation. PWE have up to a three-fold higher risk of premature death compared to the general population (Cockerell *et al*., 1994), as well as an increased risk of developing most somatic and psychiatric diseases, and epilepsy patients are twice as likely to suffer from various sleep disorders (Gutter *et al*., 2019). Sudden unexpected death in epilepsy (SUDEP) is a unique complication of the disease, for which current evidence supports an association with sleep disorders (Magana-Tellez *et al*., 2025).

Sleep-related epilepsies affect children, adolescents, and adults, and manifest as both focal and generalised seizures, and can be due to both structural and genetic aetiology (Kokkinos *et al*., 2022). In PWE, sleep disorders lead to reduced sleep quality, which in turn can impair seizure control. In contrast, epilepsy with frequent seizures can adversely affect patients' sleep quality, thus creating a "vicious circle" (Jain and Glauser, 2014). Sleep has both a

© The Authors
This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

protective and a worsening effect on epilepsy (El Youssef *et al*., 2023). Seizures are promoted during non-rapid eye movement (NREM) and inhibited during rapid eye movement (REM)-sleep (Shouse *et al*., 2000). Interictal epileptiform activity on electroencephalograms (EEG) is more frequently observed during NREM sleep, but is suppressed during REM sleep (Campana *et al*., 2017). One of the pathogenetic explanations for the dependence of seizure frequency on the sleep phase is diffuse cortical synchronisation in the NREM phase and desynchronisation in the REM phase (Ng, 2017). Sleep deprivation is a known trigger for seizures, especially in genetic generalised epilepsies, but data on the effect on focal epilepsy triggering are conflicting (Malow *et al*., 2002; Samsonsen *et al*., 2016). Both daytime and night-time seizures, and even epileptiform discharges on EEG, alter sleep architecture (Nobili *et al*., 2022). In focal epilepsy, seizures cause reduced REM sleep (Sadak *et al*., 2022) and the N3 phase of deep sleep (Pereira *et al*., 2012), but prolonged N1 and N2 sleep phases (Krutoshinskaya *et al*., 2024). Seizures most often occur in the N2 sleep phase (Gumusyayla *et al*., 2016). In contrast, in the case of genetic generalised epilepsies, the effect on sleep phases is different — the N2 phase is reduced, but the N3 and REM phases are not significantly affected, and epileptiform activity is usually observed on EEG in the N1 and N2 sleep phases (Lehner *et al*., 2022). Certain anti-seizure medications (ASMs) may possess sedative properties, as well as influence sleep architecture (Vaughn and Ali, 2012).

Sleep quality in PWE is significantly affected by anxiety, and epilepsy-specific anxiety is influenced by the fear of falling asleep if seizures tend to occur during sleep, which increases the risk of insomnia (Norton *et al*., 2023).

The aim of this study was to describe sleep disorders among PWE, as well as to determine whether sleep disorders are influenced by anxiety and epilepsy characteristics.

Table 1. Type of epilepsy, frequency of seizures and treatment

Parameter		Patients, n = 46 (%)
Type of epilepsy, aetiology	Generalised	9 (19.6%)
	Focal	29 (63.0%)
	Immune	1 (3.4%)
	Infectious	1 (3.4%)
	Structural	12 (41.4%)
	Unknown aetiology	15 (51.7%)
	Unknown type epilepsy	8 (17.4%)
Seizure frequency	Less than once every 5 years	10 (21.7%)
	Less than once every 2 years	5 (10.9%)
	Less than once a year	6 (13.0%)
	Up to three times a year	9 (19.6%)
	Up to six times a year	5 (10.9%)
	Once a month	6 (13.0%)
	Once a week	5 (10.9%)
ASM therapy	No medication	2 (4.4%)
	Monotherapy	29 (63.0%)
	Polytherapy	15 (32.6%)

MATERIALS AND METHODS

A cross-sectional study was carried out at the 7th Department of Neurology of Rīga East Clinical University Hospital from 2022 to 2023. The study included adult PWE, and a survey was conducted using a study questionnaire on epilepsy characteristics and daily habits (survey questions presented in Tables 1 and 2), the ESS, the AIS, and the GAD-7 scales. The inclusion criteria were: at least 18 years of age, an existing diagnosis of epilepsy, and the patient's physical and cognitive condition, which allowed to understand the information provided about the study and the questions included in the questionnaires, and to provide answers. The study participants signed an informed consent to participate in the study.

The study included the ESS (Johns, 1991), the most common scale for assessing sleepiness in the general population and among PWE (Sap-Anan *et al*., 2021). The questionnaire includes a description of eight situations, and the patient is asked to assess the likelihood of falling asleep in each of them, using numbers from 0 to 3, where 0 indicates that the patient would never fall asleep while performing this activity, 1 – there is a very low probability of falling asleep,

Table 2. Daily habits and presence of self-reported sleep disturbances

Parameter		Epilepsy patients (n = 46)		*p*-value
		SSD present n = 33 (%)	SSD absent n = 13 (%)	
Gender	Female	22 (66.7%)	5 (38.5%)	0.079
	Male	11 (33.3%)	8 (61.5%)	
Daily routine	Regular	24 (72.8%)	13 (100%)	0.110
	Irregular	8 (24.2%)	0 (0%)	
Use of sedatives	Yes	8 (24.2%)	0 (0%)	0.084
	No	25 (75.8%)	13 (100%)	
Caffeine before sleep	Yes	11 (33.3%)	5 (38.5%)	0.744
	No	22 (66.7%)	8 (61.5%)	
Eating before sleep	Yes	18 (54.5%)	8 (61.5%)	0.749
	No	15 (45.5%)	5 (38.5%)	
Smart devices before sleep	Yes	19 (57.6%)	9 (69.2%)	0.522
	No	14 (42.4%)	4 (30.8%)	
Physical activities	Less than once a month	8 (24%)	2 (15.4%)	0.776
	Once a week	9 (27.3%)	3 (23.1%)	
	2–3 times a week	7 (21.2%)	2 (15.4%)	
	Every day	9 (27.3%)	6 (46.2%)	
Smart devices during the day	< 2 h	10 (30.3%)	4 (30.8%)	0.970
	3–4 hours	10 (30.3%)	3 (23.1%)	
	5–6 hours	7 (21.2%)	3 (23.1%)	
	> 7 h	6 (18.2%)	3 (23.1%)	
Stress	Couple of times a year	4 (12.1%)	1 (7.7%)	0.071
	Once a month	5 (15.2%)	1 (7.7%)	
	Once a week	9 (27.3%)	9 (69.2%)	
	Every day	15 (45.5%)	2 (15.4%)	

2 – medium probability of falling asleep, and 3 – high probability of falling asleep. The total sum of the ratings for each situation determined the level of sleepiness: 0–10 — normal, 11–12 — mild EDS, 13–15 — moderate EDS, 16–24 — severe EDS.

The AIS (Soldatos *et al*., 2003) allows to assess the presence of insomnia over the past month. It is based on the diagnostic criteria set by the International Classification of Diseases, 10th ed. (van Straten *et al*., 2025). The questionnaire includes eight questions about different aspects of insomnia. Each question has four answer options, giving a score from 0 to 3. The total sum of the ratings determines the level of insomnia: 0–5 — normal, 6–9 — mild, 10–15 — moderate, and 16–24 — severe insomnia. To determine the factors influencing moderate and severe insomnia, the results of the AIS were divided into two groups — with significant insomnia (moderate/severe) and without significant insomnia. The "no significant insomnia" category included scores 0–9, while the "significant insomnia" category included scores of 10–24.

The GAD-7 scale (Spitzer *et al*., 2006), is the only screening tool for anxiety that has been validated in PWE (Budikayanti *et al.*, 2019). Seven problem situations are given to assess anxiety, the frequency of which is rated from 0 (not at all) to 3 (almost every day), and the total score determines the severity of anxiety symptoms: 0–4 — minimal anxiety, 5–9 — mild anxiety, 10–14 — moderate anxiety, and 15 or more — severe anxiety.

Data were collected in Microsoft Excel software, version 16.72. Data were analysed in the statistical software IBM SPSS, version 29.0 (IBM Corp., Armonk, NY, USA). The Fisher's Exact Test was employed to assess the association between epilepsy characteristics and daily habits with the presence of SSD, insomnia, and EDS. To examine the linear relationship between variables, the Pearson's correlation coefficient (r) was calculated between the GAD-7 score and the ESS score, as well as between the GAD-7 score and the AIS score. Data with $p < 0.05$ were accepted as statistically significant.

RESULTS

Study demographics and epilepsy characteristics. The study included 46 adult PWE, 58.7% (n = 27) female and 41.3% (n = 19) male. The mean age of patients was 43.8 years (21–73), the mean age of male patients was 45.7 (23–68) years, and the mean age of female patients was 43.3 (21–73). The majority of patients were in the age groups 18 to 30 years and 41 to 50 years — 23.9% (n = 11) in each group, 19.6% (n = 9) were 31–40 years old, 17.4% (n = 8) were 51–60 years old, 10.9% (n = 5) were 61–70 years old, while the least, 4.3% (n = 2), were in the age group over 71 years.

Epilepsy characteristics are presented in Table 1. Of the 46 study participants, none had daily seizures, while 23.9% (n = 11) of the PWE experienced one or more seizures per month, and 76.1% (n = 35) of the study participants experienced less than one seizure per month. Of all respondents, 21.7% (n = 10) experienced seizures less than once every five years. 32.6% (n = 15) of study participants required the use of more than one ASM to achieve seizure control, but the majority of participants, 63.0% (n = 29), used a single ASM.

Association of daily habits with sleep disturbance. The prevalence of SSD was 72.0% (n = 33). When analysing the associations of daily habits with SSD, no statistically significant results were found for any of the analysed parameters (Table 2).

ESS and AIS results. According to the ESS score, 32.6% (n = 15) of patients had EDS. The mean score on the ESS was 8.37 points (SD = 4.07). The minimum score was one point for 2.2% (n = 1), while the maximum was 15 points for 4.3% (n = 2) of the respondents. None of the respondents scored 16 points or more; thus severe EDS was not present. Moderately severe EDS was found in 23.9% (n = 11), while mild EDS was observed in 8.7% (n = 4) of PWE.

Symptoms of insomnia were found in 76.1% (n = 35) of PWE. The minimum AIS score was 0 points in 2.2% of patients (n = 1), the maximum score was 21 points, also in 2.2% of patients (n = 1). The mean AIS score was 8.5 points (SD = 5.0). The levels of insomnia were as follows: normal in 23.9% (n = 11), mild in 30.4% (n = 14), moderate in 37.0% (n = 17), and severe insomnia in 8.7% (n = 4) of PWE. Insomnia was present in 77.8% (n = 7) of cases with generalised epilepsy, in 72.4% (n = 21) of patients with focal epilepsy, and in 87.5% (n = 7) of patients with unknown type of epilepsy. 45.7% (n = 21) of PWE had significant (moderate to severe) insomnia.

GAD-7 Anxiety Scale results. Anxiety symptoms were present in 65.2% (n = 30) of PWE. The minimum GAD-7 score was 0 points in 4.3% (n = 2), while the maximum score was 19 points, also in 4.3% (n = 2) of PWE. The mean GAD-7 score was 7.8 points (SD = 5.3), which corresponds to mild anxiety. The most common GAD-7 score was normal in 34.8% (n = 16), followed by mild anxiety in 28.3% (n = 13), moderate anxiety in 21.7% (n = 10), and severe generalised anxiety in 15.2% (n = 7) patients.

Association of epilepsy characteristics with sleep disorders. A significant association was found between insomnia and epilepsy type ($p = 0.038$). The majority of patients with generalised epilepsy group (66.7%; n = 6) and in the unknown type epilepsy group (75.0%; n = 6) presented with significant insomnia symptoms. In contrast, in the focal epilepsy group, only 31% (n = 9) of respondents experienced significant insomnia. Thus, insomnia was clinically milder in the PWE with focal epilepsy (Table 3). PWE subjectively rated if they had any sleep disturbance. An association was found between seizure frequency and SSD ($p = 0.034$). When comparing all study groups by seizure frequency, patients with a seizure frequency of more than one time per year had more frequent SSD than patients with seizures less

Table 3. Association of epilepsy characteristics with sleep disturbances

Parameter		Epilepsy patients (n = 46)		*p*-value	Epilepsy patients (n = 46)		*p*-value	Epilepsy patients (n = 46)		*p*-value
		EDS present n = 15 (%)	EDS absent n = 31 (%)		Insomnia present n = 21 (%)	Insomnia absent n = 25 (%)		SSD present n = 33 (%)	SSD absent n = 13 (%)	
Type of epilepsy	Generalised	4 (26.7%)	5 (16.1%)	0.600	6 (28.6%)	3 (12.0%)	0.038	6 (18.2%)	3 (23.1%)	0.644
	Focal	8 (53.3%)	21 (67.7%)		9 (42.9%)	20 (80.0%)		20 (60.6%)	9 (69.2%)	
	Unknown type epilepsy	3 (20.0%)	5 (16.1%)		6 (28.6%)	2 (8.0%)		7 (21.2%)	1 (7.7%)	
Seizure frequency	Less than once in 5 years	1 (6.7%)	9 (29.0%)	0.218	3 (14.3%)	7 (28.0%)	0.362	4 (12.1%)	6 (46.2%)	0.034
	Less than once in 2 years	0 (0%)	5 (16.1%)		2 (9.5%)	3 (12.0%)		2 (6.1%)	3 (23.1%)	
	Less than once a year	2 (13.3%)	4 (12.9%)		2 (9.5%)	4 (16.0%)		4 (12.1%)	2 (15.4%)	
	Up to three times a year	4 (26.7%)	5 (16.1%)		5 (23.8%)	4 (16.0%)		8 (24.2%)	1 (7.7%)	
	Up to six times a year	3 (20.0%)	2 (6.5%)		3 (14.3%)	2 (8.0%)		4 (12.1%)	1 (7.7%)	
	Once a month	3 (20.0%)	3 (9.7%)		5 (23.8%)	1 (4.0%)		6 (18.2%)	0 (0.0%)	
	Once a week	2 (13.3%)	3 (9.7%)		1 (4.8%)	4 (16.0%)		5 (15.2%)	0 (0.0%)	
ASM therapy	No medication	1 (6.7%)	1 (3.2%)	0.301	1 (4.8%)	1 (4.0%)	0.805	1 (3.0%)	1 (7.7%)	0.532
	Monotherapy	7 (46.7%)	22 (71.0%)		12 (57.1%)	17 (68.0%)		20 (60.6%)	9 (69.2%)	
	Polytherapy	7 (46.7%)	8 (25.8%)		8 (38.1%)	7 (28.0%)		12 (36.4%)	3 (23.1%)	

than one time per year (p = 0.001). Patients with seizures less than once every two years had significantly fewer SSD than patients with more frequent seizures (p = 0.001). Every patient who had seizures at least once a month experienced SSD.

Correlation of anxiety with ESS and AIS. Significant correlation was found between the GAD-7 and ESS scores (r = 0.478, $p < 0.001$; Fig. 1). The correlation between the GAD-7 and the AIS scores was not statistically significant (r = 0.288, p = 0.052; Fig. 2).

Pharmacotherapy in the study group. The most frequently used ASMs were lamotrigine (n = 15, 32.6%), valproate (n = 15, 32.6%), and levetiracetam (n = 14, 30.4%). Carbamazepine (n = 8, 17.4%), topiramate (n = 4, 8.7%) were less frequently used in therapy. In turn, gabapentin (n = 1, 2.2%), phenobarbital (n = 2, 4.3%), and oxcarbazepine (n = 2, 4.3%) were rarely used. No association was found between ASM and EDS ($p > 0.999$), insomnia (p = 0.097) or SSD (p = 0.779).

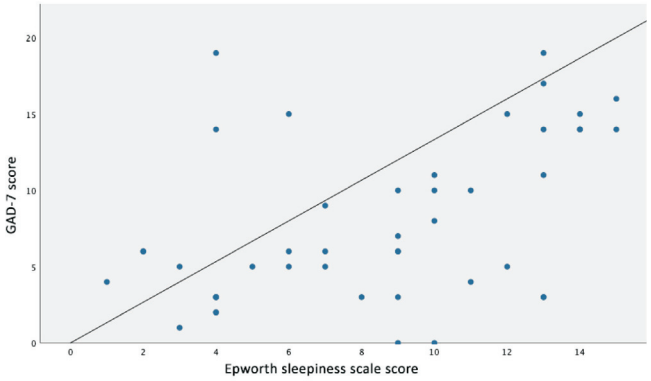


Fig. 1. Correlation between anxiety and excessive daytime sleepiness. Pearson's correlation coefficient = 0.478, $p < 0.001$.

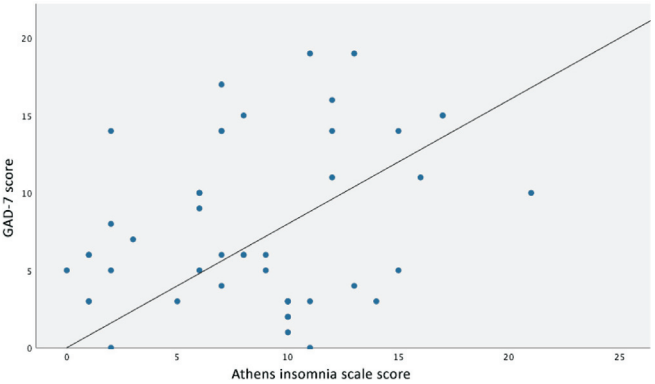


Fig. 2. Correlation between anxiety and insomnia. Pearson's correlation coefficient = 0.288, p = 0.052.

DISCUSSION

The study results indicated that sleep disorders such as insomnia and EDS are a widespread problem in PWE, with 76.1% presenting with insomnia symptoms, and 32.6% of study participants presenting with EDS. The prevalence of insomnia was higher than that reported in other studies, where insomnia was found in 18–66% of PWE (Macêdo *et al.*, 2017; Xu *et al.*, 2020; Leschziner *et al.*, 2025). Higher incidence of insomnia may be explained by the fact that 54% of patients met the criteria for drug-resistant epilepsy (Kwan *et al.*, 2010), in contrast to ~30% in the general epilepsy population (Lagger *et al.*, 2023). Poor seizure control in drug-resistant epilepsy is a risk factor for insomnia, resulting in higher prevalence (Planas-Ballvé *et al.*, 2022).

The AIS and the Insomnia Severity Index (ISI) scales are commonly used validated self-report scales for insomnia, and the results obtained with each of the scales are comparable (Chiu *et al*., 2016). Both scales can be used to determine the severity of insomnia (Okajima *et al*., 2020). The proportion of patients with SSD (72.0%) was virtually no different from the prevalence of insomnia detected by the AIS scale (76.1%) ($p = 0.81$); therefore self-reporting of sleep disturbance in the epilepsy population had a high diagnostic value and justified the use of the diagnostic scales. An association was found between seizure frequency and SSD ($p = 0.034$). Patients with seizures less than once every two years had significantly fewer subjective complaints of SSD than patients with more frequent seizures ($p = 0.001$). A similar finding was described previously — insomnia was observed to be significantly less common if the patient did not have a seizure in the last two years (Ismayilova *et al*., 2015). Previous studies have linked poor seizure control to reduced sleep quality and insomnia (Planas-Ballvé *et al*., 2022).

An association between epilepsy type and significant insomnia was found in the study ($p = 0.038$). Moderate to severe insomnia was less frequently observed in patients with focal epilepsy compared to those with generalised and unknown epilepsy. This finding indicates that severity of insomnia differs in patients experiencing different types of epilepsy, with insomnia being clinically milder in the case of focal epilepsy. Previous studies have examined the relationship between insomnia severity and epilepsy variables to a limited extent, finding no association (Yang *et al*., 2016; Samboon *et al*., 2019). Therefore, studies with a larger number of epilepsy patients would be needed to confirm the findings of our study.

The study did not confirm the association of the analysed types of sleep disorders with any of the ASMs used. Although sleep disturbances are a common side effect of ASMs (Mula and Trimble, 2009), other studies have also confirmed the absence of an association between the use of ASMs and insomnia (Vendrame *et al*., 2013). Explanation for the lack of association of a common ASM side effect with sleep disturbance is that one of the goals of antiepileptic therapy is to tailor therapy, with minimal if any drug-related adverse reactions (Brodie, 2005). Patients on a stable ASM regimen are not reported to have an increased incidence of EDS (Giorelli *et al*., 2011), while the association exists in case of polytherapy (Lee *et al*., 2019).

EDS was found in 32.6% of participants. Prevalence of sleepiness in other studies ranges from 20–47% (Chen *et al*., 2011; Zanzmera *et al*., 2012; Planas-Ballvé *et al*., 2022), which is consistent with the results of the current study.

PWE suffered from insomnia more often, while EDS was less common (76.1% vs. 32.6%). Other studies have also shown a predominance of insomnia over EDS (Khachatryan *et al*., 2020; Planas-Ballvé *et al*., 2022).

Given that anxiety is known to be a common comorbidity in PWE (Munger Clary, 2014), the GAD-7 scale was included in the study to evaluate anxiety as a factor affecting sleep disorders. The results showed a positive correlation ($r = 0.478$) between the GAD-7 score and the ESS score ($p < 0.001$). The results of the current study confirm previously reported associations of anxiety with EDS (Giorelli *et al*., 2011; Lee *et al*, 2019). Factors that determine EDS in PWE are considered to be sleep fragmentation and shortened REM sleep phase, as well as the incidence of sleep apnoea in up to 30% of refractory epilepsy patients (Giuliano *et al*., 2020) and frequent psychiatric comorbidities such as anxiety and depression (Lee *et al*, 2019).

Although previous studies have shown an association between insomnia and anxiety in PWE (Tan *et al*., 2024; Hu *et al*., 2025), in this study, the correlation between the AIS score and the GAD-7 score did not reach statistical significance ($r = 0.288$, $p = 0.052$).

In summary, the study found that sleep disorders are a significant comorbidity of epilepsy. Patients' self-reported complaints about the presence of sleep disturbance almost coincide with cases of insomnia confirmed by AIS, and therefore, the patient's subjective complaints have a high diagnostic value. An association was observed between seizure frequency and SSD and an association of anxiety with EDS in PWE. It was found that the severity of insomnia differs in patients with different types of epilepsy, with insomnia being clinically milder in focal epilepsy, a finding that adds to previous knowledge about the dependence of insomnia on epilepsy variables.

ETHICS

Permission for the study was approved by the Research Ethics Committee of the Faculty of Medicine of the University of Latvia

REFERENCES

Brodie, M. J. (2005). Medical therapy of epilepsy: When to initiate treatment and when to combine? *J. Neurol*., **252** (2), 125–130.

Budikayanti, A., Larasari, A., Malik, K., Syeban, Z., Indrawati, L. A., Octaviana, F. (2019). Screening of Generalized Anxiety Disorder in Patients with Epilepsy: Using a Valid and Reliable Indonesian Version of Generalized Anxiety Disorder-7 (GAD-7). *Neurol. Res. Int*., **2019** (2), 5902610.

Campana, C., Zubler, F., Gibbs, S., de Carli, F., Proserpio, P., Rubino, A. (2017). Suppression of interictal spikes during phasic rapid eye movement sleep: A quantitative stereo-electroencephalography study. *J. Sleep Res.,* **26**, 606–613.

Che, N.C., Tsai, M. H., Chang, C. C., Lu, C. H., Chang, W. N., Lai, S. L., Tseng, Y. L., Chuang, Y. C. (2011). Sleep quality and daytime sleepiness in patients with epilepsy. *Acta Neurol Taiwan*., **20** (4), 249–256.

Chiu, H. Y., Chang, L. Y., Hsieh, Y. J., Tsai, P. S. (2016). A meta-analysis of diagnostic accuracy of three screening tools for insomnia. *J. Psychosom. Res.,* **87**, 85–92.

Cockerell, O. C., Johnson, A. L., Sander, J. W., Hart, Y.,M., Goodridge, D. M., Shorvon, S. D. (1994). Mortality from epilepsy: Results from a prospective population-based study. *Lancet*, **1344** (8927), 918–921.

El Youssef, N., Marchi, A., Bartolomei, F., Bonini, F., Lambert, I. (2023). Sleep and epilepsy: A clinical and pathophysiological overview. *Rev. Neurol.* (Paris), **179** (7), 687–702.

Giorelli, A. S., Neves, G. S., Venturi, M, Pontes, I. M., Valois, A., Gomes, M. (2011). Excessive daytime sleepiness in patients with epilepsy: A subjective evaluation. *Epilepsy Behav.*, **21** (4), 449–452.

Giuliano, L., Mainieri, G., Cicero, C E., Battaglia, G., Guccione, A., Salomone, S., Drago, F., Nicoletti, A., Sofia, V., Zappia, M. (2020). Parasomnias, sleep-related movement disorders and physiological sleep variants in focal epilepsy: A polysomnographic study. *Seizure*, **81**, 84–90.

Gumusyayla, S., Erdal, A., Tezer, F. I., Saygi, S. (2016). The temporal relation between seizure onset and arousal-awakening in temporal lobe seizures. *Seizure*, **39**, 24–27.

Gutter, T., Callenbach, P. M. C., Brouwer, O. F., de Weerd, A. W. (2019). Prevalence of sleep disturbances in people with epilepsy and the impact on quality of life: A survey in secondary care. *Seizure*, **69**, 298–303.

Hu, P., Li, K., Han, Y., Wang, X., Xiao, Z. (2025). Anxiety and depression symptoms mediate the impact of neuroticism on insomnia in adults with epilepsy: A cross-sectional study. *BMC Neurol.*, **25** (1), 312.

Ismayilova, V., Demir, A. U., Tezer, F. I. (2015). Subjective sleep disturbance in epilepsy patients at an outpatient clinic: A questionnaire-based study on prevalence. *Epilepsy Res.*, **115**, 119–125.

Jain, S. V., Glauser, T. A. (2014). Effects of epilepsy treatments on sleep architecture and daytime sleepiness: An evidence-based review of objective sleep metrics. *Epilepsia*, **55** (1), 26–37.

Johns, M. W. (1991). A new method for measuring daytime sleepiness: The Epworth sleepiness scale. *Sleep*, **14** (6), 540–545.

Khachatryan, S. G., Ghahramanyan, L., Tavadyan, Z., Yeghiazaryan, N., Attarian, H. P. (2020). Sleep-related movement disorders in a population of patients with epilepsy: Prevalence and impact of restless legs syndrome and sleep bruxism. *J. Clin. Sleep. Med.*, **16** (3), 409–414.

Kokkinos, V., Koupparis, A. M., Koutroumanidis, M., Kostopoulos, G. K. (2022). Editorial: Brain mechanisms linking sleep and epilepsy. *Front Hum. Neurosci.*, **16**, 922372.

Krutoshinskaya, Y., Coulehan, K., Pushchinska, G., Spiegel, R. (2024). The reciprocal relationship between sleep and epilepsy. *J. Pers. Med.*, **14** (1), 118.

Kwan, P., Arzimanoglou, A., Berg, A. T., Brodie, M. J., Allen Hauser, W., Mathern, G., Moshé, S. L., Perucca, E., Wiebe, S., French, J. (2010). Definition of drug resistant epilepsy: Consensus proposal by the ad hoc Task Force of the ILAE Commission on Therapeutic Strategies. *Epilepsia*, **51** (6), 1069–1077.

Lagger, I., Garino, E., Martinez, O., Knorre, E., Ernst, G., Burgueño, A. L. (2023). Risk factors for drug-resistant epilepsy in adult patients. *Med. Clin.* (Barc.), **160** (12), 547–550.

Lee, S. A., No, Y. J., Jo, K. D., Kwon, J. H., Kim, J. Y., Shin, D. J. (2019). Factors contributing to excessive daytime sleepiness in Korean adults with epilepsy: A sleep questionnaire-based study. *Epilepsy Behav.*, **90**, 61–65.

Lehner, J., Frueh, J. S., Datta, A. N. (2022). Sleep quality and architecture in idiopathic generalized epilepsy: A systematic review and meta-analysis. *Sleep Med. Rev.*, **65**, 101689.

Leschziner, G., Bruno, E., Arlandis, M. T. (2025). Assessing sleep disturbance and daytime sleepiness in people with epilepsy: A United Kingdom survey of four categories of healthcare professional. *Epilepsy Behav.*, **170**, 110483.

Macêdo, P. J. O. M., Oliveira, P. S., Foldvary-Schaefer, N., Gomes, M. D. M. (2017). Insomnia in people with epilepsy: A review of insomnia prevalence, risk factors and associations with epilepsy-related factors. *Epilepsy Res.*, **135**, 158–167.

Magana-Tellez, O., Maganti, R., Hupp, N. J., Luo, X., Rani, S., Hampson, J. P., Ochoa-Urrea, M., Tallavajhula, S. S., Sainju, R. K., Friedman, D, *et al.* (2025). Sleep EEG and respiratory biomarkers of sudden unexpected death in epilepsy (SUDEP): A case-control study. *Lancet Neurol.*, **24** (10), 840–849.

Malow, B. A., Passaro, E., Milling, C., Minecan, D. N., Levy, K. (2002). Sleep deprivation does not affect seizure frequency during inpatient video-EEG monitoring. *Neurology*, **59**, 1371–1374.

Mula, M., Trimble, M. R. (2009). Antiepileptic drug-induced cognitive adverse effects: Potential mechanisms and contributing factors. *CNS Drugs*, **23** (2), 121–137.

Munger Clary, H. M. (2014). Anxiety and epilepsy: What neurologists and epileptologists should know. *Curr. Neurol. Neurosci. Rep.*, **14** (5), 445.

Ng, M. C. (2017). Orexin and epilepsy: Potential role of REM sleep. *Sleep*, **40** (3), doi: 10.1093/sleep/zsw061.

Nobili, L., Frauscher, B., Eriksson, S., Gibbs, S. A., Halasz, P., Lambert, I., *et al*. (2022). Sleep and epilepsy: A snapshot of knowledge and future research lines. *J. Sleep Res.*, **31** (4), e13622.

Norton, S. E., Hunt, C., Lah, S. (2023). Fear of sleep in people with epilepsy. *Epilepsy Res.*, **192**, 107124.

Okajima, I., Miyamoto, T., Ubara, A., Omichi, C., Matsuda, A., Sumi, Y., Matsuo, M., Ito, K., Kadotani, H. (2020). Evaluation of severity levels of the Athens Insomnia Scale based on the criterion of Insomnia Severity Index. *Int. J. Environ. Res. Public Health*, **17** (23), 8789.

Pereira, A. M., Bruni, O., Ferri, R., Palmini, A., Nunes, M. L. (2012). The impact of epilepsy on sleep architecture during childhood. *Epilepsia*, **53** (9), 1519–1525.

Planas-Ballvé, A., Grau-López, L., Jiménez, M., Ciurans, J., Fumanal, A., Becerra, J. L. (2022). Insomnia and poor sleep quality are associated with poor seizure control in patients with epilepsy. *Neurologia* (Engl. Ed.), **37** (8), 639–646.

Sadak, U., Honrath, P., Ermis, U., Heckelmann, J., Meyer, T., Weber, Y., Wolking, S. (2022). Reduced REM sleep: A potential biomarker for epilepsy: A retrospective case-control study. *Seizure*, **98**, 27–33.

Samsonsen, C., Sand, T., Bråthen, G., Helde, G., Brodtkorb, E. (2016). The impact of sleep loss on the facilitation of seizures: A prospective case-crossover study. *Epilepsy Res.*, **127**, 260–266.

Sap-Anan, N., Pascoe, M., Wang, L., Grigg-Damberger, M. M., Andrews, N. D., Foldvary-Schaefer, N. (2021). The Epworth Sleepiness Scale in epilepsy: Internal consistency and disease-related associations. *Epilepsy Behav.*, **121** (Pt A), 108099.

Shouse, M. N., Farber, P. R., Staba, R. J. (2000). Physiological basis: How NREM sleep components can promote and REM sleep components can suppress seizure discharge propagation. *Clin. Neurophysiol.*, **111** (Suppl 2), S9–S18.

Soldatos, C. R., Dikeos, D. G, Paparrigopoulos, T. J. (2003). The diagnostic validity of the Athens Insomnia Scale. *J. Psychosom. Res.*, **55** (3), 263–267.

Somboon, T., Pascoe, M., Eippert, M., Bruton, M., Wang, L., Bena, J., Foldvary-Schaefer, M. (2019). Insomnia in epilepsy: Association between insomnia symptom severity and disease-related characteristics. *Neurology*, P3.6–026.

Spitzer, R. L., Kroenke, K., Williams, J. B., Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch. Intern. Med.*, **166** (10), 1092–1097.

Tan, B., Liu, Q., Qin, Y., Chen, Q., Chen, R., Jin, Y., Li, M. (2024). Insomnia in epilepsy is associated with nocturnal seizures and anxiety. *Epilepsy Behav.*, **150**, 109559.

van Straten, A., Weinreich, K. J., Fábián, B., Reesen, J., Grigori, S., Luik, A. I., Harrer, M., Lancee, J. (2025). The prevalence of insomnia disorder in the general population: A meta-analysis. *J Sleep Res.*, **34** (5), e70089.

Vaughn, B. V., Ali, I. (2012). Sleep and epilepsy: Opportunities for diagnosis and treatment. *Neurol Clin.*, **30** (4), 1249–1274.

Vendrame, M., Yang, B., Jackson, S., Auerbach, S. H. (2013). Insomnia and epilepsy: A questionnaire-based study. *J. Clin. Sleep Med.*, **9** (2), 141–146.

Xu, Y., Hackett, M. L., Nikpour, A., Somerville, E., Bleasel, A., Ireland, C., Ghougassian, D. F., Anderson, C. S., Glozier, N. (2020). Course and impact of sleep disturbance in newly diagnosed epilepsy: A prospective registry study. *Clin. Neurol. Neurosurg.*, **195**, 105963.

Yang, K. I., Grigg-Damberger, M., Andrews, N., O'Rourke, C., Bena, J., Foldvary-Schaefer, N. (2016). Severity of self-reported insomnia in adults with epilepsy is related to comorbid medical disorders and depressive symptoms. *Epilepsy Behav.*, **60**, 27–32.

Zanzmera, P., Shukla, G., Gupta, A., Singh, H., Goyal, V., Srivastava, A., Behari, M. (2012). Markedly disturbed sleep in medically refractory compared to controlled epilepsy: A clinical and polysomnography study. *Seizure*, **21** (7), 487–490.

Received 10 February 2026
Accepted in the final form 24 February 2026

BEZMIEGU UN PĀRMĒRĪGU DIENAS MIEGAINĪBU IETEKMĒJOŠIE FAKTORI PACIENTIEM AR EPILEPSIJU

Šī pētījuma mērķis bija noteikt miega traucējumu izplatību epilepsijas pacientu vidū un noteikt, vai trauksme un epilepsijas raksturlielumi ietekmē miega traucējumus. Šķērsgriezuma pētījumā piedalījās 46 pieauguši epilepsijas pacienti (vecumā no 21 līdz 73 gadiem). Pašnovērtēti subjektīvi miega traucējumi (SSD) bija 72,0% pacientu. Saskaņā ar Atēnu bezmiega skalu (AIS), bezmiegs tika konstatēts 76,1% pacientu ar epilepsiju. Ar Epvorta miegainības skalu (ESS) pārmērīga dienas miegainība (EDS) tika konstatēta 32,6% pacientu. GAD-7 skala atklāja trauksmes simptomus 65,2% pacientu. Tika konstatēta saistība starp vidēji smagu vai smagu bezmiegu un epilepsijas veidu (p = 0,038). Vidēji smags vai smags bezmiegs tika identificēts 31% respondentu ar fokālo epilepsiju, salīdzinot ar 66,7% pacientu ģeneralizētas epilepsijas grupā un 75,0% nezināma tipa epilepsijas grupā, kas norāda uz vieglāku bezmiegu fokālās epilepsijas gadījumā. Pacientiem ar lēkmju biežumu vairāk nekā vienu reizi gadā SSD bija biežāki nekā pacientiem ar lēkmēm retāk nekā vienu reizi gadā (p = 0,001). Tika konstatēta korelācija starp GAD-7 un EES skalas rādītājiem, r = 0,478, p < 0,001. To pacientu īpatsvars, kuri paši ziņoja par miega traucējumiem (72,0%), bija tuvs AIS skalas noteiktā bezmiega biežumam (76,1%) (p = 0,81), kas liecina, ka pašnovērtējumam par miega traucējumiem epilepsijas populācijā ir augsta diagnostiskā vērtība. Tika konstatēts, ka bezmiega smaguma pakāpe pacientiem ar dažādiem epilepsijas veidiem atšķiras.