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Sleep Disorders in Patients with Epilepsy

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ABSTRACT

Introduction: This study aims to investigate obstructive sleep apnoea syndrome (OSAS), quality of sleep, excessive daytime sleepiness (EDS) and quality of life in patients with epilepsy.

Methods: One hundred and eleven epilepsy patients, diagnosed with ILAE (international league against epilepsy) criteria, were included in this study. The mean age of the patients was 37.6 ±13.1 (19-77) years. Fifty-four of the patients were (48.6%) men and 57 were (51.5%) women. Age, gender, education level, body mass index, seizure frequency, types of seizures, electroencephalography (EEG) findings, seizures during sleep, and number of anti-seizure drugs were recorded. Berlin Questionnaire (BQ) was used to screen OSAS. Sleep and quality of life were assessed with Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS) and Quality of Life in Epilepsy-31(QOLIE-31) scales.

Results: Thirty-six percent of the patients' quality of sleep was poor and 20.7% had mild EDS. Low risk of OUAS was found in 89.2% of the patients. Quality of life was poor according to QOLIE-31. QOLIE 31 and PSQI total score had a statistically significant low negative correlation with BQ. PSQI total score had a statistically significant, low negative correlation with QOLIE-31. Poor sleep quality, EDS, OUAS and quality of life showed no correlation with demographic features, duration of disease, types of seizures, seizure frequency, number of anti-seizure drugs.

Conclusion: The poor quality of sleep was 36% in our study. Poor quality of sleep, excessive daytime sleepiness and obstructive sleep apnoea syndrome had no correlation with the demographic and clinical features of the patients with epilepsy but showed low correlation with quality of life.

Keywords: Disorders of excessive somnolence; epilepsy; quality of life; obstructive sleep apnoea

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INTRODUCTION

Epilepsy is a chronic neurological disease. Sleep disorders can be seen together with epilepsy and can affect the quality of life. It has been shown that the prevalence of sleep disorders in epilepsy is higher than general population. The prevalence of sleep disorders in the general population is between 25-27% (1,2). In patients with epilepsy, it has been reported that sleep disorders may exceed 30% (1-7). Studies have shown that approximately 50% of active epilepsy patients have at least one comorbidity accompanying epilepsy (8). Our aim in this study is to investigate the relationship between sleep quality, excessive daytime sleepiness, sleep apnoea syndrome and quality of life in epilepsy patients.

Highlights

- **Sleep disturbances are common in patients with epilepsy.**
- **Sleep disturbances may contribute to a reduced quality of life in individuals with epilepsy.**
- **There was no correlation between sleep disorders and clinical and socio-demographical variations.**

METHOD

Among the patients who applied to our epilepsy clinic between the years 2020-2021, we included 111 patients in our study, aged over 18, were who diagnosed with epilepsy according to ILAE (International League Against Epilepsy) criteria.

Patients meeting the exclusion criteria listed below were not included in the study.

Excluding criteria;

- Chronic disease other than epilepsy
- History of sleep disorder and/or psychiatric disease and treatment
- Neurodegenerative disorder
- Shift work
- Mental retardation
- Chronic medication except anti-seizure medication

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Participants were prospectively evaluated in terms of sleep habits and disorders, sleep apnea syndrome, and quality of life. Informed consent was obtained from each participant.

The data obtained from the participants were evaluated as demographic characteristics, body mass index, duration of epilepsy, frequency of seizures, type of seizures, EEG findings and the treatment they received (monotherapy or polytherapy).

All participants received Pittsburgh sleep quality test (PSQI), Epworth sleepiness scale (ESS), Berlin questionnaire (BA), quality of life in epilepsy-31(QOLIE -31) inventory.

Turkish validity and reliability study of Pittsburgh sleep quality test (PSQI) was conducted by Ağargün et al. (1996) (9). The scale consists of seven component items (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficacy, sleep disturbances, use of sleep medication, and daytime dysfunction over the last month) and each component is scored from 0 to 3. Summed score ranges between 0-21, with higher scores reflecting poorer sleep quality.

Epworth Sleepiness Scale (ESS) is a questionnaire consists of 8 self-rated items, each scored from 0 to 3, that measure a subject's habitual "likelihood of dozing or falling asleep" in common situations of daily living. The final score is the sum of individual items (scores 0–24). Values > 10 are considered excessive daytime sleepiness and values > 15 are considered severe sleepiness. Turkish validity and reliability were conducted by İzci et al (10).

Quality of life in Epilepsy-31 includes questions about patient health and daily activities with numeric values (1-100) assigned to responses; higher scores indicate better QoL. The QOLIE-31 includes 7 subscales: Seizure Worry (5 questions), Overall QoL (2 questions), Emotional Well-Being (5 questions), Energy/Fatigue (4 questions), Cognitive Functioning (6 questions), Medication Effects (3 questions), and Social Functioning (5 questions). Turkish validity and reliability were conducted by Mollaoğlu et al. and mean score was found 56 in the study (11).

Berlin Questionnaire (BQ) was designed to identify individuals at high risk for obstructive sleep apnoea syndrome (OSAS). It has 10 questions organised into three categories. It incorporates questions snoring behaviour, wake-time sleepiness or fatigue, and the presence of obesity or hypertension. It shows high risk for sleep apnea if there are 2 or more categories where the score is positive. Turkish validity and reliability was conducted by Yüceege et al (12).

Statistical Analysis

Among the evaluated parameters, the alpha significance level was calculated as 0.05 and the sample size was calculated as 111 at 95% Power, with the predicted statistically significant correlation of the medium effect size (Effect Size=0.3).

SPSS 15.0 for Windows program was used for statistical analysis. Descriptive statistics; Number and percentage were given for categorical variables, mean, standard deviation, minimum, maximum, median for numerical variables. The ratios in the groups were compared with the Chi-Square test. Since the numerical variables did not meet the normal distribution condition, independent group comparisons were made with the Whitney U test and more than two group comparisons were made with the Kruskal Wallis test. In more than two groups, subgroup analyses were performed with Mann Whitney U test and interpreted with Bonferroni correction. The relationships between numerical variables were examined by Spearman Correlation Analysis since the parametric test condition was not met. Alpha significance level was accepted as $p<0.05$.

RESULTS

Of the 111 patients, 57 (%51.4) were women. The mean age was 37.6 ±13.1. Patients experienced epilepsy for a mean (SD) of 17.5±11.6 (2-50) years. Thirty six percent of patients experienced focal seizures and the remaining majority (64%) had generalised seizures. Monotherapy ratio was 55.9% and polytherapy was 44.1%. Nearly forty percent of patients reported experiencing seizures less than one a month, %22.5 of patients reported at least one seizure a month and the rest of the patients were seizure free for at least 2 years. The patients ratio who experienced seizure during sleep was nearly 37%; over half of the patients (63.1%) never experienced seizure during sleep. The sociodemographic and clinical characteristics of the sample are provided in Table 1. The mean results of scales and measures are listed in the Table 2.

Poor sleep quality was observed in 36% of the patients, and mild excessive daytime sleepiness was observed in 20.7% of the patients. In the Berlin Questionnaire, 89.2% of the patients were found to be low-risk for OSAS.

In the comparison of scales; a negative and weak correlation was found to be statistically significant between the OSAS risk and QOLIE-31 values, P1 subjective sleep quality, P2 sleep latency, P3 sleep duration, P7 daytime functions, PSQI sum results. There was no statistically significant relationship between the QOLIE-31 scale and the ESS. Also, no statistically significant correlation between the PSQI total score and the Berlin questionnaire was found (Table 3).

A weak statistically significant correlation was found between the Berlin questionnaire and BMI in the positive direction ($p<0.001$) (Table 4).

There was no statistically significant difference in all scales compared with the education level and disease duration (Table 4).

There was no significant difference between those who experienced seizures during sleep and those who did not (Table 5).

All patients showed no comparable difference between gender, education, seizure frequency, seizure type, treatment type and sleep quality, OSAS and ESS in the subgroup analysis (Table 6).

DISCUSSION

In this study, we aimed to investigate the effects of sleep disorders observed in epilepsy patients on the demographic structure, epilepsy clinic and quality of life of the patients. Poor sleep quality was found in 36% and mild EDS in 20.7%. These rates are high compared to the general population (1,2). The mean score of QOLIE-31 was found to be 38.62±5.26 (12-51) in our patients. This value is low compared to the general population. In the study conducted by Nazafarin Hosseini et al. (4) in 2016, it was stated that the quality of life in epilepsy depends on multiple causes. It has been stated that epilepsy is a social stigma other than a clinical diagnosis, and at the same time, the quality of life may decrease due to side effects in patients who are exposed to multiple antiseizure drugs for a long time, and non-compliance with the drug may cause a decrease in the quality of life by impairing seizure control. In their study, QOLIE-89 was applied to 56 patients and the patients were taken to motivational interviews by a trained nurse. QOLIE-89 results were found to be higher in patients who received motivational interviews. The quality of life in epilepsy patients can vary for many reasons. In our study, it was determined that age, gender, education, disease duration, seizure frequency, seizure type, number of antiseizure drugs, and presence of seizures during sleep did not affect the quality of life. The QOLIE-31 results were found to be weakly affected by poor sleep quality and OSAS. There was no interaction with the ESS.

Table 1. The sociodemographic and clinical characteristics of patients

		n	%
Gender n (%)	Male	54	48.6
	Female	57	51.4
Age Mean ± SD (Min-Max)		37.6±13.1 (19-77)	
Education n (%)	Okuma yok	3	2.7
	Okur-yazar	2	1.8
	İlköğretim	63	56.8
	Lise	27	24.3
	Üniversite	16	14.4
Length mean ± SD (Min-Max)		167.2±9.8 (150-195)	
Weight mean ± SD (Min-Max)		71.7±14.9 (45-120)	
BMI mean ± SD (Min-Max)		25.7±5.1 (15-49.95)	
Seizure frequency n (%)	Less than 12 in a year:	41	36.9
	More than 12 in a year	25	22.5
	Seizure free for at least 2 years	45	40.5
Seizure Type n (%)	Focal	40	36.0
	Generalized	71	64.0
Duration of Epilepsy Mean ± SD (Min-Max) / yr		17.5±11.6 (2-50)	
Seizure during sleep	Yes	41	36.9
	No	70	63.1
MRI	Normal	67	60.4
	Pathological findings	44	39.6
EEG	Normal	20	18.0
	Interictal epileptiform features or delta activity	91	82.0
	Focal discharge	48	43.2
	Focal Slowing	16	14.4
	Generalized epileptiform discharge	25	22.5
	Generalized continuous slow-ing	2	1.8
Treatment	Monotherapy	62	55.9
	Polytherapy	49	44.1

BMI: Body Mass Index

Table 2. The mean results of scales and measures

P1 overall sleep quality Mean ± SD (Min-Max)		1.09±0.93 (0-3)	
P2 sleep latency Mean ± SD (Min-Max)		1.15±1.09 (0-3)	
P3 sleep duration Mean ± SD (Min-Max)		0.43±0.72 (0-3)	
P4 sleep efficiency Mean ± SD (Min-Max)		0.25±0.61 (0-3)	
P5 sleep disturbance Mean ± SD (Min-Max)		0.65±0.68 (0-3)	
P6 sleep medication use Mean ± SD (Min-Max))		0.18±0.68 (0-3)	
P7 daytime functions Mean ± SD (Min-Max)		0.21±0.57 (0-3)	
PSQI Mean ± SD (Min-Max)		3.94±3.20 (0-15)	
PSQI n (%)	<5	71	64.0
	≥5 (Kötü Uyku Kalitesi)	40	36.0
Epworth Sleepiness Scale (ESS) Mean ± SD (Min-Max)		3.84±4.54 (0-24)	
Epworth Sleepiness Scale (ESS) n (%)	0-5 Lower Normal Daytime Sleepiness	80	72.1
	6-10 Higher Normal Daytime Sleepiness	23	20.7
	13-15 Mild Excessive Daytime Sleepiness	4	3.6
	16-24 Severe Excessive Daytime Sleepiness	4	3.6
Berlin Questionnaire (BQ) Mean ± SD (Min-Max)		1.11±0.31 (1-2)	
Berlin Questionnaire n (%)	≥2 High risk	12	10.8
	≥1 Low risk	99	89.2
QOLIE-31 Ort ± SD (Min-Maks)		38.62±5.26 (12-51)	

PSQI: Pittsburgh Sleep Quality Index, QOLIE-31: Quality of life in Epilepsy-31, ESS: Epworth Sleepiness Scale, BQ: Berlin Questionnaire

In the study of Piperidou et al. in 2008 (7), the effects of sleep disorders on quality of life were investigated. They reported that ESS (16.9%) and OSAS (28.2%) were common in epilepsy patients, while insomnia was detected in 24.6%. They found that insomnia lowered quality of life scores and was also associated with seizure frequency. Similar to our study, they found that ESS was not associated with demographic and clinical findings.

In our study, the mean PSQI test was 3.94±3.20 (0-15). Those with a PSQI value above 5 were found to be 36%. Total sleep duration was not low in these patients (Table 3). The total value of PSQI was not related to ESS and OSAS. Staniszewska et al. in 2017(2) showed that the PSQI value of 302 patients ((9±2 (4-16)) tend to be high. They found that sleep quality was low,. However, similar to our study, this low quality was not related to demographic and clinical findings. Insomnia has been reported to be common in patients with temporal lobe epilepsy in that study.

Table 3. Comparison of the scales and the measures

		P2 sleep latency	P3 Sleep duration	P4 sleep efficiency	P5 sleep disturbance	P6 sleep medication use	P7 daytime functions	PSQI	ESS	BQ	QOLIE-31
P1 overall sleep quality	r	0.501	0.310	0.393	0.196	0.277	0.114	0.754	-0.030	0.136	-0.274
	p	<0.001	0.001	<0.001	0.039	0.003	0.235	<0.001	0.756	0.154	0.004
P2 sleep latency	r		0.280	0.445	0.344	0.152	0.075	0.808	-0.037	0.077	-0.236
			0.003	<0.001	<0.001	0.110	0.431	<0.001	0.698	0.424	0.013
P3 sleep duration	r			0.189	0.035	0.133	-0.006	0.449	-0.066	0.028	-0.202
	p			0.047	0.714	0.164	0.954	<0.001	0.489	0.770	0.033
P4 sleep efficiency	r				0.116	-0.022	-0.121	0.459	-0.037	0.217	-0.065
	p				0.226	0.816	0.206	<0.001	0.696	0.022	0.500
P5 sleep disturbance	r					-0.011	0.315	0.531	0.232	-0.075	-0.187
	p					0.907	0.001	<0.001	0.014	0.433	0.050
P6 sleep medication use	r						0.201	0.322	0.047	0.018	-0.068
	p						0.034	0.001	0.628	0.850	0.478
P7 daytime functions	r							0.326	0.178	0.015	-0.243
	p							<0.001	0.062	0.877	0.010
PSQI	r								0.093	0.120	-0.353
	p								0.334	0.208	<0.001
ESS	r									-0.040	-0.175
	p									0.674	0.067
BQ	r										-0.266
											0.005

PSQI: Pittsburgh Sleep Quality Index, QOLIE-31: Quality of life in Epilepsy-31, ESS: Epworth Sleepiness Scale, BQ: Berlin Questionnaire

Table 4. Comparison of education level, age, BMI, duration of epilepsy with scales

		Age	Education	BMI	DE
P1 overall sleep quality	r	0.088	-0.012	-0.032	0.040
	p	0.360	0.902	0.741	0.678
P2 sleep latency	r	-0.031	-0.061	-0.029	-0.023
	p	0.745	0.526	0.760	0.808
P3 sleep duration	r	0.002	0.023	0.072	-0.037
	p	0.983	0.813	0.455	0.700
P4 sleep efficiency	r	-0.022	0.019	0.054	0.066
	p	0.815	0.846	0.571	0.494
P5 sleep disturbance	r	-0.024	-0.020	0.009	0.018
	p	0.804	0.835	0.924	0.855
P6 sleep medication use	r	0.069	-0.032	-0.072	-0.044
	p	0.470	0.742	0.453	0.646
P7 daytime functions	r	-0.148	0.114	-0.108	-0.013
	p	0.122	0.233	0.259	0.889
PSQI	r	-0.002	-0.006	0.024	-0.006
	p	0.984	0.950	0.806	0.954
ESS	r	-0.112	0.089	0.048	-0.012
	p	0.244	0.355	0.615	0.903
QOLIE-31	r	0.123	0.074	-0.096	-0.099
	p	0.197	0.438	0.317	0.300
BQ	r	0.103	-0.129	0.338	0.044
		0.281	0.179	<0.001	0.650

PSQI: Pittsburgh Sleep Quality Index, QOLIE-31: Quality of life in Epilepsy-31, ESS: Epworth Sleepiness Scale, BQ: Berlin Questionnaire, DE: Duration of Epilepsy, BMI: Body Mass Index

Table 5. Comparison of scales between those with and without seizures during sleep

	SDS	Mean	SD	Min	Max	Median	p
P1 overall sleep quality	Yes	1.10	1.02	0	3	1	0.954
	No	1.09	0.88	0	3	1	
P2 sleep latency	Yes	1.22	1.06	0	3	1	0.544
	No	1.11	1.11	0	3	1	
P3 sleep duration	Yes	0.51	0.78	0	3	0	0.311
	No	0.39	0.69	0	3	0	
P4 sleep efficiency	Yes	0.12	0.33	0	1	0	0.178
	No	0.33	0.72	0	3	0	
P5 sleep disturbance	Yes	0.68	0.69	0	2	1	0.648
	No	0.63	0.68	0	3	1	
P6 sleep medication use	Yes	0.29	0.84	0	3	0	0.125
	No	0.11	0.55	0	3	0	
P7 daytime functions	Yes	0.29	0.68	0	3	0	0.231
	No	0.16	0.50	0	3	0	
PSQI	Yes	4.12	3.16	0	13	3	0.536
	No	3.83	3.24	0	15	3	
ESS	Yes	4.05	4.84	0	21	3	0.708
	No	3.71	4.39	0	24	2	
QOLIE-31	Yes	37.68	5.40	12	50	38	0.193
	No	39.17	5.13	28	51	39	
BQ	Yes	1.07	0.26	1	2	1	0.366
	No	1.13	0.34	1	2	1	

PSQI: Pittsburgh Sleep Quality Index, QOLIE-31: Quality of life in Epilepsy-31, ESS: Epworth Sleepiness Scale, BQ: Berlin Questionnaire, SDS: Seizure During Sleep

Table 6. Evaluation of scales in subgroups

		PSQI				
		<5		≤5 Poor sleep quality		
		n	%	N	%	p
Gender	Male	35	64.8%	19	35.2%	0.856
	Female	36	63.2%	21	36.8%	
Education	Literate or illiterate	3	60.0%	2	40.0%	
	Primary school	42	66.7%	21	33.3%	
	High School	13	48.1%	14	51.9%	
	University	13	81.3%	3	18.8%	
Seizure frequency	Less than 12 in a year:	28	68.3%	13	31.7%	0.599
	More than 12 in a year	14	56.0%	11	44.0%	
	Seizure free for at least 2 years	29	64.4%	16	35.6%	
Seizure type	Focal	21	52.5%	19	47.5%	0.059
	Generalized	50	70.4%	21	29.6%	
Treatment	Monotherapy	41	66.1%	21	33.9%	0.593
	Polytherapy	30	61.2%	19	38.8%	

		ESS								
		0-5 LNDS		6-10 HNDS		13-15 MEDS		16-24 SEDS		
		n	%	n	%	n	%	n	%	p
Gender	Male	41	75.9%	9	16.7%	2	3.7%	2	3.7%	0.795
	Female	39	68.4%	14	24.6%	2	3.5%	2	3.5%	
Education	Literate or illit-erate	5	100%	0	.0%	0	.0%	0	.0%	0.926
	Primary school	46	73.0%	12	19.0%	2	3.2%	3	4.8%	
	High School	18	66.7%	7	25.9%	1	3.7%	1	3.7%	
	University	11	68.8%	4	25.0%	1	6.3%	0	.0%	
Seizure frequency	Less than 12 in a year:	31	75.6%	7	17.1%	2	4.9%	1	2.4%	0.420
	More than 12 in a year	20	80.0%	3	12.0%	0	0.0%	2	8.0%	
	Seizure free for at least 2 years	29	64.4%	13	28.9%	2	4.4%	1	2.2%	
Seizure type	Focal	31	77.5%	6	15.0%	0	0.0%	3	7.5%	0.092
	Generalized	49	69.0%	17	23.9%	4	5.6%	1	1.4%	
Treatment	Monotherapy	43	69.4%	15	24.2%	2	3.2%	2	3.2%	0.762
	Polytherapy	37	75.5%	8	16.3%	2	4.1%	2	4.1%	

Table 6. *Continued.*

		BQ				
		≥2 High risk		≤1 Low risk		
		n	%	n	%	p
Gender	Male	3	5.6%	51	94.4%	0.083
	Female	9	15.8%	48	84.2%	
Education	Literate or illit-erate	1	20.0%	4	80.0%	0.361
	Primary school	8	12.7%	55	87.3%	
	High School	3	11.1%	24	88.9%	
	University	0	.0%	16	100.0%	
Seizure frequency	Less than 12 in a year:	3	7.3%	38	92.7%	0.468
	More than 12 in a year	2	8.0%	23	92.0%	
	Seizure free for at least 2 years	7	15.6%	38	84.4%	
Seizure type	Focal	5	12.5%	35	87.5%	0.753
	Generalize	7	9.9%	64	90.1%	
Treatment	Monotherapy	9	14.5%	53	85.5%	0.157
	Polytherapy	3	6.1%	46	93.9%	

PSQI: Pittsburgh Sleep Quality Index; QOLIE-31: Quality of life in Epilepsy-31; ESS: Epworth Sleepiness Scale; BQ: Berlin Questionnaire; LNDS: Lower Normal Daytime Sleepiness; HNDS: Higher Normal Daytime Sleepiness; MEDS: Mild Excessive Daytime Sleepiness; SEDS: Severe Excessive Daytime Sleepiness

In their study in 2019 (3), Çilliler et al. found poor sleep quality ratio 46%, depression ratio 74%, and EDS ratio 24%. Unlike our study, they found that poor sleep quality was associated with seizure frequency, fatigue and EDS.

In our study, we found that poor sleep quality, OSAS, EDS and quality of life tests did not have a statistically significant relationship with the demographic characteristics of the patients: seizure type, seizure frequency, number of antiseizure drugs, duration of disease, and presence of seizures during sleep. In the study conducted by Ismailova et al. (5) in 2018, it was found that insomnia, OSAS, parasomnia were more common in those with sleep seizures, and OSAS was positively related to the number of antiseizure drugs and the duration of epilepsy. In our study, in the Berlin questionnaire, OSAS risk was found to be high in 10.8% of our patients and low risk in 89.2% of our patients. In our patients at high risk for OSAS, there was no relationship between seizure frequency, seizure type, and number of antiseizure drugs. Im et al. (1) in 2016, found sleep disorders to be higher (53.3%) than the control group. In the same study, while the decrease in seizures in the last year reduced insomnia, there was no relationship with age, gender, epilepsy type and number of antiseizure drugs. They found that the rate of poor sleep quality, EDS, insomnia was significantly higher in epilepsy patients than in the control group. Planas Ballve et al. (13) in 2023, found the total score of the poor sleep quality test (PSQI) to be 5.36±3.86. They found that seizures were linked to poor sleep quality, multiple drug use, and insomnia. In the same study, it was found that sleep latency was prolonged and total sleep duration decreased in PSQI subgroups. In our study, we found that sleep latency was prolonged in patients with poor sleep quality in the PSQI subgroup, but total sleep duration was normal and daytime dysfunction was low. We found a significant decrease in the quality of life of patients with poor sleep quality. In the polysomnography study conducted by Yang et al., a relationship was found between insomnia and seizure frequency (14), while in the study of Vendrame et al., no relationship was found between insomnia and seizure control (15). On the contrary, sleep deprivation is known to trigger seizures, especially when waking up. Although the underlying mechanism is not fully understood, findings supporting insomnia increasing neuronal hyperexcitability have been suggested (16). There are studies reporting that OSAS is more common in epilepsy than in the general population (17,18). The fact that there are different results in the studies suggests that there is variability in the evaluated criteria.

Our study has some limitations such as being cross-sectional and having a small sample size. The fact that polysomnography was not performed does not make the most objective evaluation possible. In addition, although the number of antiseizure drugs has been used in comparisons, the dose and individual effects of the drugs have not been investigated.

As a result, in our study, sleep quality impairment was found to be high in epilepsy. We showed that poor sleep quality, daytime sleepiness and sleep apnoea syndrome were not associated with the epilepsy clinic and the demographic structure of patients with epilepsy, but showed a weak relationship with quality of life. Clinicians should take into account that the quality of sleep is more impaired and the quality of life is lower in epilepsy patients compared to the general population.

Ethics approval: The study was carried out according to the ethical principles of the Declaration of Helsinki. Our study was approved by Health Sciences University Haseki Training and Research Hospital Ethics Committee (Date: 08.04.2021/115).

Informed Consent: Written informed consent was obtained from all participants.

Peer Review: External Independent.

Author contributions: Concept: AM. Design: AM. Audit: SG, BPB. Materials: AM, BPB; Resources: AM,BPB. Data collection and/or processing: AM, BPB ABSB. Analysis and/or comment: AM, BPB, SG. Literature review: AM. Writing of manuscript: AM, BPP, SG, ABSB. Review and approval of manuscript: AM, BPB, SG.

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