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Risk of Malnutrition and Psychiatric Comorbidity in Adults with Epilepsy: A Cross- sectional Study

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Abstract

Background and purpose

Epilepsy is a chronic neurological condition that is frequently associated with psychiatric and nutritional comorbidities, which can adversely affect clinical outcomes and quality of life. Whilst studies have shown that the risk of malnutrition is common in patients with epilepsy and that psychiatric comorbidities are also increased, this study aimed to assess the risk of malnutrition in adults with epilepsy and its association with the burden of depression and anxiety.

Methods

This single-centre, cross-sectional analytical study included 360 patients with epilepsy who presented to the Adult Neurology Outpatient Clinic Faculty of Medicine between 1 August 2024 and 31 December 2024. The NRS-2002 was administered to all patients, with the MNA administered additionally to patients aged 65 and over. Depression was assessed using the Hamilton Depression Rating Scale, whilst anxiety was assessed using the Hamilton Anxiety Rating Scale. The Mann-Whitney U, Kruskal-Wallis, chi-square/Fisher's exact and Spearman's rho tests were used in the statistical analyses. Independent factors associated with the risk of malnutrition were assessed using multivariate binary logistic regression analysis. A two-tailed p-value of < 0.05 was considered statistically significant.

Results

The mean age of the patients was 34.63 ± 13.36 years, and 50.6 per cent of the cases were male. The mean NRS-2002 score was 0.74 ± 1.44 and the risk of malnutrition was found to be 16.9 per cent. According to the MNA results for the 15 patients aged 65 and over, 2 were malnourished and 1 was at risk of malnutrition. The mean HDRS score was 6.23 ± 7.57, and the mean HARS score was 5.83 ± 7.27. A significantly higher burden of depression and anxiety was observed in patients at risk of malnutrition ($p < 0.001$ for both). The number of seizures in the past year, the number of seizures requiring hospitalisation, the total number of seizures and the number of status epilepticus episodes showed a positive correlation with NRS-2002, HDRS and HARS scores. Whilst HDRS and HARS scores increased with age, no significant association was found with the NRS-2002. In multivariate logistic regression analyses, both depression severity (OR = 2.053; 95% CI: 1.442–2.924; $p < 0.001$) and anxiety severity (OR = 2.331; 95% CI: 1.582–3.435; $p < 0.001$) were found to be independently associated with the risk of malnutrition.

Conclusion

The risk of malnutrition in adult patients diagnosed with epilepsy is closely linked to the burden of depression and anxiety. A multidisciplinary approach to the management of epilepsy should be adopted, focusing not only on seizure control but also on nutritional status and psychiatric comorbidities.

1. Introduction

Epilepsy is a chronic condition characterised by seizures; depression and anxiety are common comorbidities in people with epilepsy, which adversely affect treatment adherence, social functioning and daily life. (1–2)

Malnutrition, on the other hand, is a significant clinical condition that develops as a result of insufficient or unbalanced intake of energy and nutrients, and which affects the prognosis of chronic diseases and quality of life. (3)

In patients with epilepsy, the Hamilton Depression Rating Scale (HDRS) and the Hamilton Anxiety Rating Scale (HARS) are commonly used clinician-based assessment tools for evaluating the clinical severity of frequently observed psychiatric comorbidities. (4–5)

It has been reported that depression and anxiety are associated with increased seizure frequency, poor clinical prognosis and treatment non-adherence in patients with epilepsy.

Although psychiatric comorbidities and nutritional problems have each been linked to epilepsy, the relationship between the risk of malnutrition and the psychiatric burden has not been sufficiently investigated. (6–7)

Studies have shown a bidirectional relationship between epilepsy and malnutrition. Whilst the electrolyte and metabolic imbalances, neurotransmitter and mitochondrial dysfunction, and immune system and infection-related issues caused by malnutrition trigger seizures, the metabolic burden of seizures, difficulties with swallowing and chewing, and the direct effects of medication all contribute to the impact of epilepsy on nutritional balance. (8)

2. Methods

This study is a single-centre, analytical, observational and cross-sectional study conducted at the Adult Neurology Outpatient Clinic of the Faculty of Medicine, Dicle University, between 1 August 2024 and 31 December 2024. In the thesis protocol, the minimum sample size was calculated as 320 patients using the Cohen's effect size approach, with $\alpha = 0.05$ and 95% power; the final analysis was carried out on 360 patients. Ethical approval was obtained from the Clinical Research Ethics Committee of the Faculty of Medicine, Dicle University, by Decision No. 224 dated 12 June 2024

Patients diagnosed with epilepsy, aged 18 years or over, and who provided informed consent were included in the study. Individuals under the age of 18, patients without a diagnosis of epilepsy, cases

with severe comorbidities (metabolic disorders, oncological diseases, childhood syndromes) and patients not using (ASM) were excluded from the study.

Demographic characteristics, clinical data relating to epilepsy and the anti-seizure medications used were recorded on the data collection form. For the nutritional assessment, the NRS-2002 was administered to all patients; the MNA was also administered to patients aged 65 and over. A total NRS-2002 score of ≥ 3 was considered indicative of a risk of malnutrition; on the MNA, a score of 24–30 was classified as normal, 17–23.5 as at risk, and < 17 as malnutrition. Depression was assessed using the Hamilton Depression Rating Scale (HDRS), and anxiety was assessed using the Hamilton Anxiety Rating Scale (HARS). The validated Turkish versions of both scales were used. (4–5) For the HDRS, scores of 0–7 indicated no depression, 8–15 mild depression, 16–28 moderate depression and ≥ 29 severe depression; for the HARS, scores of 0–5 indicated no anxiety, 6–14 minor anxiety and ≥ 15 major anxiety.

Statistical analyses were performed using SPSS 27.0. Descriptive statistics were presented as mean ± standard deviation, median, minimum–maximum and n (%). The Mann-Whitney U test was used to compare two independent groups; the Kruskal-Wallis test was used for three or more groups; the chi-square or Fisher's exact test was used for categorical variables; and Spearman's rho correlation analysis was used to assess relationships between numerical variables. All tests were two-tailed, and $p < 0.05$ was considered statistically significant.

Multivariate binary logistic regression analyses were conducted to identify factors independently associated with the risk of malnutrition. The severity of depression or anxiety was included in the model, along with age, gender and the number of seizures in the past year. Due to the strong correlation between HDRS and HARS, separate regression models were constructed. The severity of depression and anxiety was included in the model as categorical variables based on the raw scores for HDRS and HARS. The results were reported as odds ratios (OR) and 95% confidence intervals (CI).

3. Results

A total of 360 patients were included in the analysis. The mean age was 34.63 ± 13.36 years, and 50.6 per cent of the patients were male. The prevalence of at least one chronic condition other than epilepsy was 13.1 per cent (hypertension, diabetes mellitus, hypercholesterolaemia and atrial fibrillation), and the prevalence of smoking was 24.7 per cent. The basic demographic characteristics are summarised in Table 1.

Table 1
Descriptive characteristics of patients.

N = 360		**n**	**%**
Gender	Male	182	50,6
	Female	178	49,4
Marital status	Married	171	47,5
	Single	189	52,5
Educational background	Illiterate	70	19,4
	primary school/ Secondary school	123	34,2
	High school	102	28,3
	University and above	65	18,1
Occupation	Civil Servant	37	10,3
	Worker	36	10
	Farmer	9	2,5
	Tradesperson	5	1,4
	Housewife	94	26,1
	Student	35	9,7
	Unemployed Person	144	40
Chronic non-epileptic condition	Present	47	13,1
	Absent	313	86,9
Smoking	Yes	89	24,7
	No	271	75,3
Age (mean ± SD) (min–max)	34.63 ± 13.36 (min: 18–max: 82)		
Values are presented as n (%) unless otherwise indicated. SD: standard deviation.			

The most commonly used antiepileptic drug was levetiracetam. 68.1 per cent of patients were receiving monotherapy, 25.8 per cent were receiving dual therapy and 6.1 per cent were receiving triple therapy. The characteristics of antiepileptic drug use are presented in Table 2.

Table 2
Comparison of NRS-2002 scores according to antiepileptic drug use

		Mean ± SD	Median	Min–Max	p
Use of valproic acid*	Yes	0,99 ± 1,62	0	0–6	0,085
	No	0,67 ± 1,39	0	0–7	
Use of levetiracetam*	Yes	0,81 ± 1,52	0	0–7	0,134
	No	0,62 ± 1,30	0	0–5	
Use of carbamazepine*	Yes	0,61 ± 1,33	0	0–5	0,25
	No	0,78 ± 1,48	0	0–7	
Use of lamotrigine*	Yes	0,85 ± 1,51	0	0–6	0,47
	No	0,72 ± 1,44	0	0–7	
Use of lacosamide*	Yes	1,31 ± 1,93	0	0–6	0,075
	No	0,69 ± 1,39	0	0–7	
Use of phenytoin*	Yes	0,71 ± 1,25	0	0–3	0,953
	No	0,75 ± 1,45	0	0–7	

**NRS-2002 scores were compared according to antiseizure medication use using the Mann–Whitney U test. Values are presented as mean ± SD, median, and minimum–maximum.*

In the seizure burden analysis, the time elapsed since the most recent seizure was found to be 16.84 ± 28.40 months, the number of seizures in the past year was 11.47 ± 23.27, the number of seizures requiring hospitalisation was 0.54 ± 1.42, and the total number of seizures was 45.12 ± 106.29. The number of status epilepticus episodes was 0.64 ± 1.39, and the prevalence of a history of status epilepticus was 28.3 per cent. (A history of status epilepticus was defined as patients who had experienced status epilepticus at least once in their lifetime.) 85.1 per cent of patients reported experiencing focal seizures, seizures that progressed from focal to bilateral generalised tonic-clonic seizures, or generalised tonic-clonic seizures. The characteristics of the seizures are summarised in Table 3 and Fig. 1.

Table 3
Data on the characteristics of patients' epileptic seizures

Variable	Mean ± SD	Median	Min–Max
Duration of most recent seizure (months)	16,84 ± 28,40	5	1–120
Number of seizures in the past year	11,47 ± 23,27	3	0–150
Number of seizures requiring hospitalisation	0,54 ± 1,42	0	0–15
Total number of seizures	45,12 ± 106,29	10	1–1000
Number of status epilepticus episodes	0,64 ± 1,39	0	0–10

Values are presented as mean ± SD, median, and minimum–maximum. Status epilepticus history was defined as at least one lifetime episode of status epilepticus.

The mean NRS-2002 score was 0.74 ± 1.44, and 61 patients (16.9%) were at risk of malnutrition. According to the MNA administered to 15 patients aged 65 and over, 2 patients were malnourished, 1 patient was at risk of malnutrition, and 12 patients had a normal nutritional status. The mean HDRS score was 6.23 ± 7.57 and the mean HARS score was 5.83 ± 7.27. According to the HDRS classification, 222 patients (61.7 per cent) had no depression; 80 patients (22.2 per cent) had mild depression, 55 patients (15.3 per cent) had moderate depression and 3 patients (0.8 per cent) had severe depression. According to the HARS classification, 210 patients (58.3 per cent) had no anxiety; 99 patients (27.5 per cent) were found to have minor anxiety and 51 patients (14.2 per cent) had major anxiety. The nutritional status and psychiatric scale results are presented in Table 4.

Table 4
Patients' nutritional status and psychiatric scale scores

Measurement	Result
Average NRS-2002 score	0,74 ± 1,44 (0–7)
Risk of malnutrition according to the NRS-2002	61/360 (%16,9)
Number of patients assessed using the MNA	15
MNA within normal range	12/15 (%80,0)
MNA risk of malnutrition	1/15 (%6,7)
MNA malnutrition	2/15 (%13,3)
Average HDRS score	6,23 ± 7,57 (0–35)
No depression	222/360 (%61,7)
Mild depression	80/360 (%22,2)
Moderate depression	55/360 (%15,3)
Severe depression	3/360 (%0,8)
Average HARS score	5,83 ± 7,27 (0–44)
No anxiety	210/360 (%58,3)
Minor anxiety	99/360 (%27,5)
Major anxiety	51/360 (%14,2)

NRS-2002 ≥ 3 was accepted as malnutrition risk. HDRS was classified as no depression (0–7), mild depression (8–15), *moderate depression* (16–28), *and severe depression (≥ 29). HARS was classified as no anxiety (0–5), minor anxiety* (6–14), *and major anxiety*

In demographic and clinical comparisons, NRS-2002 scores differed only between occupational groups ($p = 0.027$); the highest scores were observed in the self-employed and unemployed groups. HDRS scores were higher among married patients ($p < 0.001$), those with a low level of education ($p < 0.001$), housewives and the unemployed ($p < 0.001$), those with a chronic illness ($p = 0.001$) and those taking phenytoin ($p = 0.039$). Similarly, HARS scores were higher among married patients ($p < 0.001$), those with a low level of education ($p = 0.009$), housewives and the unemployed ($p = 0.002$), and those with a chronic illness ($p = 0.004$). No significant differences were found with regard to gender, smoking status or the majority of antiepileptic drugs. No significant differences were found between seizure type and the NRS-2002, HDRS and HARS ($p = 0.407$, $p = 0.437$ and $p = 0.469$, respectively).

The association between the risk of malnutrition and the psychiatric burden was clear. The rate of no depression was 67.2 per cent in the group without a risk of malnutrition, compared with 34.4 per cent in the at-risk group; the rates of mild depression were 19.4 per cent and 36.1 per cent respectively; the

rates of moderate depression were 13.0 per cent and 26.2 per cent; and the rates of severe depression were 0.3 per cent and 3.3 per cent. With regard to anxiety, the proportion of patients without anxiety was 63.9 per cent in the group at no risk and 31.1 per cent in the at-risk group; the prevalence of major anxiety was 11.0 per cent and 29.5 per cent, respectively. Furthermore, according to the MNA, all three elderly patients identified as malnourished or at risk were found to have moderate depression and major anxiety.

Whilst no correlation was found between age and the NRS-2002 in the correlation analyses ($r = 0.087$; $p = 0.101$), HDRS ($r = 0.392$; $p < 0.001$) and HARS ($r = 0.372$; $p < 0.001$) scores increased with age. The number of seizures in the past year, the number of seizures requiring hospitalisation, the total number of seizures and the number of status epilepticus episodes showed a low-to-moderate positive correlation with the NRS-2002, HDRS and HARS. There was a very strong correlation between the NRS-2002 and HDRS ($r = 0.368$), between the NRS-2002 and HARS ($r = 0.302$), and between HDRS and HARS ($r = 0.937$; $p < 0.001$ for all).

Multivariate logistic regression analyses were carried out to identify independent factors associated with the risk of malnutrition. Separate models were constructed due to the strong correlation between depression and anxiety scores. After adjusting for age, gender and the number of seizures in the past year, it was demonstrated that the severity of depression was independently associated with the risk of malnutrition (OR = 2.053; 95% CI: 1.442–2.924; $p < 0.001$). Similarly, anxiety severity was also found to be independently associated with the risk of malnutrition (OR = 2.331; 95% CI: 1.582–3.435; $p < 0.001$). Age, gender and the number of seizures in the past year did not reach statistical significance in either model. The results of the univariate and multivariate analyses of the relationship between the risk of malnutrition and psychiatric burden are presented in Table 5.

Table 5
Association between malnutrition risk and psychiatric symptom burden

Variable	Malnutrition risk absent n (%)	Malnutrition risk present n (%)	Univariate p	Adjusted OR (95% CI)	Multivariable p
Depression severity			**< 0.001**	2.053 (1.442–2.924)	**< 0.001**
No depression	201 (67.2)	21 (34.4)			
Mild depression	58 (19.4)	22 (36.1)			
Moderate depression	39 (13.0)	16 (26.2)			
Severe depression	1 (0.3)	2 (3.3)			
Anxiety severity			**< 0.001**	2.331 (1.582–3.435)	**< 0.001**
No anxiety	191 (63.9)	19 (31.1)			
Minor anxiety	75 (25.1)	24 (39.3)			
Major anxiety	33 (11.0)	18 (29.5)			

Adjusted OR values were obtained from separate multivariable logistic regression models adjusted for age, sex, and number of seizures during the previous year.

4. Discussion

Depression and anxiety are common psychiatric comorbidities in patients with epilepsy. Meta-analyses have reported that the prevalence of depression in adults ranges from 23 per cent to 32 per cent. It has been demonstrated that these psychiatric disorders can have a more pronounced negative impact on health-related quality of life than on certain clinical parameters, such as seizure frequency. (9) Whilst it has been reported that the NRS-2002 has been validated with high sensitivity and specificity both in international studies and in the adult population in Turkey, it has also been shown that depression and anxiety significantly reduce health-related quality of life in patients with epilepsy. (10) ASPEN recommends the use of screening scales that have been validated in hospital and outpatient settings. In this context, the NRS-2002 is recommended for adults, and the MNA for individuals aged 65 and over (11–13) In a recent multicentre study conducted in Turkey, the risk of malnutrition in neurology clinics was determined to be 18.7 per cent, and it was observed that the risk increased significantly, particularly in the older age group. These findings may highlight the importance of taking nutritional risks into account in patients with epilepsy.

The mean age of the participants was 34.63 ± 13.36 years, and 50.6 per cent were male. An analysis of sociodemographic characteristics revealed that 52.5 per cent were single, 34.2 per cent had completed primary or lower secondary education, 26.1 per cent were housewives and 40 per cent were unemployed. Furthermore, 24.7 per cent of the patients reported that they had smoked. The prevalence of chronic diseases in addition to epilepsy was found to be 13.1 per cent. When compared with studies in the literature, the research by Boz and colleagues, which involved 420 patients with epilepsy, reported that 48 per cent of the cases were male, the average age was calculated as 24.2 ± 12.7 years, and 73.3 per cent of the participants were unemployed. (14) In a study by Uçan Tokuç and colleagues involving 215 patients with epilepsy, the mean age was reported as 35.31 ± 10.25 years; it was found that 62.3 per cent of the patients were women, 28.4 per cent were single, and 82.2 per cent had completed primary or lower secondary education. (15) A comprehensive study conducted in the United States between 2010 and 2017 reported that 22–27 per cent of adults with epilepsy smoked, and it was found that this rate was higher than that of the general population. (16) Similarly, a comprehensive study carried out between 2021 and 2022 reported that 46 per cent of adults with epilepsy smoked, and that this rate was significantly higher than in the general population (17). The literature indicates that approximately 60–70 per cent of individuals diagnosed with epilepsy have additional chronic conditions, and that the prevalence of comorbidity in these patients is approximately four times higher than in the general population (18–19). In our study, the low prevalence of chronic conditions and smoking is thought to be due to the fact that the study was conducted in a young population. Furthermore, the literature reports that cases of failure to marry and divorce are common among individuals diagnosed with epilepsy, particularly among women. Our findings show that the socio-demographic characteristics of patients with epilepsy largely correspond to the data in the literature, although some differences do exist. The fact that the unemployment rate was found to be lower and the level of education relatively higher in our study may be related to the socio-economic conditions of the region in which the research was conducted. In our study, the prevalence of smoking and chronic diseases associated with epilepsy was found to be lower than the rates reported in the literature. This may be explained by the fact that the sample consisted of outpatients with a relatively young average age, and there were fewer cases with severe comorbidities. Furthermore, the fact that smoking was assessed on the basis of self-report, together with the high proportion of women and housewives in the study, may have contributed to the smoking rate being found to be lower.

A large-scale study conducted in Germany between 2008 and 2020 reported that the prescription rate for levetiracetam rose from 18 per cent to 32.4 per cent; conversely, the usage rates of valproic acid and carbamazepine decreased. (20) Another study carried out in China indicated that, as of 2017, the use of levetiracetam had overtaken that of valproic acid. The main reason for this may be the restrictions imposed on the use of valproic acid in women of childbearing age. (21) The fact that levetiracetam is the most commonly prescribed antiepileptic drug is consistent with the literature.

In our study, the mean score on the NRS-2002 assessment was 0.74 ± 1.44, and 16.9% of all patients were found to be at risk of malnutrition. When the scores obtained from the scales were compared with the descriptive characteristics, a significant difference was observed only between occupational groups

and NRS-2002 scores. In particular, it was found that tradespeople and the unemployed were at a higher risk of malnutrition. Furthermore, it was found that a patient's cumulative history of epileptic seizures (number of seizures in the past year, number of seizures requiring hospitalisation, total number of seizures and episodes of status epilepticus) had a negative impact on malnutrition. By contrast, no significant association was found between age, gender, marital status, educational level, the presence of chronic diseases, smoking status, the types of antiepileptic drugs (valproic acid, levetiracetam, carbamazepine, lamotrigine, lacosamide, phenytoin) used, and NRS-2002 scores.

The relationship between malnutrition and epilepsy is complex and involves a bidirectional interaction. Whilst malnutrition may facilitate epileptogenesis by lowering the seizure threshold, epilepsy may in turn contribute to malnutrition through the severity of the condition, sociocultural factors and the side effects of treatments. In a screening study conducted at various clinics in Turkey, it was reported that, according to NRS-2002 results, 18.7 per cent of patients were at risk of malnutrition and that one in five outpatients was at risk in this regard. (22) In a large-scale study by Doğanay and colleagues involving 191,028 patients, in-patient patients were assessed using the NRS-2002, and a risk of malnutrition was identified in 18.7 per cent of cases in the neurology clinic. (23) In a study conducted by Uzdil and colleagues at a neurology clinic, it was reported that no statistically significant difference was found between NRS-2002 scores and age, gender, marital status, tobacco and alcohol use, educational level and employment status. (24) A review of the literature on the effects of antiepileptic drugs (AEDs) on nutritional status indicates that topiramate, felbamate, zonisamide and stiripentol lead to weight loss; lamotrigine, levetiracetam, phenytoin, tiagabine and lacosamide have a neutral effect; whilst valproate, gabapentin, pregabalin, carbamazepine, oxcarbazepine and vigabatrin may lead to weight gain. (25) However, no studies have been found that evaluate the effects of these medications on NRS-2002 scores. Our findings suggest that approximately one in five patients with epilepsy is at risk of malnutrition, and that this risk is particularly pronounced in low socioeconomic groups. These results are consistent with rates reported in the literature and indicate that nutritional risk is a critical yet often overlooked aspect of epilepsy management.

In our study, the mean HDRS score was 6.23 ± 7.57; depression was not detected in 61.7% of the patients, while mild depression was identified in 22.2%. The mean HARS score was 5.83 ± 7.27; 58.3% of the cases showed no anxiety, while 27.5% exhibited mild anxiety. Both depression and anxiety scores were found to be higher in married individuals compared to single individuals. In terms of educational level, the highest scores were found among the illiterate, while the lowest scores were found among those with a college education or higher. When occupational groups were examined, scores were found to be higher among housewives and the unemployed, and lower among civil servants and students. Depression and anxiety scores are also significantly higher in individuals with chronic illnesses. It has been determined that depression and anxiety scores increase with advancing age, and that these scores also rise as the number of seizures in the past year, the number of seizures requiring hospitalization, the total number of seizures, and the number of status epilepticus episodes increase. A strong positive correlation was found between HDRS and HARS. No significant difference was found in terms of gender and smoking status. No statistically significant difference was found between ASM use and HARS

scores. In contrast, it was determined that HDRS scores were significantly higher in patients using phenytoin. However, the limited number of patients using phenytoin (n = 7) should be considered a significant limitation that reduces the reliability and generalizability of this finding. There is a bidirectional relationship between epilepsy and depression, and depression stands out as the most common psychiatric comorbidity in epilepsy. Studies conducted in Canada, Italy, the United Kingdom, and the United States have shown that the prevalence of depression among individuals with epilepsy is higher than in the general population and among people with other chronic conditions, with rates reported to range from 9% to 37%. Similarly, a bidirectional relationship has been identified between epilepsy and anxiety; the lifetime prevalence of anxiety is approximately 2.4 times higher in individuals with epilepsy than in those without epilepsy. Studies indicate that the prevalence of anxiety in patients with epilepsy ranges from 11% to 25%. The frequent co-occurrence of depression and anxiety can make differentiation difficult in clinical practice. (26)

In a meta-analysis of patients with epilepsy, it was shown that advanced age, female gender, low educational level, unemployment, and the presence of anxiety significantly increase the risk of depression. However, the same study found no significant association between marital status and depression. (27) In a single-center study conducted by Thompson and colleagues on patients with epilepsy, no significant association was found between age, gender, the presence of chronic disease, and depression. In contrast, lower rates of depression were observed among those with higher levels of education, employed individuals, and married individuals. An increase in seizure frequency and a higher total number of seizures significantly increased the risk of depression. Furthermore, it has been reported that the antiepileptic drugs (AEDs) used—carbamazepine, lamotrigine, levetiracetam, phenytoin, valproic acid, and zonisamide—have no significant effect on depression. (28)

In our study, the finding that depression and anxiety scores were higher among married individuals compared to single individuals may be considered an unexpected result at first glance. Many studies in the literature have reported that marriage exerts a protective effect on psychiatric disorders through social support mechanisms; however, various factors specific to patients with epilepsy may negatively alter this relationship. First and foremost, it has been reported that anxiety and depression are common among primary caregivers—particularly the spouses of individuals diagnosed with epilepsy—and that this situation can reciprocally increase the psychiatric burden within the family. (29) On the other hand, it has been shown that an epilepsy diagnosis and the antiepileptic medications used can lead to sexual dysfunction; this, in turn, constitutes an independent risk factor for depression and anxiety in married individuals. (30) Furthermore, it is known that rates of stigmatization among individuals with epilepsy in Turkey are significantly high and that this stigmatization imposes a significant psychosocial burden within marriage as well. (15) However, it should be noted that the cross-sectional study design cannot rule out a possible selection bias in this relationship: it is thought that in conservative sociocultural settings such as Diyarbakır, the rate of marriages arranged under family pressure may be higher among individuals with a heavy disease burden, and that this situation may contribute to relatively higher psychiatric scores in the married group. Prospective studies are needed to clarify this relationship more clearly.

In our study, we examined levels of depression and anxiety in relation to malnutrition status. According to the MNA results, moderate depression and major anxiety were detected in two malnourished patients and one patient classified as at risk. According to the NRS-2002, significantly higher rates of depression and anxiety were observed in patients at risk for malnutrition. A review of the literature revealed no studies that directly addressed the relationship between malnutrition and anxiety and depression in patients with epilepsy. However, in a study conducted by Nucci and colleagues on cancer patients, it was reported that each one-unit increase in the NRS-2002 score led to a 71% increase in depression scores and was positively correlated with anxiety scores. (31) In a study of geriatric patients aged 65 and older, it was reported that patients with an increased risk of malnutrition according to the MNA also exhibited a significantly worse depression status. (32) In a study examining the relationship between diet and depression in patients with epilepsy, it was reported that an unbalanced diet, in particular, increases the risk of moderate depression. This finding supports the possibility of a significant association between nutritional status and depression in patients with epilepsy. (33) More importantly, the association between the burden of psychiatric symptoms and the risk of malnutrition remained significant even after adjusting for age, gender and seizure burden; this suggests that depression and anxiety may represent independent clinical correlates of nutritional vulnerability in patients with epilepsy.

Our findings have shown that levels of depression and anxiety are significantly higher in epilepsy patients at risk of malnutrition. This demonstrates that malnutrition can have significant consequences not only physically but also psychologically. Although studies specifically on epilepsy are limited, data obtained from other patient groups support our findings. Consequently, large-scale, prospective studies are needed to establish more clearly the relationship between malnutrition and depression and anxiety in patients with epilepsy.

Our findings reveal that depression and anxiety are common among patients with epilepsy, and that these conditions are particularly associated with a low level of education, unemployment, the presence of chronic illness and an increased seizure burden. The results emphasise that focusing solely on seizure control is not sufficient in the management of epilepsy; mental health must also be assessed on a regular basis. For this reason, the early identification of the risk of depression and anxiety in people with epilepsy through routine screening, and the provision of appropriate psychiatric support to at-risk groups, could be a critical step in improving treatment success and quality of life.

5. Limitations

Various limitations must be acknowledged, including the cross-sectional design, the absence of biochemical nutritional markers, and the lack of structured psychiatric interviews. Firstly, as the study has a cross-sectional design, the findings merely indicate the relationships between variables; no definitive conclusions regarding causality can be drawn.

Our study was conducted at a single centre and included only patients attending the Neurology Outpatient Clinic at Dicle University Faculty of Medicine. This limits the generalisability of the results. The

fact that the majority of the sample consisted of young adults prevented the findings from adequately representing older patients. Although multivariate logistic regression analyses were carried out, residual confounding effects associated with unmeasured variables cannot be completely ruled out.

Nutritional assessment was carried out using the NRS-2002 and, in a limited number of patients, the MNA; biochemical parameters and detailed dietary records were not examined. The Hamilton Anxiety Rating Scale (HARS) and the Hamilton Depression Rating Scale (HDRS), which are used for the diagnosis of depression and anxiety, are scales that measure symptom severity; structured clinical interviews, which are the gold standard method for psychiatric diagnosis, were not carried out.

Declarations

Consent to participate

Informed consent to participate in the study was obtained from all participants prior to their inclusion in the study.

Consent for publication

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Author Contribution

CÇ conceived and designed the study, collected the data, contributed to the statistical analysis, interpreted the results, and drafted the manuscript. MÖ contributed to data collection, statistical analysis, interpretation of the results, and critical revision of the manuscript. MUÇ, MB, TB, EB, ÜC, and HG contributed to data collection, review and interpretation of the data, and critical revision of the manuscript. All authors read and approved the final manuscript.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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This study was presented as an oral presentation at the 15th National Epilepsy Congress, held in Muğla, Turkey, from 14 to 17 May 2026.

Ethics approval

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Clinical Research Ethics Committee of the Faculty of Medicine, Dicle University (Decision No. 224, 12 June 2024).

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Figures

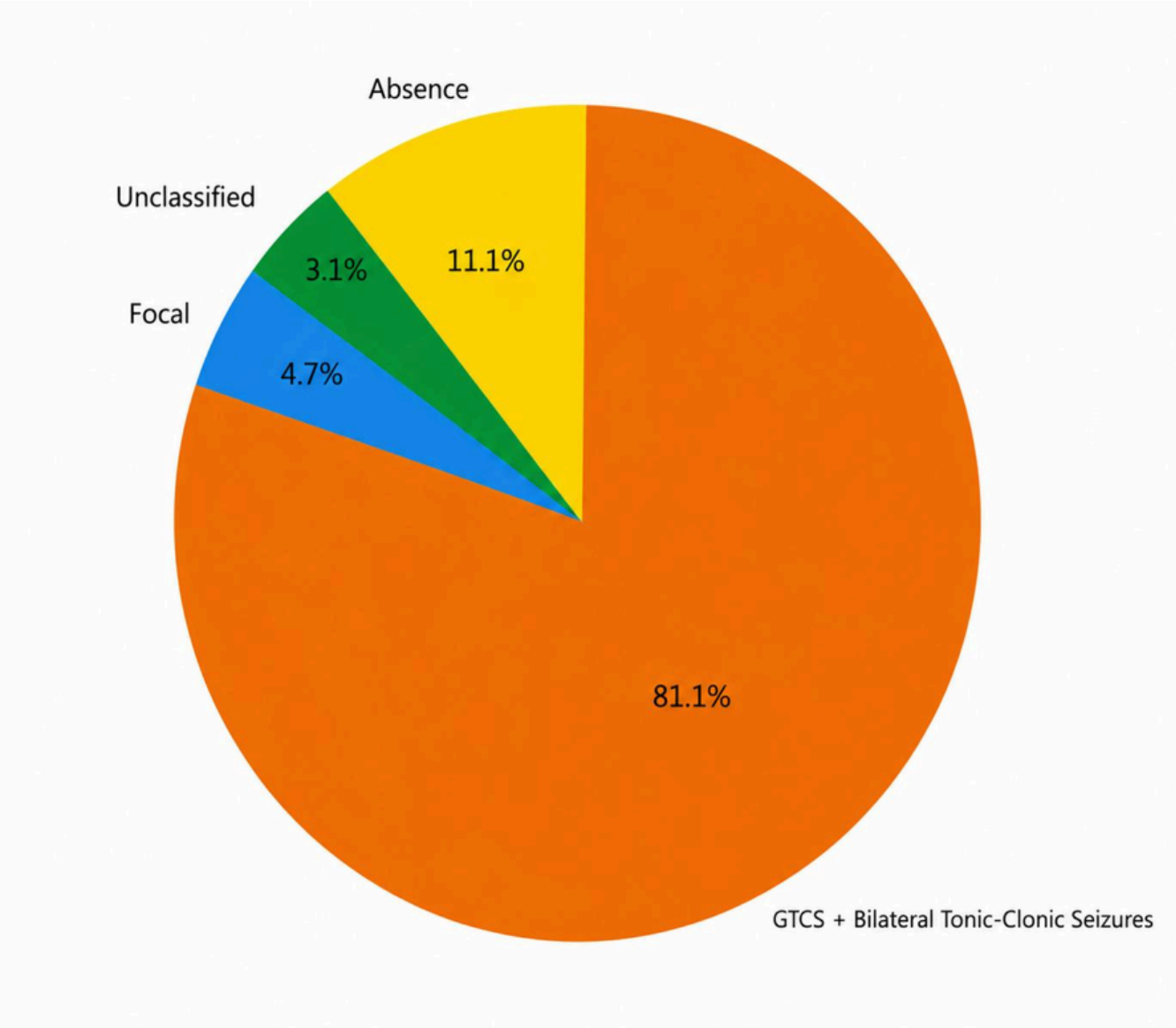


Figure 1

Distribution of the types of seizures experienced by patients