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Regular Article

Exploring psychiatric comorbidities and their effects on quality of life in patients with temporal lobe epilepsy and juvenile myoclonic epilepsy

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Aim: The relation of epilepsy with psychiatric disorders is of great interest to researchers due to its behavioral, social, and cognitive outcomes. In this study, we explored psychiatric comorbidity and its effects on quality of life (QOL) in patients with mesial temporal lobe epilepsy (MTLE) and juvenile myoclonic epilepsy (JME).

Methods: Thirty patients with MTLE, 30 patients with JME, and 30 healthy controls underwent the Structured Clinical Interview for DSM-IV (SCID-I) to diagnose psychiatric disorders. None of the subjects had previously undergone psychiatric examination. The Quality of Life in Epilepsy Inventory-89 (QOLIE-89) was used to assess QOL. We compared psychiatric comorbidity among groups and evaluated its effects on QOL.

Results: We detected comorbid psychiatric disorders in 37% of patients with JME and in 57% of patients with MTLE. Comorbid psychiatric disorders were less frequent in healthy controls compared to the patient groups ($P = 0.029$). Comparing demographic and clinical features of patients with JME and MTLE and their mean QOL scores, there was no statistical difference. Furthermore, we compared QOLIE scores between patients with and without psychiatric comorbidity. JME patients with mood disorders had lower scores on the Attention/Concentration subscale ($P = 0.013$). MTLE patients with a psychotic disorder had lower scores on the Social Isolation, Energy, and Fatigue subscales ($P = 0.045$). Patients with somatoform disorders had higher Pain scores ($P = 0.04$).

Conclusion: Our study suggests that comorbid psychiatric disorders negatively affect patients' QOL regardless of seizure syndrome. Comorbid psychiatric conditions should be determined to increase QOL in patients with epilepsy.

Key words: juvenile myoclonic epilepsy, mesial temporal sclerosis, psychiatric comorbidity, psychiatric symptoms, quality of life.

THE RELATION BETWEEN epilepsy and psychiatric disorders is a popular research area because of the effects of epilepsy on emotional, behavioral, social, and cognitive outcomes. Epidemiological studies have shown that comorbid psychiatric disorders are seen in approximately 20–40% of adult epilepsy patients.[1] These studies, however, have been done in heterogeneous patient groups using different diagnosing tools and it is difficult to compare them.[2] Also, these studies had small sample sizes or control groups were not selected among healthy people.[3]

Previous studies have shown that patients with epilepsy face many psychosocial problems, which frequently cause depression, anxiety, and low self-esteem.[4] Additionally, epilepsy is a chronic neurological disorder, which may cause depression

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directly. It has been suggested that epileptic seizures in which different brain regions are involved may cause specific psychopathological conditions,[5–10] although there are surveys showing that there is no relation between the type of epilepsy and psychopathology.[11] Explorations of the etiology of comorbid psychiatric disorders in epileptic patients have found that besides the anatomic features of epileptic focus, duration of illness, antiepileptic medications, treatment resistance, and sociodemographic factors, type and frequency of epileptic seizures may cause or contribute to psychiatric conditions in patients with epilepsy.[10,12,13] Moreover, there is substantial evidence showing that the psychiatric, cognitive, and behavioral problems associated with epilepsy antedate the development of epileptic seizures. One other explanation for these data is that there is an etiology common to epilepsy and many of its comorbidities.

The relation between epilepsy and psychiatric comorbidity has been tested frequently but researches exploring quality of life (QOL) parameters, including functioning, physical health, psychosocial health, degree of being independent, and social relationships, are scarce.[1,14–16] In this study, we compared the presence of psychiatric comorbidity in patients with mesial temporal lobe epilepsy (MTLE; which is generally a treatment-resistant condition), patients with juvenile myoclonic epilepsy (JME; which has a benign prognosis and good response to treatment), and healthy controls. We tested whether there was any association of psychiatric comorbidity with sociodemographic factors, antiepileptic medication, treatment-resistance, or duration of illness in patients with epilepsy. Furthermore, we evaluated QOL among epilepsy patients in relation to psychiatric comorbidity.

METHODS

Participants

This study was approved by the ethics committee of Bakirkoy Research and Training Hospital for Psychiatric and Neurological Diseases and was carried out in accordance with the Declaration of Helsinki. We included patients with JME (n = 30) and with mesial temporal sclerosis (n = 30) who have been followed in our epilepsy outpatient unit regularly and diagnosed with epilepsy according to electroencephalogram, cranial magnetic resonance imaging (MRI) findings, and the International League Against Epilepsy classification of epilepsy syndromes (1989). Additionally, we enrolled 30 healthy controls who were matched for age and sex with the patient groups. All subjects gave their informed consent.

Procedures

We collected data on age, sex, level of education, income, marital status, age of onset of epilepsy, duration of illness, MRI findings, family history of epilepsy, frequency and type of seizure, date of the last seizure, and antiepileptic treatment in patients. In healthy controls, we obtained data on age, sex, marital status, income, and level of education. Healthy controls who did not have previous history of psychiatric disorders and had not been examined by a psychiatrist previously were selected among hospital staff to represent a similar sociodemographic status with patients. Also, patients had not previously been diagnosed with a mental health condition by a professional. Their physical and neurological examinations were normal.

Psychiatric evaluation

We carried out the Structured Clinical Interview for DSM-IV (SCID-I), which is a semi-structured interview for making the major DSM-IV axis I diagnoses, with patients and healthy controls. The SCID-I assesses the month prior to the interview and the lifetime psychiatric status.[17] The validity and reliability of the Turkish version of the SCID-I have been carried out by Çorapçıoğlu *et al.*[18] We explored comorbid psychiatric disorders and frequencies in patient groups who had no psychiatric history and compared them with the type of morbidity and frequency in healthy controls.

QOL in epilepsy

We used the Quality of Life in Epilepsy Inventory-89 (QOLIE-89) in MTLE and JME patients and analyzed the effects of psychiatric comorbidity on QOL in different epilepsy types. The QOLIE-89 is a self-report inventory that evaluates life satisfaction in four scales and 17 subscales. It was developed in the USA and contains 89 items. The 17 subscales are as follows: Overall QOL, Emotional Well-Being, Role Limitations Due to Emotional Problems, Social Support, Social Isolation, Energy/Fatigue, Worry About Seizure, Medication Effects, Health

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Discouragement, Work/Driving/Social Function, Attention/Concentration, Language, Memory, Physical Function, Pain, Role Limitations Due to Physical Problems, and Health Perceptions.[19] The validity and reliability of the Turkish version of the QOLIE-89 have been carried out by Mollaoğlu *et al.*[20]

Data analysis

We used SPSS 17.0. Following the descriptive analyses (mean, SD), we performed the Student's *t*-test for comparisons of continuous variables and the χ^2-test for comparisons of categorical variables. Correlations between the variables were tested using Pearson and Spearmen correlation tests. A *P*-value of 0.05 was used as the threshold for statistical significance.

RESULTS

Demographic, clinical, and imaging characteristics

We compared patients with JME, patients with MTLE, and healthy controls in terms of age, sex, marital status, level of education, income, age of onset of epilepsy, presence of treatment-resistant seizure, type of seizure, frequency of the epileptic seizure in the last year, duration of epilepsy, date of the last seizure, previous history of status, and treatment and lateralization of the lesion (right or left hemisphere) on MRI. We did not detect any significant differences among the three groups in terms of those parameters, except the control group had higher income (Table 1). MRI findings showed that among MTLE patients, six (20%), four (13.3%), and 20 (66.6%) had mesial temporal sclerosis in both lobes, in the right lobe, and in the left lobe,

Table 1. Sociodemographic and clinical features of the subjects

Features		MTLE group	JME group	Control group	Significance
Age		33.67 ± 9.84	26.63 ± 7.36	32.1 ± 9.3	$P > 0.05$
Sex (M/F)		15/15	11/19	16/14	$P > 0.05$
Marital status (singe/married)		16/14	13/17	15/15	$P > 0.05$
Level of education (primary school/high school/university)		22/6/2	20/7/3	13/10/7	$P > 0.05$
Income (none/minimum wage/more)		20/6/4	14/7/9	0/24/6	$P < 0.05$
Duration of epilepsy (years)		22 ± 11.68	12.46 ± 8.27	—	—
Treatment (mono/poli)		10/20	22/8	—	—
Treatment resistance		9	0	—	—
Type of seizure		Complex partial seizure ($n = 7$); partial seizure and seconder generalized tonic clonic seizure ($n = 23$)	Myoclonus ($n = 10$); generalized tonic clonic seizure + myoclonus ($n = 20$)	—	—
Age of onset of epilepsy (years)		11.7 ± 9.3	14 ± 5	—	$P < 0.05$
Date of last seizure	<1 month previously	14	4	—	$P < 0.05$
	1 month–1 year previously	12	10		
	>1 year previously	4	16		
History of status	Yes	5	7	—	$P > 0.05$
	No	25	23		
Lateralization of lesion	Right	4	—	—	—
	Left	20			
	Bilateral	6			

JME, juvenile myoclonic epilepsy; MTLE, mesial temporal lobe epilepsy.

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respectively. Twenty patients (66.6%) were on polytherapy. Carbamazepine was the most common antiepileptic both in mono- and polytherapies. In total, nine (30%) of the patients were treatment-resistant. Seven patients (23.3%) had complex partial seizures and all others had partial seizures or secondary generalized seizures.

Among JME patients, 22 (73.3%) were on monotherapy and the most common antiepileptic drug was sodium valproate. Myoclonia and absence seizures were seen in 10 patients (30%) and all others had myoclonia, absence, and generalized tonic-clonic seizures.

Psychiatric evaluation

Comorbid psychiatric disorders were observed in 11 (37%) patients with JME. Among those, five (17%) had an anxiety disorder, four (13%) had a mood disorder, and two (7%) had a psychotic disorder. In total, 17 (57%) patients with MTLE had a comorbid psychiatric disorder. Of those, seven (23%) had an anxiety disorder, five (17%) had a mood disorder, four (13%) had a psychotic disorder, and one (3%) had a somatoform disorder. There were seven (23%) participants among the healthy controls with a psychiatric disorder. Among those, four (13%) had a mood disorder, two (7%) had an anxiety disorder, and one (3%) had a psychotic disorder. Psychiatric disorders were less frequent in healthy controls compared to the patient groups ($P = 0.029$), although there were no statistically significant differences between the JME and MTLE patients in terms of the frequency ($P = 0.121$). Alcohol/substance abuse was not observed in any of the groups. Patients with a comorbid psychiatric disorder were referred to the psychiatric outpatient service of our hospital (Table 2).

QOL of patients with epilepsy

We compared QOLIE-89 scores between JME patients with and without comorbid psychiatric disorders. There were no statistically significant differences in terms of QOL subscale scores and comorbid psychiatric disorders, except that patients with mood disorders had statistically significantly worse QOLIE-89 Attention/Concentration subscale scores ($P = 0.013$). The relation between comorbid psychiatric disorders and QOLIE-89 subscale scores in MTLE was evaluated in patients with and without a psychiatric disorder. MTLE patients with a psychotic disorder had lower scores for the Social Isolation ($P = 0.045$) and Energy/Fatigue ($P = 0.049$) subscales. Moreover, patients with somatoform disorder had higher Pain scores ($P = 0.04$). We did not find any significant difference in terms of QOL scores between patient groups. Comparing the demographic and clinical features of patients with JME and MTLE and their mean QOL scores, we did not detect any statistically significant differences (Table 3).

When compared to the studies in the USA and Norway,[19,21] mean QOL scores in our patients were lower than those in the US and Norwegian epilepsy patients (Table 4).[19–21]

Table 2. Subjects' comorbid psychiatric diagnoses as measured with the SCID-I

Psychiatric diagnosis		JME group	MTLE group	Control group
Mood disorders	Bipolar I disorder	—	1	1
	Bipolar II disorder	1	1	—
	Unipolar expression	2	3	3
	Dystimic disorder	1	—	—
Anxiety disorders	Panic disorder	—	1	—
	Generalized anxiety disorder	2	2	2
	Obsessive–compulsive disorder	1	4	—
	Post-traumatic stress disorder	1	—	—
Somatoform disorder	Somatoform disorder	—	1	—
Psyciotic disorders	Schizoaffective disorder	—	2	—
	Psychotic disorder not otherwise specified	2	1	1

JME, juvenile myoclonic epilepsy; MTLE, mesial temporal lobe epilepsy; SCID-I, Structured Clinical Interview for DSM-IV.

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Table 3. Comparing the demographic and clinical features of patients with JME and MTLE and their mean quality of life scores

		JME		MTLE	
Features	Parameters	Mean ± SD	*P*	Mean ± SD	*P*
Sex	Female	66.84 ± 15.48	0.74	70.07 ± 21.79	0.10
	Male	70.07 ± 15.39		58.13 ± 18.66	
Marital status	Single	67.97 ± 15.43	0.71	67.53 ± 20.93	0.33
	Married	68.06 ± 15.61		60.19 ± 20.79	
Education	Elementary	64.24 ± 10.03	0.67	60.91 ± 22.55	0.53
	High school	67.24 ± 20.60		74.51 ± 14.97	
	University	70.87 ± 22.94		68.33 ± 22.44	
Occupation	Works	69.34 ± 14.22	0.86	73.63 ± 11.72	0.53
	Does not work	71.61 ± 12.75		59.71 ± 26.25	
	Minimum wage	62.14 ± 6.94		71.87 ± 11.78	
Income	More	74.93 ± 16.21	0.23	65.41 ± 15.44	0.58
	None	66.52 ± 16.79		61.51 ± 23.71	
Age of onset of epilepsy	<10	75.85 ± 14.69	0.26	60.58 ± 21.89	0.64
	10–20	67.31 ± 15.41		69.49 ± 20.69	
	>20	56.65 ± 9.63		66.09 ± 16.69	
Frequency of seizures during last year	>1/month	57.48 ± 1.14	0.20	57.96 ± 17.83	0.06
	No seizures	71.43 ± 15.26		83.76 ± 7.57	
	>1/year	65.40 ± 16.43		64.71 ± 23.76	
Date of last seizure	<1 month previously	53.52 ± 14.77	0.18	61.05 ± 18.39	0.10
	1 month–1 year previously	68.80 ± 12.35		61.11 ± 23.81	
	>1 year previously	71.16 ± 15.76		83.76 ± 7.57	
History of status	Yes	62.28 ± 13.32	0.48	56.42 ± 26.01	0.49
	No	69.77 ± 15.66		65.64 ± 19.93	
Treatment	Monotherapy	69.41 ± 16.67	0.40	70.09 ± 22.08	0.31
	Politherapy	64.21 ± 10.45		61.10 ± 20.09	
Localization of lesion on MRI	Nilateral	—	—	62.00 ± 22.02	0.79
	Right	—		56.88 ± 30.27	
	Left	—		66.17 ± 19.33	
Psychiatric evaluation	Anxiety disorder	67.42 ± 14.74	0.30	63.31 ± 24.35	0.18
	Mood disorder	52.66 ± 15.81		63.57 ± 19.98	
	Normal	71.31 ± 14.77		72.29 ± 17.78	
	Psychotic disorder	68.98 ± 7.82		42.30 ± 15.76	
	Somatoform disorder	—		53.07	

JME, juvenile myoclonic epilepsy; MTLE, mesial temporal lobe epilepsy.

DISCUSSION

Psychiatric symptoms in epilepsy patients are not regularly explored, although clinicians are aware that psychiatric disorders are frequent in these patients. This results in delayed diagnosis and treatment of psychiatric disorders in these patients.[22] In consideration of this information, we aimed to explore comorbid psychiatric disorders in different epilepsy syndromes and tested the effects of psychiatric comorbidity on QOL of patients with epilepsy. We found that 37% of patients with JME had comorbid psychiatric disorders, such as anxiety disorders, mood disorders, or psychotic disorder. Fifty-seven percent of patients with MTLE had a comorbid psychiatric disorder, such as anxiety disorder, mood disorders, psychotic disorder, or somatoform disorder. Only 23% of participants among healthy controls had a comorbid psychiatric disorder. Comorbid psychiatric disorders were less often seen in healthy controls compared to the patient groups, although there was no statistically significant difference

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Table 4. Comparing mean quality of life scores of Turkish, US, and Norwegian epilepsy patients with JME or MTLE

Subscales of QOLIE-89	JME	MTLE	Mollaoğlu *et al.*[20†]	Devinsky *et al.* [19‡]	Stavem *et al.* [21§]
Health Perceptions	56.1 ± 21.4	51.6 ± 14.8	37.43 ± 22.86	68.3 ± 19.6	71.5 ± 23.6
Overall Quality of Life	65.0 ± 18.2	62.5 ± 22.6	41.33 ± 23.50	67.2 ± 18.4	71.9 ± 19.9
Physical Function	87.0 ± 13.6	84.3 ± 20.6	65.92 ± 26.64	85.3 ± 19.8	85.5 ± 20.3
Role Limitations Due to Physical Problems	68.0 ± 36.6	56.6 ± 44.2	28.15 ± 39.35	69.3 ± 34.5	69.8 ± 34.8
Role Limitations Due to Emotional Problems	65.3 ± 38.2	54.6 ± 43.2	22.77 ± 36.23	67.8 ± 34.5	71.0 ± 34.6
Pain	67.3 ± 22.9	71.8 ± 27.2	50.46 ± 28.47	75.6 ± 24.8	74.3 ± 28.0
Work/Driving/Social Function	68.5 ± 21.9	65.0 ± 23.4	34.53 ± 26.64	66.9 ± 22.9	80.1 ± 20.2
Energy/Fatigue	54.5 ± 23.3	57.5 ± 21.8	39.34 ± 25.12	55.3 ± 21.1	56.6 ± 23.4
Emotional Well-Being	59.2 ± 22.6	57.4 ± 26.1	38.49 ± 20.04	67.2 ± 19.3	76.4 ± 19.9
Attention/Concentration	70.2 ± 21.5	60.5 ± 22.6	43.84 ± 26.50	70.0 ± 20.7	80.0 ± 20.0
Health Discouragement	76.0 ± 28.9	65.3 ± 33.5	39.00 ± 35.80	69.9 ± 27.7	83.4 ± 24.2
Worry About Seizure	54.5 ± 31.6	57.6 ± 30.8	35.21 ± 29.82	58.3 ± 25.8	78.2 ± 25.7
Memory	69.4 ± 21.4	69.8 ± 25.6	38.63 ± 28.45	54.3 ± 24.2	72.4 ± 24.0
Language	81.7 ± 23.4	69.8 ± 27.6	52.18 ± 31.35	74.6 ± 21.0	85.9 ± 20.3
Medication Effects	61.2 ± 31.9	69.6 ± 20.3	32.95 ± 26.65	55.3 ± 30.5	78.4 ± 23.7
Social Support	68.5 ± 24.7	57.7 ± 30.1	48.11 ± 24.36	72.5 ± 22.9	78.4 ± 23.3
Social Isolation	80.3 ± 22.8	73.0 ± 34.8	61.23 ± 30.42	76.8 ± 25.0	86.4 ± 20.3

[†]QOLIE scores of Turkish patients with epilepsy.
[‡]QOLIE sores of US patients with epilepsy.
[§]QOLIE scores of Norwegian patients with epilepsy.
JME, juvenile myoclonic epilepsy; MTLE, mesial temporal lobe epilepsy; QOLIE-89, Quality of Life in Epilepsy Inventory-89.

between JME and MTLE patients in terms of the frequency. Additionally, we did not detect any statistical difference comparing the demographic and clinical features of patients with JME and MTLE and their mean QOL scores. Comorbid psychiatric disorders negatively affected QOL scores in the different domains of the inventory, regardless of the seizure syndrome.

Senol *et al.*[23] studied the effects of fatigue, demographic, and socioeconomic factors on QOL in patients with epilepsy. They used the Beck Depression Inventory and the QOLIE-89. They reported that frequency of seizures, depression, and fatigue were the strongest predictors of QOLIE-89 scores. In their study, however, patients were only evaluated for depression and for type of epileptic syndrome. Sandstrom *et al.*[24] assessed the relation of QOL and interictal mood disorders in epileptic patients using the Beck Depression Inventory, the SCID Screen Patient Questionnaire-Extended (a self-report tool), and the QOLIE-31 (the short form of the QOLIE-89). They found that major depressive disorder significantly decreases QOL. In our study, patients' psychiatric evaluations were carried out by a psychiatrist. A major limitation of the study by Sandstrom *et al.*[24] is that they used a self-report method, instead of a psychiatrist's evaluation. Despite this limitation, their study is important as it shows that depression significantly decreases QOL in patients with epilepsy.

In a study by Filho *et al.*[10] 170 MTLE and 100 JME patients were compared in terms of psychiatric comorbidity. They detected psychiatric disorders in 50% of MTLE patients and in 49% of JME patients. In the MTLE group, frequencies of the disorders were as follows: mood disorders, 25.8%; psychotic disorders, 15.8%; and anxiety disorders, 14.1%. In JME patients, psychiatric comorbid disorders were as follows: anxiety disorders, 23%; mood disorders, 19%; and psychotic disorders, 8%. They reported that psychosis was related to MTLE and that anxiety disorders were related to JME. They further suggested that affected brain regions in both epileptic syndromes were related to psychiatric disorders. In our study, we detected different frequencies of comorbidities in both patient groups. In our JME group, the most common psychiatric disorders were anxiety disorders (17%), followed by mood disorders (13%), and psychotic disorders (7%). In our MTLE group, the most observed psychiatric

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disorders were anxiety disorders (23%), followed by mood disorders (17%), psychotic disorders (13%), and somatoform disorders (3%). However, our results showed that there were no statistically significant differences in terms of type of psychiatric disorders, which reflects that psychiatric disorders might not be specific to the type of epileptic syndromes.

Several studies explored the association of the presence of psychiatric comorbidity, type of disorder, and intracranial lesion, and showed inconclusive results. A study in which Perini *et al.* assessed the role of brain dysfunction on etiology of psychiatric disorders[25] showed that 80% of temporal lobe epilepsy patients, 22% of JME patients, and 10% of diabetic patients had comorbid psychiatric disorders. Those authors suggested that the high prevalence of psychiatric disorders in temporal lobe epilepsy patients was related to limbic dysfunction rather than chronicity of the disease and the psychosocial results of the medical illness. Sperli *et al.*[26] studied the association of right hemisphere with psychiatric disorders in 217 patients who were evaluated for epilepsy surgery. They found that 39% of the patients had comorbid psychiatric disorders. Additionally, they showed that comorbidity was more frequent in patients with a right hemisphere lesion. Those authors suggested that lateralization of the focus was not related to a specific psychiatric disorder. In our study, we did not find an association between psychiatric comorbidity and focus lateralization in patients with MTLE. This might be due to the small sample size in the current study. Similar to the study by Sperli *et al.*[26] we did not detect any relation between clinical and demographic factors and comorbid psychiatric disorders.

Boro and Haut[27] explored medical comorbidity during epilepsy treatment and reported that communication between the patient and the doctor is limited to the problem of controlling the seizures. However, evaluating and treating comorbidities may substantially improve QOL. During the study, we observed that patients with psychiatric problems did not inform us of these complaints; this might have been due to a lack of awareness about their condition or their focus on their seizure treatment. As there are only a few tertiary epilepsy clinics in Turkey, there is limited time to examine epileptic patients and there are difficulties in communication.

The results of our study suggest that psychiatric comorbidity in epilepsy patients affects QOL independent of clinical and demographic factors. Our study showed that attention and concentration problems in JME patients with a mood disorder significantly affect QOL. Furthermore, QOL is affected in MTLE patients by psychotic disorder, social isolation, lack of energy, and fatigue.

Moreover, pain in MTLE patients with somatoform disorder significantly affects QOL. When compared to the studies in the USA and Norway,[19,21] QOL scores of Turkish patients with both epileptic syndromes had lower scores than US citizens and Norwegians. Because QOL scores were substantially lower than in developed countries, we propose that, in Turkey, this might be due to the stigma of 'epilepsy' rather than to factors related to JME, which is a benign epilepsy type with a good treatment response, or to MTLE, which is generally treatment-resistant.

Using the QOLIE-89 inventory, Mollaoğlu *et al.* (from Turkey) found that duration and frequency of illness affected QOL most and that patients' scores were lower than in the studies from developed countries.[20] Like our results, a study by Özkara *et al.*[28] in which the Washington Psychosocial Seizure Inventory was used, showed that QOL scores of Turkish epileptic patients were lower than those in developed countries.

Our study has some limitations. First, our clinic is a tertiary epilepsy center, which resulted in the inclusion of more treatment-resistant MTLE patients. Second, the small sample size probably limited the power of our study to detect associations among the groups. Third, some conditions, such as attention-deficit hyperactivity disorder, are not included in the SCID, thus our patients were not examined for these conditions.

The strengths of the current study are as follows: This is the first study carried out in Turkish epileptic patients exploring comorbid psychiatric disorders and their effects on QOL. Second, we used a healthy control group and assessed all participants with a structured-psychiatric interview, which was valid and reliable. Third, all of the interviews were done by experienced clinicians.

There are several studies reporting high frequencies of psychiatric comorbidities in chronic illnesses.[29,30] Experiencing a chronic disease may limit daily routines and decreased QOL may cause comorbid psychiatric disorder.[31] Our data suggest that it is important to detect and treat these comorbid conditions earlier to increase QOL and treatment success in epilepsy.

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DISCLOSURE STATEMENT

The authors declare that there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

D.H.E. contributed to the design of the study, collected the data, and wrote the manuscript. A.C.D. and S.B. contributed to conception and design of the study and revised the paper. A.A. evaluated the patients for psychiatric disorders. V.S. and M.O. contributed with analysis and interpretation of data. Y.A. contributed to the design of the study and supervised drafts and revisions of the article. All authors have read and approved the final manuscript.

REFERENCES

1. Devinsky O. Psychiatric comorbidity in patients with epilepsy: Implications for diagnosis and treatment. *Epilepsy Behav.* 2003; **4**: 2–10.
2. Swinkels WA, Kuyk J, van Dyck R, Spinhoven P. Psychiatric comorbidity in epilepsy. *Epilepsy Behav.* 2005; **7**: 37–50.
3. Stefansson SB, Olafsson E, Hauser WA. Psychiatric morbidity in epilepsy: A case controlled study of adults receiving disability benefits. *J. Neurol. Neurosurg. Psychiatry* 1998; **64**: 238–241.
4. Schiffer RB, Babigian HM. Behavioral disorders in multiple sclerosis, temporal lobe epilepsy, and amyotrophic lateral sclerosis: An epidemiologic study. *Arch. Neurol.* 1984; **41**: 1067–1069.
5. Collings JA. Epilepsy and well-being. *Soc. Sci. Med.* 1990; **31**: 165–170.
6. Monaco F, Cavanna A, Magli E *et al.* Obsessionality, obsessive–compulsive disorder, and temporal lobe epilepsy. *Epilepsy Behav.* 2005; **7**: 491–496.
7. Schmitz EB, Moriarty J, Costa DC, Ring HA, Ell PJ, Trimble MR. Psychiatric profiles and patterns of cerebral blood flow in focal epilepsy: Interactions between depression, obsessionality, and perfusion related to the laterality of the epilepsy. *J. Neurol. Neurosurg. Psychiatry* 1997; **62**: 458–463.
8. Swinkels WA, Boas WE, Kuyk J, van Dyck R, Spinhoven P. Interictal depression, personality traits and psychological dissociation in patients with temporal lobe epilepsy (TLE) and extra-TLE. *Epilepsia* 2006; **47**: 2092–2103.
9. Krishnamoorthy ES. Neuropsychiatric disorders in epilepsy: Epidemiology and classification. In: Trimble MR, Schmitz B (eds). *The Neuropsychiatry of Epilepsy*. Cambridge University Press, Cambridge, 2002; 5–17.
10. Filho GM, Rosa VP, Lin K, Caboclo LO, Sakamoto AC, Yacubian EM. Psychiatric comorbidity in epilepsy: A study comparing patients with mesial temporal sclerosis and juvenile myoclonic epilepsy. *Epilepsy Behav.* 2008; **13**: 196–201.
11. Manchanda R, Schaefer B, McLachlan R, Blume WT. Interictal psychiatric morbidity and focus of epilepsy in treatment-refractory patients admitted to an epilepsy unit. *Am. J. Psychiatry* 1992; **149**: 1096–1098.
12. Ertekin BA, Kulaksizoğlu IB, Ertekin E *et al.* A comparative study of obsessive- compulsive disorder and other psychiatric comorbidities in patients with temporal lobe epilepsy and idiopathic generalized epilepsy. *Epilepsy Behav.* 2009; **14**: 634–639.
13. Gaitatzis A, Trimble MR, Sander JW. The psychiatric comorbidity of epilepsy. *Acta Neurol. Scand.* 2004; **110**: 207–220.
14. Krishnamoorthy ES. Psychiatric issues in epilepsy. *Curr. Opin. Neurol.* 2001; **14**: 217–224.
15. Shetty T, Trimble MR. The Bear Fedio Inventory: Twenty years on. *J. Epilepsy* 1997; **10**: 254–262.
16. Giray S, Ozenli Y, Ozisik H, Karaca S, Aslaner U. Health-related quality of life of patients with epilepsy in Turkey. *J. Clin. Neurosci.* 2009; **16**: 1582–1587.
17. First MB, Gibbon M, Spitzer RL, Williams JBW, Benjamin LS. *Structured Clinical Interview for DSM-IV Axis II Personality Disorders*. American Psychiatric Press, Washington, DC, 1997.
18. Çorapçıoğlu A, Aydemir Ö, Yıldız M, Esen A, Köroğlu E. *Structured Clinical Interview for DSM-IV Axis I Personality Disorders*. Clinical Version. Physicians Publishing, Ankara, 1999 (in Turkish).
19. Devinsky O, Vickrey BG, Cramer J *et al.* Development of the quality of life in epilepsy inventory. *Epilepsia* 1995; **36**: 1089–1104.
20. Mollaoğlu M, Durna Z, Eskazan E. Quality of life of patients with epilepsy: Assessment with the use of the Quality of Life in Epilepsy Inventory-89 (QOLIE-89). *Epilepsy* 2001; **7**: 73–80 (in Turkish).
21. Stavem K, Bjornaes H, Lossius MI. Reliability and validity of a Norwegian version of the quality of life in epilepsy inventory (QOLIE-89). *Epilepsia* 2000; **41**: 91–97.
22. Baybas S, Dirican A. Quality of life in patients with epilepsy. In: Bora D, Yeni SN, Gürses C (eds). *Epilepsy*. Nobel Tıp Kitabevleri, Istanbul, 2008; 727–734 (in Turkish).
23. Senol V, Soyuer F, Arman F, Oztürk A. Influence of fatigue, depression, and demographic, socioeconomic, and clinical variables on quality of life of patients with epilepsy. *Epilepsy Behav.* 2007; **10**: 96–104.
24. Sandstrom SA, Bowman ES, Johnson CS, Salanova V. Interictal mood disorder and quality of life in active epilepsy. *Epilepsy Behav.* 2010; **17**: 199–204.

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25. Perini GI, Tosin C, Carraro C *et al.* Interictal mood and personality disorders in temporal lobe epilepsy and juvenile myoclonic epilepsy. *J. Neurol. Neurosurg. Psychiatry* 1996; **61**: 601–605.
26. Sperli F, Rentsch D, Despland PA *et al.* Psychiatric comorbidity in patients evaluated for chronic epilepsy: A differential role of the right hemisphere? *Eur. Neurol.* 2009; **61**: 350–357.
27. Boro A, Haut S. Medical comorbidities in the treatment of epilepsy. *Epilepsy Behav.* 2003; **4**: 2–12.
28. Özkara C, Atakli D, Gokalp P, Arpaci B, Baybas S. Psychosocial evaluation of epileptic patients with Washington Psychosocial Seizure Inventory. *Epilepsy* 1999; **5**: 124–130 (in Turkish).
29. Novy J, Castelao E, Preisig M *et al.* Psychiatric comorbidities and cardiovascular risk factors in people with lifetime history of epilepsy of an urban community. *Clin. Neurol. Neurosurg.* 2012; **114**: 26–30.
30. Wells KB, Golding JM, Burnam MA. Psychiatric disorder in a sample of the general population with and without chronic medical conditions. *Am. J. Psychiatry* 1988; **145**: 976–981.
31. Piazzini A, Canevini MP, Maggiori G, Canger R. Depression and anxiety in patients with epilepsy. *Epilepsy Behav.* 2001; **2**: 481–489.

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