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Impact of aggression, depression, and anxiety levels on quality of life in epilepsy patients

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Filiz Izci[1]
Ebru Fındıklı[2]
Mehmet Akif Camkurt[3]
Deniz Tuncel[4]
Merve Şahin[2]

[1]Department of Psychiatry, School of Medicine, Istanbul Bilim University, Istanbul, [2]Department of Psychiatry, School of Medicine, Sütçü İmam University, [3]Department of Psychiatry, Afşin State Hospitale, [4]Department of Neurology, School of Medicine, Sütçü İmam University, Kahramanmaraş, Turkey

Abstract: The aim of this study was to investigate the impact of aggression levels on the quality of life (QoL) of epilepsy patients. This study was conducted on 66 volunteer control subjects, who were matched by age and sex to the patient group, which consisted of 66 patients who applied to the Psychiatry and Neurology clinics for outpatient treatment, were aged between 18 years and 65 years, and were diagnosed with epilepsy. A sociodemographic and clinical data form designed by us was distributed among the study participants, along with Buss–Perry Aggression Scale, Beck Anxiety Scale, Beck Depression Scale, and the Quality of Life Scale Short Form (SF-36). Compared with the control group, the patient group displayed higher scores in all subgroups of Buss–Perry Aggression Scale subscales at a statistically significant level ($P<0.05$). As per the SF-36 questionnaire, physical functioning, physical role disability, general health perception, social functioning, mental health perception, and pain subscales were statistically lower in the patient group ($P<0.05$). Significant links between Beck Depression Scale and Beck Anxiety Scale levels, as well as some subscales of QoL and aggression levels, were also determined. In conclusion, epilepsy patients experienced impaired QoL compared with the healthy control group and their QoL was further impaired due to increased levels of anxiety, depression, and aggression.

Keywords: aggression, depression, anxiety, quality of life, epilepsy

Introduction

Psychiatric disorders are more frequently seen in epilepsy patients compared with the general population. These psychiatric disorders most commonly include mood disorders, notably depression, which are followed by anxiety disorders, psychosis, and personality disorders.[1–3] Compared with healthy control subjects, epilepsy patients have been reported to have behavioral changes characterized by bouts of aggression such as hostility, temper tantrums, violent crimes, and murder.[4] Besides these signs, they display personality characteristics such as impatience, indiscipline, irresponsibility, fluctuations in mood, increased impulsive behavior, and disorders in interpersonal relations.[5,6]

Epilepsy patients may experience impaired quality of life (QoL) for a variety of reasons, including seizure-driven accidents, increased number of physical illnesses, psychological problems such as anxiety and depression, decrease in self-esteem, desperation, aggressiveness, sexual problems, diminished educational success, and unemployment.[7] One conducted study have shown that epilepsy leads to the development of dependency and impairment of social functions. As a result, young adults suffer from impairments in developing healthy personality perception, building up successful social relations, and gaining autonomy.[8] At advancing ages, this manifests itself in a form of behavioral problems such as depression, feelings of loneliness,

Correspondence: Filiz Izci
Department of Psychiatry, School of Medicine, Istanbul Bilim University, Abide-i Hürriyet Caddesi No 164, Sisli, Istanbul, Turkey
Tel +90 50 5450 3013
Email filizizci@yahoo.com

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anxiety and aggression, and impulsivity. Many studies report that epileptic patients are confronted by psychosocial problems, which often give rise to depression, anxiety, and lower self-esteem.[9,10]

Mood disorders with anxiety and depressive symptoms are observed in >50%–60% of patients with epilepsy. While depressive symptoms are in the foreground, the relationship between epilepsy and anxiety is in the background. However, anxiety is considered one of the important factors affecting the QoL.[11] Epilepsy patients may demonstrate interictal, ictal, or postictal aggressive behavior.[12] Normally, ictal aggressive behavior is not a targeted but a resistive stereotyped nature, and it more widely stems from the frontal or temporal regions. More frequently, aggressive behavior takes place during the postictal period.[13,14] Generally, postictal aggression occurs while the patient is in a state of confusion; whenever one tries to hold down the patient, the patient resorts to resistive violence.[13] In a study conducted in Italy, aggressive behavior in patients with epilepsy was different from that of the normal population. Factors such as age, sex, and psychiatric disorders have been shown to influence the level of aggression in this group of patients.[15] Psychiatric symptomatology in epilepsy can appear concurrently with the seizure disorder and improve or remit on the abolition of epileptic activity.[16] In epilepsy patients, impulsive behavioral changes such as aggression may easily bring into the forefront psychiatric symptoms such as anxiety and depression. Studies show that epilepsy patients have a lower QoL compared with the general population. Psychiatric and cognitive disorders have an important place among the factors giving rise to impaired QoL in epilepsy patients.[7] We aim to determine the impact of the coexistence of aggression, anxiety, and depression on the QoL of epilepsy patients.

Methods

Participants

This study was conducted with 66 patients aged between 18 years and 65 years who applied to the Psychiatry and Neurology clinics for outpatient treatment and were diagnosed with epilepsy, as well as 66 volunteer control subjects who were matched by age and sex to the patient group and whose written consent was obtained. In addition, patients with epilepsy were chosen from patients considered to have idiopathic epilepsy that was not due to any trauma, surgery, or organicity. Patients were grouped according to the shape of the focal or generalized seizure and pass, as follows: generalized tonic–clonic seizure (GTCS) group, partial seizure (PS) group, and both focal and generalized seizures (GTCS + PS) group. Also age- and sex-matched healthy control subjects who met the study criteria and were selected from hospital staff. Verbal and written informed consent was taken from the patient and control group. The study was started after the approval of Ethics Committee of Kahramanmaraş Sütçü İmam University, Faculty of Medicine was granted.

Data collection

The inclusion criteria were that the participants had to be aged between 18 years and 65 years, literate, willing to take part in the study, and having been followed up with a diagnosis of epilepsy for at least 1 year, with a minimum stable period of 6 months.

According to the exclusion criteria, patients who had any of the following disorders according to the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, text revision (*DSM-IV-TR*) diagnosis criteria were excluded from the study: mental retardation, disorders associated with alcohol-substance use, schizophrenia or other psychotic disorders, dementia, or any other cognitive impairment. Noneligible patients also included those who were detected to have neurological diseases with specific personal characteristics such as migraines, multiple sclerosis, and Parkinson's disease, those who had systemic diseases leading to cognitive impairment, those who had an apparent chronic disease that might damage general medical condition (notably thyroid diseases, hypertension history, cardiac diseases, pheochromocytoma history, diabetes history), those who had been using drugs perpetually due to an apparently chronic condition, and those who smoked.

On the other hand, the control group included volunteers who agreed to take part in the study, were literate and healthy both physically and mentally, and did not use drugs, alcohol, or any other substances.

Measures

Sociodemographic and clinical data forms were distributed among the patient and control groups that we designed by taking into consideration the goals of the study and in line with the information derived from clinical experience and literature review, as well as other forms such as Buss–Perry Aggression Scale (Bpas), Beck Anxiety Scale (BAS), Beck Depression Scale (BDS), and the Quality of Life Scale Short Form (SF-36).

Scales used

Patient follow-up form (sociodemographic and clinical data collection form): Having been filled in by a physician, this form included the questions relating to age, sex, marital status, educational background, working status, level

of income, smoking, alcohol and drug use, and the medical history of the patient and his/her close relatives. *DSM-IV* Clinical Interview Form – Clinical Version Structured for Axis Diagnoses (SCID-I/CV): SCID-I is a clinical interview form developed by First et al[17] in 1997 for *DSM-IV* Axis I disorders. A validity and reliability study for this form has already been conducted for Turkey.[18] BAS: This scale was developed by Beck et al[19] in 1988 in response to the need for a scale that is able to distinguish anxiety from depression. It measures the intensity of anxiety symptoms experienced by individuals. It also interrogates subjective anxiety and bodily symptoms. It consists of 21 items, is scored from 0 to 3 on the basis of Likert scaling, and is filled in by the patient. Total score ranges from 0 to 63. Higher total score indicates the intensity of anxiety. Validity and reliability study for Turkey was performed by Ulusoy et al.[20] BDS: This scale, created by Beck[21] in 1961, is a self-report inventory to measure emotional, cognitive, somatic, and motivational components. This scale is composed of 21 items, two of which are dedicated to emotions, eleven to cognitions, two to behaviors, five to somatic indications, and one to interpersonal indications. It consists of 21 questions in total, each answer being scored on a scale value of 0, 1, 2, and 3, to obtain a score ranging from 0 to 63. On the basis of total scores, 0–9 indicates no/minimal depression, 10–18 indicates mild depression, 19–29 indicates moderate depression, and 30–63 indicates severe depression. Used to detect the intensity of depressions, BDS was tested for its suitability to Turkish society by a validity and reliability study conducted by Hisli.[22] Bpas: In order to determine the aggression levels of the patients included in the study, Aggression Questionnaire developed by Buss and Perry[23] was used. Originally created in 1992 with four fundamental components, this questionnaire form was subsequently revised by Buss and Warren,[24] who increased the number of items to 5 by adding indirect aggression. This scale was adapted into Turkish by Can.[25] This scale consists of five items: physical aggression, verbal aggression, anger, hostility, and indirect aggression. Respondents provide five-rating Likert-type answers to 34 items in total: 1) extremely uncharacteristic of me; 2) somewhat uncharacteristic of me; 3) neither uncharacteristic nor characteristic of me; 4) somewhat characteristic of me; and; 5) extremely characteristic of me.[24] Scores obtained from the scale are usually evaluated by taking into account each component separately. A high score from any subitem of the scale indicates that an individual has aggressive behavior to that factor.[25] SF-36: This form is designed to measure QoL among those with physical disease and psychiatric disorder, as well as among healthy subjects. The form consists of 36 items and investigates eight dimensions of health: physical functioning, emotional role functioning, physical role functioning, social role functioning, mental health, vitality, bodily pain, and general health perceptions. As there is no standard total score, scores from eight sections are summed up.[26] A validity and reliability study of SF-36 for Turkey has not yet been conducted.[27]

Statistical analysis

The software SPSS (SPSS Inc., Chicago, IL, USA) for Windows 18.0 was employed to assess raw data. Correlations between categorical variables were evaluated by using the chi-square test. After homogeneity and normal distribution of the groups were tested by Kolmogorov–Smirnov/Shapiro–Wilk tests, the Student's *t*-test was applied to analyze the data with normal distribution, while nonnormally distributed data were analyzed by using the Mann–Whitney *U*-test. In order to evaluate the links between groups in multiple group analysis, one-way analysis of variance was employed along with the post-hoc Tukey's test. While comparing groups separately by using the Mann–Whitney *U*-test for nonnormally distributed data, Bonferroni adjustment was applied. As the number of groups was 3, $P<0.017$ was accepted as significant in multiple group comparisons for nonnormally distributed data. Over the course of correlation analyses, Pearson's test was used for normally distributed data, whereas Spearman's correlation test was used for nonnormally distributed data.

Results

This study included 66 patients who were diagnosed with epilepsy and satisfied inclusion criteria, as well as 66 healthy control subjects who matched the patient group in terms of age and sex. Of the patient group, 54% were females (n=35) and 46% were males (n=31). The average age of the patient group was 33.39±12.51 years, and the average age of the control group was 30.74±5.76 years. No statistically significant difference was identified between the patient group and the control group in terms of sociodemographic attributes, except education levels ($P>0.05$). Of the patient group, 53.3% (n=35) were epilepsy patients who were diagnosed with GTCS, while 46.9% were epilepsy patients (n=31) who were diagnosed with PS. Seizure frequency (number of seizures/month) for GTCS, PS, and GTCS + PS patients was 0.40, 1.0, and 0.67, respectively (Table 1).

When the average value of Bpas subscale scores for the patient groups was compared with those for the control group, the average scores for Bpas-Physical Aggression and Bpas-Verbal Aggression were statistically significantly higher among GTCS, PS, and GTCS + PS patient groups ($P<0.05$).

Table 1 Sociodemographic characteristics of patient groups and control group

Patient groups and control group	GTCS + PS (1) (n=66)	GTCS (2) (n=35)	PS (3) (n=31)	Control (4) (n=66)	Comparison between groups	*P*-value
Age (mean ± SD), years	33.39±12.51	34.91±14.05	31.68±10.46	30.74±5.76	1–4	0.484*
Sex, n (%)						
Male	31 (46)	11 (31.4)	20 (64.5)	26 (39.4)	1–4	0.951*
Female	35 (54)	24 (68.5)	11 (35.5)	40 (60.6)		
Place of residence, n (%)						
Village	5 (7.6)	1 (2.9)	4 (12.9)	5 (7.6)	1–4	0.851*
Town	8 (12.1)	6 (17.1)	2 (6.5)	6 (9.1)		
Country	53 (80.3)	28 (80)	25 (80.6)	55 (83.3)		
TI (mean ± SD)	12.06±8.36	13.28±11.26	15.45±12.86			
SF	0.67	0.4	1.0			

Note: *$P>0.05$. Values in parenthesis in column titles represent the group number.
Abbreviations: GTCS, generalized tonic–clonic seizure; PS, partial seizure; SF, seizure frequency; TI, term of illness; SD, standard deviation.

On the other hand, the average scores for Bpas-Anger subscale were high among GTCS + PS and GTCS patient groups at a statistically significant level ($P<0.05$). Average scores for Bpas-Hostility subscale were statistically significantly higher among GTCS and PS patient groups ($P<0.05$) (Table 2).

As a result of the comparison by scores of the BAS and BDS scales among patient groups and the control group, it was observed that the BDS and BAS scores were statistically significantly higher among GTCS, PS, and GTCS + PS patient groups compared with the control group ($P<0.05$) (Table 2).

Table 2 Average scores for BAS, BDS, and Bpas among patient groups and control group

Patient groups and control group	Total patients (1) n=66 (Mean ± SD)	GTCS (2) n=35 (Mean ± SD)	PS (3) n=31 (Mean ± SD)	Control (4) n=66 (Mean ± SD)	Comparison between groups	*P*-value	z
Bpas-Physical Aggression	2.73±0.96	2.73±1.08	2.73±0.82	2.23±0.79	1–4	0.003*	2.955
					2–4	0.017*	2.382
					3–4	0.015*	2.444
					2–3	0.995	0.006
Bpas-Anger	2.27±0.69	2.32±0.77	2.21±0.59	1.93±0.61	1–4	0.003*	3.015
					2–4	0.012*	
					3–4	0.123*	
					2–3	0.751	
Bpas-Hostility	3.26±1.22	3.20±1.48	3.32±0.87	2.60±0.99	1–4	0.001*	3.378
					2–4	0.031	
					3–4	0.010*	
					2–3	0.904	
Bpas-Verbal Aggression	2.73±1.34	2.78±1.48	2.68±1.18	1.85±0.75	1–4	0.001*	3.882
					2–4	0.003*	2.966
					3–4	0.001*	3.389
					2–3	0.882	0.148
BDS	22.7±15.93	20.91±15.43	24.68±16.50	10.241±1.10	1–4	0.001*	5.2
					2–4	0.001*	
					3–4	0.001*	
					2–3	0.512	
BAS	21.18±14.60	21.37±13.08	20.971±6.36	10.891±1.37	1–4	0.001*	4.516
					2–4	0.001*	
					3–4	0.002*	
					2–3	0.991	

Notes: To compare groups, $P<0.05$ was accepted as significant from 1 to 4, whereas $P<0.017$ was accepted as significant after Bonferroni adjustment for 2–3, 2–4, and 3–4 comparisons. Values in parenthesis in column titles represent the group number. *$P<0.005$.
Abbreviations: GTCS, generalized tonic–clonic seizure; PS, partial seizure; Bpas-Physical Aggression, Buss–Perry Aggression-Physical Aggression Subscale; Bpas-Anger, Buss–Perry Aggression-Anger Subscale; Bpas-Hostility, Buss–Perry Aggression-Hostility Subscale; Bpas-Verbal Aggression, Buss–Perry Aggression-Verbal Aggression Subscale; BAS, Beck Anxiety Scale; BDS, Beck Depression Scale; SD, standard deviation.

With regard to the scores from the SF-36 questionnaires distributed among the patient groups and control group, scores for SF-36 P-Func subscale were statistically significantly lower among GTCS + PS and GTCS groups compared with the control group ($P<0.05$). Scores for SF-36 Pain, P-Role, G-Health, and M-Health subscales were statistically significantly lower among GTCS + PS, GTCS, and PS groups compared with the control group ($P<0.05$). Scores for SF-36 S-Func subscale were statistically significantly lower among GTCS + PS groups compared with the control group ($P<0.05$). Finally, scores for SF-36 E-Role subscale were statistically significantly lower among PS groups compared with the control group ($P<0.05$) (Table 3).

A positive correlation could be seen between BDS and BAS scores and Bpas subscale scores. In the scope of SF-36 QoL scale, a negative correlation was identified between P-Func subscale and Bpas-Hostility and Bpas-Verbal Aggression subscales, whereas P-Role sub-scale was detected to have been negatively correlated with all subscales of Bpas. A negative correlation was also present between Pain subscale and Bpas-Physical Aggression subscale, while S-Func subscale was negatively correlated with Bpas-Physical Aggression and Bpas-Anger subscales. M-Health was also negatively correlated with all subscales of Bpas (Table 4).

According to the correlation analysis between BDS subscale scores and SF-36 subscale scores, a negative correlation was also seen with all subscales of SF-36. Similarly, the correlation analysis between BAS subscale scores and SF-36 subscale scores revealed a negative correlation with all subscales of SF-36 (Table 5).

Table 3 SF-36 scores of patient groups and control group

Patient groups and control group	GTCS + PS (1) (Mean ± SD)	GTCS (2) (Mean ± SD)	PS (3) (Mean ± SD)	Control (4) (Mean ± SD)	Comparison between groups	*P*-value	z
P-Func	24.89±4.62	24.37±4.70	25.48±4.54	26.68±4.21	1–4	0.004*	2.868
					2–4	0.004*	2.289
					3–4	0.081	1.744
					2–3	0.244	1.164
Pain	7.37±2.84	7.58±2.83	7.14±2.88	9.04±1.95	1–4	0.001*	3.359
					2–4	0.010*	2.581
					3–4	0.001*	3.222
					2–3	0.561	0.581
P-Role	5.66±1.59	5.29±1.64	5.87±1.50	6.76±1.60	1–4	0.001*	4.329
					2–4	0.001*	4.399
					3–4	0.008*	2.664
					2–3	0.096	1.666
G-Health	13.79±4.89	14.30±5.47	13.22±4.15	17.91±2.97	1–4	0.001*	4.971
					2–4	0.002*	3.145
					3–4	0.001*	5.042
					2–3	0.442	0.769
Vitality	14.18±4.33	14.57±4.43	13.74±4.25	15.63±3.23	1–4	0.086	1.717
					2–4	0.519	0.645
					3–4	0.26	2.222
					2–3	0.37	0.897
S-Func	6.71±2.06	6.66±1.91	6.77±2.25	7.56±1.63	1–4	0.003*	2.922
					2–4	0.006	2.775
					3–4	0.049	1.966
					2–3	0.466	0.728
E-Role	4.32±1.03	4.37±1.09	4.26±0.96	4.83±1.09	1–4	0.006	2.279
					2–4	0.045	2.003
					3–4	0.013*	2.49
					2–3	0.763	0.301
M-Health	18.56±6.27	18.71±6.57	18.39±6.01	25.00±3.60	1–4	0.001*	6.575
					2–4	0.001*	5.358
					3–4	0.001*	5.389
					2–3	0.575	560

Notes: To compare groups, $P<0.05$ was accepted as significant from 1 to 4, whereas $P<0.017$ was accepted as significant after Bonferroni adjustment for 2–3, 2–4, and 3–4 comparisons. SF-36 (Quality of Life Scale) Subscale: P-Func (physical functionality), P-Role (physical role difficulty), G-Health (general health perceptions), S-Func (social functionality), E-Role (emotional role difficulty), M-Health (mental health). Values in parenthesis in column titles represent the group number. *$P<0.005$.
Abbreviations: GTCS, generalized tonic–clonic seizure; PS, partial seizure; SF-36, Quality of Life Scale Short Form; SD, standard deviation.

Table 4 Correlation levels between BDS, BAS, SF-36 subscales, and Bpas subscales

Bpas subscale scores	Bpas-Physical Aggression	Bpas-Verbal Aggression	Bpas-Anger	Bpas-Hostility
BDS				
r	0.236	0.156	0.159	0.308
P	0.007*	0.076	0.070	0.001*
BAS				
r	0.326	0.422	0.374	0.348
P	0.001*	0.001*	0.001*	0.001*
P-Func				
r	0.035	−0.175	−0.104	−0.224
P	0.689	0.045*	0.237	0.010*
P-Role				
r	−0.180	−0.307	−0.257	−0.316
P	0.039*	0.001*	0.003*	0.001*
S-Func				
r	−0.234	−0.163	−0.183	−0.158
P	0.007*	0.061	0.036*	0.071
M-Health				
r	−0.286	−0.340	−0.311	−0.309
P	0.001*	0.001*	0.001*	0.001*

Notes: *$P<0.05$; *r*, correlation factor. SF-36 (Quality of Life Scale) Subscales: P-Func (physical functionality), P-Role (physical role difficulty), G-Health (general health perceptions), S-Func (social functionality), E-Role (emotional role difficulty), M-Health (mental health).

Abbreviations: BAS, Beck Anxiety Scale; BDS, Beck Depression Scale; Bpas-Physical Aggression, Buss–Perry Aggression-Physical Aggression Subscales; Bpas-Anger, Buss–Perry Aggression-Anger Subscale; Bpas-Hostility, Buss–Perry Aggression-Hostility Subscale; Bpas-Verbal Aggression, Buss–Perry Aggression-Verbal Aggression Subscale; SF-36, Quality of Life Scale Short Form.

Discussion

Epilepsy is a chronic course disease, affecting QoL and posing a greater risk in terms of psychopathology compared with the general population. One of the studies on this issue found that epilepsy patients are four times more likely to develop psychiatric disease than the general population.[28] Another study found a psychiatric comorbidity requiring treatment at the rate of 29%.[29] A meta-analysis of 64 studies performed on the relationship between general psychopathology and psychosis, aggression, sexual dysfunction, personality changes, and affective disorders among epilepsy patients showed that psychopathology risk in the epilepsy group was higher compared with the healthy control group.[30] A psychiatric characterization of 666 epilepsy patients indicated that 51% of them were normal, 19% were anxious, 11% were depressive, 7% were aggressive, 6% were obsessive, and 6% had severe affective disorders.[31] In another study in which psychiatric comorbidity was investigated among 6,320 patients, depression was detected to be the most frequently diagnosed disorder, followed by schizophrenia, bipolar disorder, anxiety disorder, substance abuse, and posttraumatic stress disorder, respectively.[32] In this study, anxiety, depression, and aggression levels of the patients were found to be significantly higher than those of the control group patients. Verbal aggression, physical aggression, anger, and hostility subscale scores were significantly higher in patients with epilepsy.

Depressive disorder is one of the most frequent psychiatric disorders among epileptic patients.[33] The possibility of an epilepsy patient suffering a major depressive episode throughout his/her life was found to be between 3.7% and 6.7%.[34] In addition to this, depression comorbidity among epilepsy cases was calculated as 43%,[35] and depression was reported to be more common among epileptics than with members of the control group.[36] On the other hand, anxiety in epilepsy patients may develop in the form of clinically generalized anxiety disorder, phobia, panic disorder, or obsessive–compulsive disorder.[37] Patients generally feel frightened and anxious due to potential death and/or brain damage that may be caused by seizure.[38] Anxiety among epileptic patients may manifest itself in the shape of simple PS (aura), psychological reaction as a premonition, a postictal condition, an interictal behavior, or a panic attack.[39] Studies conducted in Turkey have found depression and aggression scores greater among epilepsy cases compared with the control group.[40,41] According to a matched longitudinal cohort study, the higher rate of occurrence of depression was associated with epilepsy. Such an observation may bring forward the presence of the widely seen underlying pathophysiological mechanisms of epilepsy and depression.[42] Several brain areas such as the

Table 5 Results of correlation tests performed between BDS and BAS subscale scores and SF-36 subscale scores

SF-36 subscale scores	P-Func	P-Role	Pain	G-Health	Vitality	S-Func	E-Role	M-Health
BDS								
r	−0.382	−0.219	−0.207	−0.532	−0.396	−0.315	−0.21	−0.438
P	0.000*	0.012*	0.017*	0.000*	0.000*	0.000*	0.016*	0.000*
BAS								
r	−0.345	−0.379	−0.123	−0.358	−0.167	−0.182	−0.186	−0.419
P	0.000*	0.000*	0.159	0.000*	0.056	0.037*	0.033*	0.000*

Notes: *$P<0.05$; *r*, correlation factor. SF-36 (Quality of Life Scale) Subscale: P-Func (physical functionality), P-Role (physical role difficulty), G-Health (general health perceptions), S-Func (social functionality), E-Role (emotional role difficulty), M-Health (mental health).

Abbreviations: SF-36, Quality of Life Scale Short Form; BDS, Beck Depression Scale; BAS, Beck Anxiety Scale.

frontal, temporal, and limbic regions are associated with the biological pathogenesis of depression in people with epilepsy (PWE) (comorbid depression and anxiety disorders in epilepsy patients). It was also suggested that structural abnormalities, monoamine pathways, cerebral glucose metabolism, the hypothalamic–pituitary–adrenal axis, and interleukin-1b led to the pathogenesis of depression in PWE. The anatomical structures amygdala and hippocampus are of importance concerning anxiety, and γ-aminobutyric acid and serotonin are closely correlated with its pathogenesis. One study found that 9%–37% of PWE suffered from depression and 11%–25% suffered from anxiety, which are higher proportions than those found in people without epilepsy. These rates of depression and anxiety were close to that of drug refractory epilepsy in a long-term population-based study.[43] Similar mechanisms underlie anxiety symptoms and epilepsy, in that both involve neurons discharging excitatory currents.[44] Along similar lines with the existing literature, our patient group displayed significantly higher depression and anxiety scores.

Epileptic patients may demonstrate emotional changes such as shifts in affection, addiction, depressive disorder, and paranoia, as well as behavioral changes such as temper tantrums and aggression.[45] Aggressiveness related to epilepsy has been well described in the literature for more than a century. These patients share several characteristics in common: broadly speaking, younger men with a long history of drug-resistant epilepsy and with a lower level of intelligence than average in the general population. Violent acts have a postictal nature, are normally followed by a cluster of seizures, and have an abrupt onset that is associated with stressful situations and alcohol abuse.[46] Epilepsy and violent behavior have long been regarded as similar because of their episodic or impulsive natures.[47] Violent behavior among patients with epilepsy can be categorized into periictal violence (preictal, ictal, and postictal), which occurs around the time of a seizure attack, and interictal violence, which has less of a temporal relationship with seizure attacks.[48] The prevalence of violence among patients with epilepsy may change depending on the definition of violent behavior, epilepsy subtypes, and the origin of the study population.[49] For instance, temporal lobe epilepsy had been reported to be related to a high rate of ~7% of violent acts.[31] Low intelligence has been considered one of the major risk factors of violence among epilepsy patients.[50] Another possible explanation is that structural brain abnormalities may give rise to epilepsy, intellectual disability, and impulse control dysfunction, and any of these triggers an overall disability.[51]

Our study, on the other hand, propounded the fact that depression levels affect physical aggression and hostility scores, while anxiety levels increased verbal and physical aggression, anger, and hostility scores. Moreover, functionality was detected to have been affected in most of the QoL subscales as the level of aggression was stepped up. Physical functioning was found to be negatively affected in patients with higher hostility and verbal aggression levels, and social functioning was found to be negatively affected in patients with higher physical aggression and anger scores. Likewise, this study showed that levels of aggression adversely affect mental health and functioning. So, we can say that aggression directly affects physical, social, and mental health.

The QoL has a tendency to deteriorate more rapidly among PWE than among the general population, due to both seizures and concurrent medical, psychiatric, and psychosocial problems.[52] More specifically, several recent studies have shown that depression and anxiety symptoms were the principal determinants of QoL. A study of patients with temporal lobe epilepsy in the United States showed that interictal anxiety and depressive symptoms were more responsible for the variance in QoL than to seizure frequency, severity, or chronicity.[53] In another study, comorbidity, particularly depression and side effects of antiepileptic drugs, was seen as an important predictor of low QoL factors. In addition, the most important factor affecting the QoL in patients with epilepsy is stated to be the duration of the disease.[54] Coexisting depression and anxiety seemed to pose a greater risk to QoL than those with only one of these conditions.[55] On the other hand, this study revealed that according to the correlation levels established between depression and anxiety levels and QoL subscales, depression and anxiety levels negatively affect QoL.

Conclusion

According to this study, anxiety, depression, and aggression levels of epilepsy patients were found to be significantly higher than those of the control group. It was revealed that as the level of depression and anxiety increased, all subscales of QoL were negatively affected. In the patient group, according to the SF-36 forms, physical functioning, physical role disability, general health perception, social functioning, mental role disability, mental health perception, and pain subscales were statistically lower. It was also detected that as BDS and BAS levels increased, aggression levels rose, which in turn significantly impaired certain subscales of QoL.

In the light of the results obtained from both this study and the existing literature, it can be concluded that epilepsy

patients have an impaired QoL compared with the healthy control group and that their QoL is further impaired by the increased levels of anxiety, depression, and aggression. Furthermore, it was found that the depression and anxiety levels had a considerable impact on aggression levels, which in turn significantly deteriorated the QoL of epilepsy patients in the areas of physical and social functioning, mental health, and general health. In the management of epilepsy disease, sufficient attention should be paid to the fact that personality characteristics and psychiatric symptoms may affect QoL and functioning levels of epilepsy patients over the course of treatment and follow-up stages.

Limitations

This study has several limitations, including the insufficient number of samples and the fact that the scales were filled in by the patients. Also, during patient selection, chronic diseases were excluded but drugs that may affect aggression, cognition, and, therefore, QoL were not detailed, which may be one of the other limitations of our study.

Disclosure

The authors report no conflicts of interest in this work.

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