

Factors Associated with Generic and Disease-specific Quality of Life in Epilepsy

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Abstract

Objective To investigate the association between quality of life (QOL) and sociodemographic factors, clinical seizure factors, depression and anxiety in patients suffering from epilepsy.

Methods We examined 141 consecutive patients with epilepsy (mean age 25.8±9.6, 61.7% male). All patients completed the Self-Rating Depression Scale, Self-Rating Anxiety Scale, WHOQOL-BREF and QOLIE-31(Chinese version). Multiple linear regression analyses were applied to investigate factors impact on QOL.

Results The results revealed that scores on two domains of the WHOQOL-BREF (i.e., physical and psychological domains, $P < 0.05$) were significantly lower in the epilepsy group compared with the control group. Multiple regression analyses showed that anxiety, depression and course explained approximately 40% of the variance in patients' QOL. Anxiety was consistently the strongest predictor of lower scores on almost all QOL domains. In addition, the severity of depressive symptoms was significantly associated with lower scores across many QOL domains.

Conclusion Our findings suggest that QOLIE scores might be substantially affected by the presence and severity of anxiety symptoms and, to a lesser degree, of depressive symptoms and prolonged course of illness. In contrast, clinical seizure variables had a weaker association with QOL. Healthcare professionals should be aware of the significance of patients' emotional state and of the role it plays in their QOL.

Key words: Epilepsy; Quality of life; Anxiety; Depression

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INTRODUCTION

As a recurrent chronic disease, epilepsy is difficult to control in approximately 20% of patients, even when standard therapy is applied^[1]. The ultimate goal of epilepsy treatment should be to enable patients to live without the medical and/or psychosocial complications of seizures, and thereby minimize the adverse effects of epilepsy on their overall quality of life (QOL)^[2]. Many patients suffering

from epilepsy also experience mood problems, which can greatly impact QOL. Seizures are the most obvious component of epilepsy, but are not the only factor involved in the illness. Although depression and anxiety may have more of an impact on QOL in patients with refractory epilepsy than seizures, mood disorders in many epileptic patients do not currently receive adequate diagnosis and treatment^[3].

Previous studies in Western populations reported that the total incidence of depression was

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44%-63% in epilepsy^[4-5], and anxiety, although with a lower incidence of 5%-32%, also has a far-reaching impact on QOL in epilepsy^[6]. In view of the great impact of mood problems on epileptic patients^[7], we investigated QOL and psychological well-being of patients with idiopathic epilepsy with generic and epilepsy-specific instruments, and studied the factors impacting on QOL in epilepsy, particularly focusing on mood problems. The purpose of this study was to identify psychosocial factors that impact on QOL in adults with epilepsy, seeking to produce results that will be helpful in the clinical treatment of epilepsy.

MATERIALS AND METHODS

Subjects

Participants in this study were outpatients with epilepsy from the Department of Neurology in our hospital. We recruited 141 subjects (all older than 16 years of age) between January 2003 and December 2007. All patients had experienced at least two seizures of any type in the past year. Data were obtained during patients' visits to the hospital. As our institute is a teaching hospital and provides specialist service to one province in the South of China, those may constitute a sample with more clinical and emotional problems than the general. We used the following exclusion criteria: 1) symptomatic epilepsy due to case history, electroencephalography and neuroimaging^[8]; 2) severe cognitive disabilities and a lack of verbal ability; 3) other chronic diseases that might affect QOL. The control group included 59 volunteers without any neurological symptoms or history of mental disorders.

Assessments

1. World Health Organization Quality of Life Measure-Abbreviated Version (WHOQOL-BREF).

The Chinese version of the WHOQOL-BREF (Ministry of Health, China, 1999)^[9], a widely used generic measure, was used to compare QOL between epileptic patients and the general population. The QOL-BREF comprises 26 items of four aspects, including physical, psychological, social relation and environment domains.

2. Quality of Life in Epilepsy-31(QOLIE-31)

The Quality of Life in Epilepsy-31 instrument is a self-administered questionnaire^[10]. This questionnaire contains 31 questions and seven subscales; each of

the subscales assesses a different domain of QOL: Seizure Worry (SW), Overall Quality of Life (OQOL), Emotional Well-Being (EW), Energy/Fatigue (E/F), Cognitive Function (CF), Medication Effects (ME), and Social Function (SF). We used a Chinese version of the QOLIE-31, which had been produced and certified by following established international translation principles, including a series of forward and backward translations and reconciliatory discussions involving English translators and epilepsy experts. The 20th item of driving restriction was altered to bicycle limitation in our study. Responses to QOLIE-31 scales yielded seven individual scores (per subscale) and a total score. The scores on each scale range from 1 to 100, and the total score is calculated by weighing and summing the subscale scores. Higher scores indicate better QOL^[10-11]. Cronbach's coefficient alpha of the overall instrument was 0.916, and those for the subscales ranged from 0.660 to 0.844, indicating satisfactory internal reliability.

3. Psychological well-being

Participants were interviewed with the Zung Self-Rating Depression Scale (SDS) and Zung Self-Rating Anxiety Scale (SAS). These self-rating questionnaires can be applied to any degree of education, and both consist of 20 items, each scored between 1 and 4. Norms in China include the following scores: mild depression (score from 53 to 62) and mild anxiety (50-60); moderate depression (63-72) and moderate anxiety (61-70); severe depression (>73) and severe anxiety (>70)^[12].

Data Analyses

Results were calculated as frequencies (%) and means \pm SD. Significant differences between groups were determined by a two-tailed Student's *t* test for two groups and ANOVA with Bonferroni's correction for multiple groups. The chi-square test was also used for data analyses. Correlations were determined using Spearman's correlation coefficient. A multiple stepwise regression was performed for the significant predictors of one or more dimensions of QOL. Scores on the QOLIE-31 scale (including total scores and seven subscale scores) served as the dependent variable. Independent variables included patient variables (education), seizure variables (age of onset of epilepsy, type of epilepsy, course of epilepsy, seizure frequency), antiepileptic drug (AED) variables (i.e. the number of AEDs used), and SAS and SDS scores. All variables found to be significant were entered into

the multivariate regression models as reported in previous studies^[13-14]. P-values less than 0.05 were considered statistically significant. All analyses were conducted with Statistical Package For The Social Science (SPSS), Version 11.0 for Windows.

Ethical Considerations

This study was approved by the research committee of Fujian Medical University, China. All participants gave written consent. Written information was given to all medical staff concerned.

RESULTS

Sociodemographic, Illness- and Family-related Data

Demographic, illness-related and family-related characteristics of epileptic patients are summarized in Table 1. The main AEDs in use included carbamazepine, sodium valproate and phenytoin sodium. None of the patients had received any anti-depressive or anti-anxiety medication. The control group consisted of 59 individuals without neurological or other complaints, with a mean age of 24.4±6.8, 59.3% males, educational level (primary school / middle school / university) 12 / 38 / 9, and marital status (single / married / divorced) of 35 / 24 / 0. The average income of the control group was similar to that of the patient group.

TABLE 1. Descriptive Characteristics of Patients with Epilepsy

Item	Epilepsy Patients (n=141)
Sex (male/female)	87/54
Age (year)	16-58
Educational Degree (Primary school/middle school/university)	30/95/16
Marital Status (single /married /divorced)	88/50/3
Duration of Seizures (month)	0.8-540 (P ₅₀ 56)
Age at Onset of Seizures (years)	14-55 (P ₅₀ 17.3)
Type of Seizure ^[8]	
Generalized	74 cases (52.5%)
Partial	43 cases (30.5%)
Other	24 cases (17%)
Number of AEDs Used	
0	20 cases (14.2%)
1	72 cases (51.1%)
≥2	49 cases (34.7%)

Note. Even monthly number of seizures in last three months (0/<1-4/≥4 times): 30/43/53/15 cases.

Quality of Life Scores

Physical and psychological scores of the epilepsy group were lower than in the control group, whereas the environmental score was higher (see Table 2). The scores of the epilepsy patients on the QOLIE-31 are listed in Table 3. The ratio of scores lower than 50 in QOLIE domains is also listed. The seizure worry domain had the lowest score, with 73.8% of patients exhibiting scores below 50 in this domain.

TABLE 2. Comparison between Epilepsy and Control Group on Scores of QOL-BREF

Item	Epilepsy (n =141)	Control (n =59)	t Value
Physiology	12.7±1.8	13.3±1.5	2.253*
Psychology	12.4±1.9	13.8±1.8	4.825*
Social relation	13.6±2.3	13.7±1.4	0.310
Environment	13.4±2.3	13.9±1.7	1.506

Note. *P <0.05.

TABLE 3. Epilepsy Group QOLIE-31 General Score and Scores on Each Dimension

Item	Epilepsy Group (n =141)	Ratio of Patients with Score below 50 (%)
Overall score	45.21±9.42	73.0
Seizure worry	42.67±10.53	73.8
Overall QOL	45.71±9.92	71.6
Emotional well-being	45.93±9.98	61.0
Energy/Fatigue	50.04±8.25	42.6
Cognition	47.52±8.71	60.3
Medication side-effects	44.60±9.14	67.4
Social	47.14±8.39	58.9

Emotional Well-being

No difference was found in SDS or SAS scores between males and females with epilepsy ($\chi^2=0.102$, $P=0.992$, $\chi^2=0.254$, $P=0.969$). The rate of anxiety problems among the patient group was 39.7%, and 57.4% of epilepsy patients experienced depressive emotions. The SDS and SAS scores in the patient group were higher than those in the control group ($P<0.001$), indicating a deterioration in emotional wellbeing in epilepsy patients (see Tables 4, 5).

TABLE 4. Comparison of SDS Scores between the Epilepsy and Control Groups

Group	SDS Scores	No Depression (male/female)	Mild Depression (male/female)	Moderate Depression (male/female)	Severe Depression (male/female)
Epilepsy (n =141)	52.86±10.79	60(39/21)	52(30/22)	24(15/9)	5(3/2)
Control (n =59)	38.45±7.85	52(23/29)	6(1/5)	1(0/1)	0
t value	10.537*				

Note. * $P < 0.05$.

TABLE 5. Comparison of SAS Scores between the Epilepsy and Control Groups

Group	SAS Scores	No Anxiety (male/female)	Mild Anxiety (male/female)	Moderate Anxiety (male/female)	Severe Anxiety (male/female)
Epilepsy (n =141)	47.25±9.72	85(53/32)	42(26/16)	10(6/4)	4(2/2)
Control (n =59)	36.69±8.37	55(23/32)	1(0/1)	3(1/2)	0
t value	7.285*				

Note. * $P < 0.05$.

SDS scores were significantly positively correlated with seizure frequency ($r=0.201, P=0.017$) and SAS scores were significantly negatively correlated with education level ($r=-0.233, P=0.005$). Bivariate analyses did not reveal any significant relationship between emotional scores and age of seizure onset, course, type of seizure and number of drugs.

Variables Associated with Quality of Life in Epilepsy

Multiple stepwise regression analyses were performed, with age of seizure onset, course, education level, seizure frequency, type of seizure, number of drugs, SDS score, and SAS score as independent variables, and QOLIE scores with general and subscales as dependent variables ($\alpha=$

0.05). All of the variance inflation factors were below 1.5 in the test of multicollinearity. The results are shown in Table 6.

Multiple regression analyses revealed that anxiety, depression and course explained approximately 40% of the variance of overall scores of QOL. Anxiety was consistently the strongest predictor of lower scores on all QOL domains, except for medication side-effects, which was related to none of the independent variables. Anxiety had a much stronger effect on QOL than depression. Some variables, including seizure onset, seizure frequency and number of drugs, could not be entered in the multiple regression equation.

TABLE 6. Multiple Regression of QOLIE Scores on Education, Age of Seizure Onset, Course, Type of Epilepsy, Seizure Frequency, Number of Drugs, and Scores on the SDS and on the SAS

Independent Variable	Seizure Worry	Overall QOL	Emotional Well-being	Energy/Fatigue	Cognition	Social	Overall Score
Education							
β	0.03	0.09	0.03	0.09	0.16*	0.10	0.13
Course							
β	-0.07	-0.16*	-0.12	-0.08	-0.19*	-0.14	-0.19**
Type of epilepsy							
β	-0.15*	0.01	0.00	-0.05	-0.11	-0.14	-0.13
SDS score							
β	-0.21*	-0.15	-0.28**	-0.25**	-0.04	-0.15	-0.20*
SAS score							
β	-0.25**	-0.43**	-0.35**	-0.34**	-0.42**	-0.43**	-0.48**
F value	10.50	16.42	32.45	25.91	15.78	31.57	30.29
p value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
R	0.43	0.44	0.57	0.52	0.51	0.43	0.63
R ²	0.19	0.19	0.32	0.27	0.26	0.19	0.40
Adjusted R ²	0.17	0.18	0.31	0.26	0.24	0.18	0.39

Note. No independent variable was significantly related to the QOL domain of medication side-effects.

* $P < 0.05$, ** $P < 0.01$.

DISCUSSION

Cramer and colleagues suggested that a score of 50 on the QOLIE-31 is equivalent to the mean level of QOL in epilepsy in an American context^[10]. The current study identified severe QOL impairment by averages of those unsatisfied scores for overall QOLIE and subscale scores. Scores of more than 50% of patients were lower than the mean level of 50 in most aspects (excluding Energy and Fatigue), with seizure worry exhibiting the highest ratio, 73.8%. These results indicate that patients suffering from epilepsy in China may have a substantially lower QOL than the general population. Therefore, a clear understanding of QOL issues is critical for effective treatment of epilepsy in China.

Compared with the control group, patients in the epilepsy group exhibited difficulties in the physiological and psychological domains. In the social and environmental domains, patients exhibited similar QOL, indicating that they received sufficient support from their surroundings and families.

Although epilepsy is characterized by episodic seizures, it exerts a significant ongoing psychological burden on patients and their families. Furthermore, epilepsy is associated with high rates of psychiatric comorbidity^[15]. A previous population-based survey demonstrated that 29% of epilepsy patients reported having experienced at least one episode of depression, compared with the prevalence of depressive episodes of 8.6% among healthy people, 13% among patients with diabetes, and 16% among people with asthma^[16]. The higher incidence in epilepsy may be related to the common pathophysiological basis of epilepsy and mood disorders. This association is supported by the application of antiepileptic drugs for mental disorders such as bipolar affective disorder and anxiety disorder^[17].

In the present study, 57.4% of patients suffered from depressive problems, which is above the prevalence reported by similar studies in other countries. This result may be related to social and cultural factors particular to China. It is possible that Chinese people are prone to depressive feelings because of a tendency toward reserved emotional expression. In addition, seizure frequency was positively correlated with depression among patients with epilepsy.

The present study suggests that anxiety symptoms exerted a much stronger impact on QOL

in epilepsy than depressive symptoms and seizures, although their prevalence was lower (39.7%). Patients who were anxious exhibited poorer scores in all QOL domains except the medication effects subscale. Anxious symptoms were negatively correlated with education level, indicating that anxiety in epilepsy may be aggravated by the misunderstanding of seizures and treatment. In addition, a previous study reported that the anxiety of family members regarding epilepsy is also significantly related to epilepsy patients' QOL^[18]. Therefore, education regarding medical knowledge may be an important way of improving QOL in China.

Although mood symptoms (depression and anxiety) are frequent psychiatric morbidities of epilepsy, they often go unrecognized and untreated. In a study by Kanner and colleagues, only one-third of 97 patients with partial epilepsy had been treated within 6 months from the onset of their depression, and 60% of them had been symptomatic for more than 1 year before any treatment was suggested^[3]. The current data suggest an even more severe problem. None of our patients had received treatment for mood disorders, despite the negative impact on their QOL. These findings highlight the importance of identifying mood disorders among epilepsy patients and providing appropriate treatment.

Patients with generalized seizures or both seizure types exhibited lower scores in seizure worry than those suffering from partial seizures. Beyond that, the results revealed no correlation between QOL scores and seizure frequency. Therefore, our results are in accord with the findings of Herman and Jacoby^[19], who reported that psychosocial factors explained most of the variance in QOL. Other researchers consider QOL as a subjective valuation directly concerning patients' life experience^[13].

One recent study reported that patients' perception of their health status varied with age and epilepsy chronicity^[20]. In the current study, a longer course of epilepsy was linked with a lower score in the cognition subscale and overall QOL. It has been reported that scores of general QOL and cognitive aspects decrease as the time after diagnosis increases, meaning that patients with chronic epilepsy exhibit more difficulties in adjustment compared with those with more recent diagnoses^[21]. These results suggest that more caution should be taken with patients with a prolonged course,

regarding cognitive impairment. One study revealed that attitudes towards epilepsy are negative among the general population, particularly in the contexts of marriage and employment^[22]. This finding may be linked to the additional problems associated with prolonged course of epilepsy.

Thus, although the presence of seizure may be the most obvious component of epilepsy, it is not the only important aspect of the disorder. This is reflected in the current results, showing that the percentage of variance in QOL scores uniquely explained by the severity or course of epilepsy was much lower than that explained by mood symptoms.

Several limitations of our study must be considered. The data presented were collected at a teaching hospital affiliated with one university in one province in the South of China. This may mean that the patients in our sample may have more severe medical problems and worse health compared with the general population of epilepsy sufferers. In addition, our data were collected in only one follow-up examination, which may neglect some important information regarding the impact of therapy on epilepsy. Nevertheless, our results offer new and valuable insights regarding QOL and mood disorders in a large group of epilepsy patients.

Our results confirmed that anxiety and depression have the strongest impact on QOL in patients with epilepsy. Scores on most QOL subscales exhibited a non-linear decrease as anxiety severity increased. The factors directly related to QOL among epilepsy patients were psychosocial factors rather than seizure type or severity.

In conclusion, the present results demonstrated that QOLIE was influenced by a combination of biomedical and psychosocial variables. In addition, our findings indicate that intervention in the emotional disorders accompanying epilepsy, including depression and anxiety, may improve QOLIE in addition to the control of epileptic seizures.

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